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ROTHE.

ROTHE, RICHARD (1799–1867), theologian, was born at Posen, January 28, 1799, of parents in a good position. After passing through the grammar schools of Stettin and Breslau, he studied theology in the universities of Heidelberg and Berlin (1817–20) under Daub, Schleiermacher, and Neander, the philosophers and historians Hegel, Creuzer, and Schlosser, exercising a considerable influence in shaping his thought. From 1820 to 1822 he was in the clerical seminary at Wittenberg, and spent the next year in private study under his father's roof at Breslau. In the autumn of 1823 he was appointed chaplain to the Prussian embassy in Rome, of which Baron Bunsen was the head. This post he exchanged in 1828 for a professorship in the Wittenberg seminary, and hence in 1837 he removed to Heidelberg as professor and director of a new clerical seminary; in 1849 he accepted an invitation to Bonn as professor and university preacher, but in 1854 he returned to Heidelberg as professor of theology and member of the Oberkirchenrath, a position he held until his death, August 20th, 1867. Rothe's mental and religious development was one of continuous progress. As a youth he was the subject of deep religious feeling, with a decided bent towards a supernatural mysticism; his chosen authors were those of the romantic school, and Novalis remained his life through a special favorite. In Berlin and Wittenberg he came under the influence of Pietism as represented by such men as Stier and Tholuck, though the latter pronounced him a "very modern Christian." He afterwards himself confessed that, though he had been a sincere, he was never a happy Pietist. In Rome, where he enjoyed the intimate friendship of Bunsen, and studied church history under the broadening influence of classical and ecclesiastical art, his mind broke loose from the straitened life and narrow views of Pietism and he learned to look at Christianity in its human and universalistic aspects. From that time he began to develop and work out his great idea, the inseparable relation of religion and morals, finding in the latter the necessary sphere and the realization of the idea of the former. He began then, and particularly after the revolution of July, 1830, likewise to give a more definite form to his peculiar view of the relations of church and state. In consequence of this enlargement of his ideas of the world, religion, morals, Christianity, the church and the state, Rothe gradually found himself out of harmony with the Pietistic thought and life of Wittenberg, and his removal to Heidelberg in 1837 and the publication of his first important work (*Anfänge der christlichen Kirche*) in that year coincide with the attainment of the principal theological positions with which his name is associated. During the middle period of his career (1837–61) he led the life of a scholastic recluse, taking no active public part in ecclesiastical affairs in any way. During the last six years of his life (1861–67), partly owing to his liberation from great domestic cares and partly to the special circumstances of the church in Baden, he came forward publicly and actively as the advocate of a free theology and of the PROTESTANTENVEREIN (*q.v.*). This important change in Rothe's practice was preceded by the publication of a valuable series of theological essays (in the *Studien und Kritiken* for 1860), afterwards published in a separate volume (*Zur Dogmatik*, Gotha, 1st ed. 1863, 2d ed. 1869), on revelation and inspiration more particularly. These essays were a very searching examination of the relation of revelation to Scripture, and provoked much hostile criticism in quarters previously friendly to Rothe, where the relation was usually treated as almost one of identity. In consequence of this publication, and his advocacy of the programme of the Protestantenverein, he was classed at the end of his life amongst the more decided theological liberals rather than with the moderate orthodox party, amongst whom so many of his personal friends were to be found.

Rothe was one of the most if not the most profound and influential of modern German theologians next to Schleiermacher. Like the latter, he combined with the keenest logical faculty an intensely religious spirit, while his philosophical tendencies were rather in sympathy with Hegel than Schleiermacher, and theosophic mysticism was more congenial to him than the abstractions of Spinoza, to whom Schleiermacher owed so much. He classed himself amongst the theosophists, and energetically claimed to be a convinced and happy supernaturalist in a scientific age. A peculiarity of his thought was its systematic completeness and consistency; aphoristic, unsystematic, timidly halting speculation was to him intolerable. Though his own system may seem to contain extremely doubtful or even fantastic elements, it is allowed by all that it is in its general outlines a noble massive whole, constructed by a profound, comprehensive, fearless, and logical mind. Another peculiarity of his thought was the realistic nature of his spiritualism; his abstractions are all real existences; his spiritual entities are real and corporeal; his truth is actual being. Hence Rothe, unlike Schleiermacher, lays great stress, for

instance, on the personality of God, on the reality of the worlds of good and evil spirits, and on the visible second coming of Christ. Hence his religious feeling and theological speculation demanded their realization in a kingdom of God coëxtensive with man's nature, terrestrial history, and human society; and thus his theological system became a *Theologische Ethik*. It is on the work published under this title that Rothe's permanent reputation as a theologian and ethical writer will rest. The first edition, in three volumes, was published in 1845–48, and remained twelve years out of print before the second (1867–71, in five volumes) appeared. It was the author's purpose to rewrite the whole, but he had completed the first two volumes only of the new edition when death overtook him. The remainder was reprinted from the first edition by Prof. Holtzmann, with the addition of some notes and emendations left by the author.

This work begins with a general sketch of the author's system of speculative theology in its two divisions, theology proper and cosmology, the latter falling into the two subdivisions of *Physik* (the world of nature) and *Ethik* (the world of spirit) It is the last subdivision with which the body of the work is occupied. After an analysis of the religious consciousness, which yields the doctrine of an absolute personal and spiritual God, Rothe proceeds to deduce from his idea of God the process and history of creative development, which is eternally proceeding and bringing forth, as its unending purpose, worlds of spirits, partially self-creative and sharing the absolute personality of the Creator. As a thorough-going evolutionist Rothe regards the natural man as the consummation of the development of physical nature, and obtains spirit as the personal attainment, with divine help, of those beings in whom the further creative process of moral development is carried on. His theory leaves the natural man, without hesitation, to be developed by the natural processes of animal evolution. The attainment of the higher stage of development is the moral and religious vocation of man; this higher stage is self-determination, the performance of every human function as a voluntary and intelligent agent, or as a person, having as its cosmical effect the subjection of all material to spiritual existences. This personal process of spiritualization is the continuation of the eternal divine work of creation. Thus the moral life and the religious life coincide, and when normal are identical; both have the same aim and are occupied with the same task, the accomplishment of the spiritualization of the world. "Piety, that it may become truth and reality, demands morality as its fulfilment, as the only concrete element in which the idea of fellowship with God is realized; morality, that it may find its perfect unfolding, requires the aid of piety, in the light of which alone it can comprehend its own idea in all its breadth and depth." Rothe follows Schleiermacher in dividing his ethical system into the three parts of the doctrine of moral ends (*Güterlehre*), or the products of moral action, the doctrine of virtue (*Tugendlehre*), or of the power producing moral good, and the doctrine of duty (*Pflichtenlehre*), or the specific form and manner in which that power obtains its results. The process of human development Rothe regards as necessarily taking an abnormal form and passing through the phase of sin. This abnormal condition necessitates a fresh creative act, that of salvation, which was, however, from the first part of the divine plan of development. As a preparation for this salvation supernatural revelation was required for the purifying and revivification of the religious consciousness, and the Saviour Himself had to appear in human history as a fresh miraculous creation, born of a woman but not begotten by a man. In consequence of His supernatural birth the Saviour, or the second Adam, was free from original sin. By His own moral and religious development He made possible a relation of perfect fellowship between God and man, which was the new and highest stage of the divine creation of mankind. This stage of development inaugurated by the Saviour is attained by means of His kingdom or the community of salvation, which is both moral and religious, and in the first instance and temporarily only religious—that is, a church. As men reach the full development of their nature, and appropriate the perfection of the Saviour, the separation between the religious and the moral life will vanish, and the Christian state, as the highest sphere of human life representing all human functions, will displace the church. "In proportion as the Saviour Christianizes the state by means of the church must the progressive completion of the structure of the church prove the cause of its abolition." The decline of the church is, therefore, not to be deplored, but recognized as the consequence of the independence and completeness of the Christian life. It is the third section of his work—the *Pflichtenlehre*—which is generally most highly valued, and where his full strength as an ethical thinker is displayed, without any mixture of theosophic speculation.

Since Rothe's death several volumes of his sermons and of his lectures (on dogmatics, the history of homiletics) and a collection of brief essays and religious meditations under the title of *Stille Stunden* (Wittenberg, 1872), have been published. See F. Nippold, *Richard Rothe, ein christliches Lebensbild* (2 vols., Wittenberg, 1873–74); Schenkel, "Zur Erinnerung an Dr. R. Rothe," in the *Allgemeine kirchliche Zeitschrift*, 1867–68; Holtzmann, "Richard Rothe," in the *Jahrbuch des Protestantenvereins*, 1869; Schwarz, *Zur Geschichte der neuesten Theologie* (4th ed., Leipsic, 1869, pp. 417–444); Pfleiderer, *Religionsphilosophie auf geschichtlicher Grundlage* (2d ed., Berlin, 1884, vol. i., pp. 611–615). (J. F. S.)

ROTHERHAM, a market-town and municipal borough in the West Riding of Yorkshire, is situated at the junction of the Rother with the Don navigation, on several railway lines, 5 miles northeast of Sheffield. The parish church of All Saints, occupying the site of a building dating from Anglo-Saxon times, was erected in the reign of Edward IV., and is a good specimen of Perpendicular. Among the other principal public buildings are the new market-hall, the post-office, the court-house, the temperance hall, St. George's Hall, the council hall, and the corporation offices. There are a large number of educational and literary institutions, including the grammar school founded in 1483, the people's charity school, the Independent college, the mechanics' institute, the free library, and the literary and scientific society. There is a large hospital, besides almshouses and various other charities. The town possesses extensive iron, steel, and brass works, potteries, glass works, breweries, saw mills, and rope yards. The population of the municipal borough (area 5995 acres) in 1881 was 34,782.

The town is of Roman origin, and was of some importance in Anglo-Saxon times. In the time of Edward the Confessor it possessed a market and a church. Mary queen of Scots stayed a night at Rotherham while a prisoner, as did also Charles I. when in the hands of the Scots. During the Civil War it sided with the Parliament. It was taken possession of by the Royalists in 1643, but after the victory of Marston Moor was yielded up to a detachment of the Parliamentary forces. The townships of Rotherham and Kimberworth were incorporated as a municipal borough in August, 1871, the adjacent suburbs being included in 1879. The corporation act as the sanitary authority, and own the waterworks, gasworks, and markets. They have introduced a system of main drainage, and have also provided a public park and a free library.

ROTHESAY, a royal burgh, and the principal town of the county of Bute, Scotland, is situated in the island of Bute, at the head of a well-sheltered and spacious bay in the Firth of Clyde, 40 miles W. of Glasgow and 18 S.W. of Greenock, with which there is frequent communication by steamers. The bay affords good anchorage in any wind, and there are also a good harbor and pier. The town is the headquarters of an extensive fishing district, and is much frequented as a watering place. Besides two hydropathic establishments, it has several hotels and numerous lodging houses. Facing the bay there is an extensive esplanade. In the centre of the town are the ruins of the ancient castle, supposed by some to have been erected in 1098 by Magnus Barefoot, and by others at the same date by the Scots to defend themselves against the Norwegians. The village which grew up round the castle was made a royal burgh by Robert III., who created his eldest son David duke of Rothsay. During the Commonwealth the castle was garrisoned by Cromwell's troops. It was burned by the followers of Argyll in 1685, and remained neglected till the rubbish was cleared away by the marquis of Bute in 1816. The principal modern buildings are the aquarium, the town-hall and county buildings, the public halls, the academy, and the Thomson institute. The corporation consists of a provost, three bailies, a dean of guild, a treasurer, and twelve councillors. The population of the royal burgh in 1871 was 8027 and in 1881 it was 8291.

ROTHSCHILD, the name of a Jewish family which has acquired an unexampled position from the magnitude of its financial transactions. The original name was Bauer, the founder of the house being MAYER ANSELM (1743–1812), the son of Anselm Moses Bauer, a small Jewish merchant of Frankfort-on-the-Main. His father wished him to become a rabbi, but he preferred business, and ultimately set up as a money lender at the sign of the "Red Shield" (*Rothschild*) in the Frankfort Judengasse. He had already acquired some standing as a banker when his numismatic tastes obtained for him the friendship of William, ninth landgrave, and afterwards elector of Hesse-Cassel, who in 1801 made him his agent. In the following year Rothschild negotiated his first great Government loan, ten million thalers for the Danish Government. When the landgrave was compelled to flee from his capital on the entry of the French, he placed his silver and other bulky treasures in the hands of Rothschild, who, not without considerable risk, took charge of them and buried them, it is said in a corner of his garden, whence he dug them up as opportunity arose for disposing of them. This he did to such advantage as to be able afterwards to return their value to the elector at 5 per cent. interest. He died at Frankfort 19th September, 1812, leaving ten children, five sons and five daughters. Branches of the business were established at Vienna, London, Paris, and Naples, each being in charge of one of the sons, the chief of the firm always residing at Frankfort, where, in accordance with the wish of the founder, all important consultations are held. By a system of coöperation and joint counsels, aided by the skilful employment of subordinate agents, they obtained unexampled opportunities of acquiring an accurate knowledge of the condition of the financial market, and practically embraced the whole of Europe within their financial network. The unity of the interests of the several members of the firm has been preserved by the system of intermarriages, which has been the general practice of the descendants of the five brothers, and the house has thus grown in solidity and influence with every succeeding generation. Each of the brothers received in 1815 from Austria the privilege of hereditary landowners, and in 1822 they were created barons by the same country. The charge of the Frankfort house devolved on the eldest, ANSELM MAYER (1773–1855), born 12th June, 1773, who was chosen a member of the royal Prussian privy council of commerce, and, in 1820, Bavarian consul and court banker.[1] The Vienna branch was undertaken by SOLOMON (1774–1826), born 9th December, 1774, who entered into intimate relations with Prince Metternich, which contributed in no small degree to bring about the connection of the firm with the allied powers. The third brother, NATHAN MAYER (1777–1836), born 16th September, 1777, has, however, generally been regarded as the financial genius of the family, and the chief originator of the transactions which have created for the house its unexampled position in the financial world. He came to Manchester about 1800 to act as a purchaser for his father of manufactured goods; but at the end of five years he removed to London, where he found full scope for his financial genius. The boldness and skill of his transactions, which caused him at first to be regarded as rash and unsafe by the leading banking firms and financial merchants, latterly awakened their admiration and envy. By the employment of carrier pigeons and of fast-sailing boats of his own for the transmission of news he was able to utilize to the best advantage his special sources of information, while no one was a greater adept in the art of promoting the rise and fall of the stocks. The colossal influence of the house dates from an operation of his in 1810. In that year Wellington made some drafts which the English Government could not meet; these were purchased by Rothschild at a liberal discount, and renewed to the Government, which finally redeemed at par. From this time the house became associated with the allied powers in the struggle against Napoleon, it being chiefly through it that they were able to negotiate loans to carry on the war. Rothschild never lost faith in the ultimate overthrow of Napoleon, his all being virtually staked on the issue of the contest. He is said to have been present at the battle of Waterloo, and to have watched the varying fortunes of the day with feverish eagerness. Being able to transmit to London private information of the allied success several hours before it reached the public, he effected an immense profit by the purchase of stock, which had been greatly depressed on account of the news of Blucher's defeat two days previously. Rothschild was the first to popularize foreign loans in Britain by fixing the rate in sterling money and making the dividends payable in London and not in foreign capitals. Latterly he became the financial agent of nearly every civilized Government, although persistently declining contracts for Spain or the American States. He did not confine himself to operations on a large scale, but on the contrary made it a principle to despise or neglect no feasible opportunity of transacting business, while at the same time his operations gradually extended to every quarter of the globe. He died 28th July, 1836, and was succeeded in the mangement of the London house by his son LIONEL (1808–1879), born 22d November, 1808, whose name will always be associated with the removal of the civil disabilities of the Jews. He was elected a member for the City of London in 1847, and again in 1849 and 1852, but it was not till 1858 that the joint operation of an Act of Parliament and a resolution of the House of Commons, allowing the omission from the oath of the words to which as a Jew he conscientiously objected, rendered it possible for him to take his seat. He continued to represent the City of London till 1874. JACOB (1792–1868), the youngest of the original brothers, was intrusted with the important mission of starting the business in Paris after the restoration of the Bourbons, for whom he negotiated large loans. At the Revolution of 1848 he was a heavy loser, and had also to be protected for a time by a special guard. It was by his capital that the earliest railroads were constructed in France; the profits he obtained from the speculation were very large. He died 15th November, 1868. The Naples branch was superintended by another of the brothers, KARL (1780–1855). It was always the least important of the five, and after the annexation of Naples to Italy in 1860 it was discontinued.

See *Das Haus Rothschild*, 1858; Picciotto, *Sketches of Anglo-Jewish History*, 1875; Francis, *Chronicles and Characters of the Stock Exchange*, 1853; Treskow, *Biographische Notizen über Nathan Meyer Rothschild nebst seinem Testament*, 1837; Roqueplan, *Le Baron James de Rothschild*, 1868.

ROTHWELL, an urban sanitary district in the West Riding of Yorkshire, situated in a pleasant valley four miles south of Leeds. It is of great antiquity, and soon after the Conquest was granted as a dependency of the Castle of Pontefract to the Lacys, who erected at it a baronial residence of which there are still some remains. The church of the Holy Trinity is an old structure in the Later English style with embattled parapet. There are a mechanics' institute and a workingmen's club. Coal and stone are obtained in the neighborhood, and the town possesses match works and rope and twine factories. The population of the urban sanitary district (area 3302 acres) in 1871 was 3733, and in 1881 it was 5105.

ROTIFERA. The *Rotifera* (or *Rotatoria*) form a small, in many respects well-defined, but somewhat isolated class of the animal kingdom. They are here treated of separately, partly on account of the difficulty of placing them in one of the large phyla,

[1] [Mayer Karl, son of Karl of Naples mentioned below, and head of the Frankfort branch, was born 5th August, 1820, and died 16th October, 1886. It is said that his heirs will establish a public museum of his art collection at Frankfort.—AM. ED.]

partly on account of their special interest to microscopists.

Now familiarly known as "wheel animalcules" from the wheel-like motion produced by the rings of cilia which generally occur in the head region, the so-called rotatory organs, they were first discovered by Leeuwenhoek (1),[1] to whom we also owe the discovery of *Bacteria* and ciliate *Infusoria*. Leeuwenhoek described the *Rotifer vulgaris* in 1702, and he subsequently described *Melicerta ringens* and other species. A great variety of forms were described by other observers, but they were not separated as a class from the unicellular organisms (*Protozoa*) with which they usually occur until the appearance of Ehrenberg's great monograph (2), which contained a mass of detail regarding their structure. The classification there put forward by Ehrenberg is still widely adopted, but numerous observers have since added to our knowledge of the anatomy of the group (3). At the present day few groups of the animal kingdom are so well known to the microscopist, few groups present more interesting affinities to the morphologist, and few multicellular animals such a low physiological condition.

General Anatomy.—The *Rotifera* are multicellular animals of microscopic size which present a cœlom. They are bilaterally symmetrical and present no true metameric segmentation. A head region is generally well marked, and most forms present a definite tail region. This tail region has been termed the "pseudopodium." It varies very much in the extent to which it is developed. It attains its highest development in forms like *Philodina*, which affect a leech-like method of progression and use it as a means of attachment. We may pass from this through a series of forms where it becomes less and less highly developed. In such forms as *Brachionus* it serves as a directive organ in swimming, while in a large number of other forms it is only represented by a pair of terminal styles or flaps. In the sessile form it becomes a contractile pedicle with a suctorial extremity. A pseudopodium is entirely absent in *Asplanchna*, *Triarthra*, *Polyarthra*, and a few other genera. The pseudopodium, when well developed, is a very muscular organ, and it may contain a pair of glands (Fig. 2, A, *gl*) which secrete an adhesive material.

The surface of the body is covered by a firm homogeneous structureless cuticle. This cuticle may become hardened by a further development of chitin, but no calcareous deposits ever take place in it. The cuticle remains softest in those forms which live in tubes. Among the free-living forms the degree of hardening varies considerably. In some cases contraction of the body merely throws the cuticle into wrinkles (*Notommata*, *Asplanchna*); in others definite ring-like joints are produced which telescope into one another during contraction; while in others again it becomes quite firm and rigid and resembles the carapace of one of the *Entomostraca;* it is then termed a "lorica." The lorica may be prolonged at various points into spines, which may attain a considerable length. The surface may be variously modified, being in some cases smooth, in others marked, dotted, ridged, or sculptured in various ways (Fig. 1, K). The curved spines of *Philodina aculeata* (Fig. 1, G) and the long rigid spines of *Triarthra* are further developments in this direction. The so-called setæ of *Polyarthra* on the other hand are more complex in nature, and are moved by muscles, and thus approach the "limbs" of *Pedalion*.

Several genera present an external casing or sheath or tube which is termed an "urceolus." In *Floscularia* and *Stephanoceros* the urceolus is gelatinous and perfectly hyaline; in *Conochilus* numerous individuals live in such a hyaline urceolus arranged in a radiating manner. The urceolus, which is secreted by the animal itself, may become covered with foreign particles, and in one species, the well-known *Melicerta ringens*, the animal builds up its urceolus with pellets which it manufactures from foreign particles and deposits in a regular oblique or spiral series, and which are cemented together by a special secretion. The urceolus serves as a defence, as the animal can by contracting its stalk withdraw itself entirely within the tube.

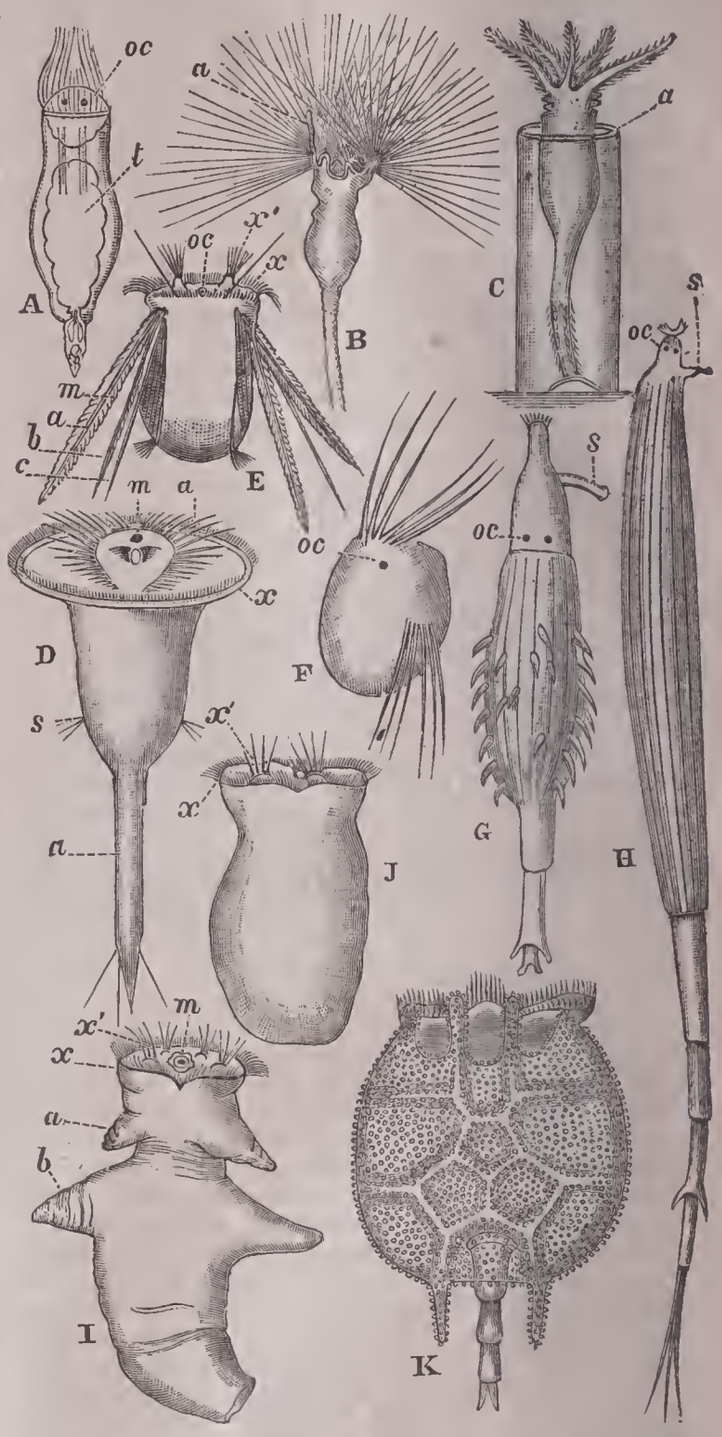


FIG. 1.—A, *Floscularia campanulata*, an adult male, drawn from a dead specimen (after Hudson): *t*, testis; *oc*, eye-spots. B, *Floscularia appendiculata*, an adult female (after Gegenbaur): *a*, the ciliated flexible proboscis. C, *Stephanoceros eichhornii*: *a*, the ureeolus. D, *Microcodon clavus*, ventral view (after Grenacher): *m*, mouth; *a*, bristles; *x*, arehitroeh; *s*, lateral sense-organs. E, *Polyarthra platyptera*: *oc*, eye spot; *x'* isolated tufts representing a eephalotroch; *x*, branehiotroeh; *a*, *b*, and *c*, three pairs of appendages whieh are moved by the museles *m*. F, another figure of *Polyarthra*, to show the position whieh the appendages may take up. G, *Philodina aculeata*: *oc*, eye-spot; *s*, ealear. H, *Actinurus neptunius*: *oc*, eye-spot; *s*, ealear. I, *Asplanchna sieboldii*, male, viewed from the abdominal surface: *a*, anterior short arms; *b*, posterior longer arms; *m*, mouth; *x'*, cephalotroehie tufts; *x*, branehiotroeh. J, *Asplanchna sieboldii*, female; letters as before. K, *Notcus quadricornis*, to show the extent to whieh the loriea may beeome seulptured. (All, except where otherwise stated, from Pritehard.)

Locomotor Organs.—While, as mentioned above, several genera or individual species present long spines, these become movable, and may be spoken of as appendages, in two genera only. In *Polyarthra* (Fig. 1, E, F) there are four groups of processes or

[1] These numbers refer to the bibliography at p. 12.

plumes placed at the sides of the body, each of which groups can be separately moved up and down by means of muscular fibres attached to their bases, which pro-

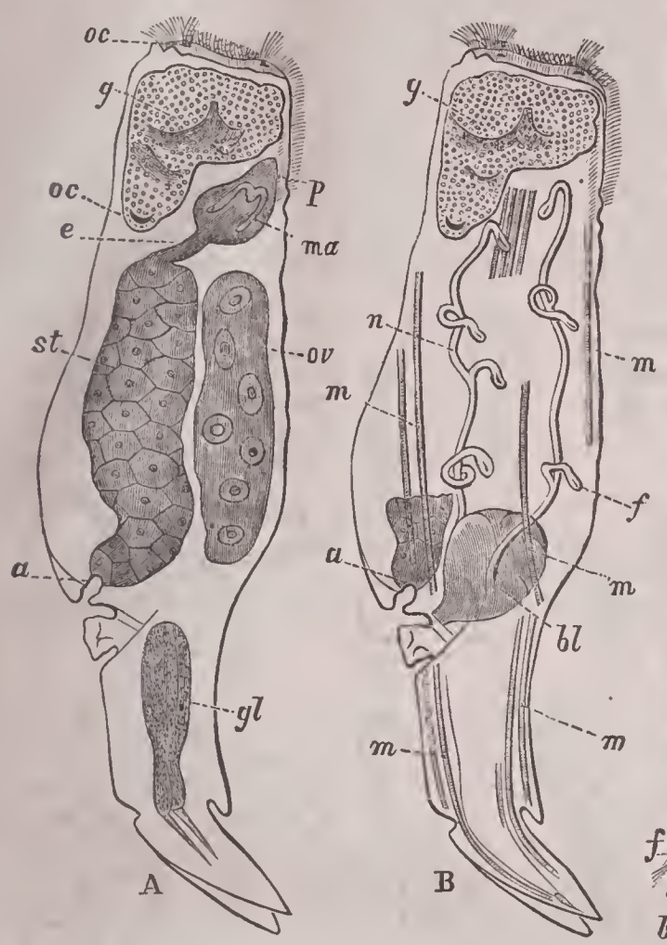


FIG. 2.—*Floscularia appendiculata*. A and B represent the same animal, some of the organs being shown in one figure and some in the other. *oc*, eye-spots: *g*, nerve ganglion; *p*, pharynx (the mouth should be shown opening opposite the letter); *ma*, the mastax; *e*, œsophagus; *st*, stomach: *a*, anus, opening the cloaca; *gl*, mucous glands in the pseudopodium; *n*, nephridia; *f*, flame-cells; *bl*, contractile vesicle; *m*, *m*, muscles.

jeet into the body. The processes themselves are unjointed and rigid. In *Pedalion* (Fig. 3), a remarkable form discovered by Dr. C. T. Hudson in 1871 (**12**, **13**, **14**, and **15**), and found in numbers several times since, these appendages have acquired a new and quite special development. They are six in number. The largest is placed ventrally at some distance below the mouth. Its free extremity is a plumose fan-like expansion (Fig. 3, A, *a*, and H). It is (in common with the others) a hollow process into which run two pairs of broad, coarsely transversely striated muscles. Each pair has a single insertion on the inner wall—the one pair near the free extremity of the limb, the other near its attachment; the bands run up, one of each pair on each side and run right round the body forming an incomplete muscular girdle, the ends approximating in the median dorsal line. Below this point springs the large median dorsal limb, which terminates in groups of long setæ. It presents a single pair of muscles attached along its inner wall which run up and form a muscular girdle round the body in its posterior third. On each side is attached a superior dorso-lateral and an inferior ventro-lateral appendage, each with a fan-like plumose termination consisting of compound hairs, found elsewhere only among the *Crustacea*; each of these is moved by muscles running upwards towards the neck and arising immediately under the trochal disk, the inferior ventro-lateral pair also presenting muscles which form a girdle in the hind region of the body. Various other muscles are present: there are two complete girdles in the neck region immediately behind the mouth; there are also muscles which move the hinder region of the body. In addition to these the body presents various processes which are perhaps some of them unrepresented in other Rotifers. In the median dorsal line immediately below the trochal disk there is a short conical process presenting a pair of muscles which render it capable of slight movement. From a recess at the extremity of this process spring a group of long setose hairs the bases of which are connected with a filament probably nervous in nature. This doubtless represents a structure found in many Rotifers, and variously known as the "calcar," "siphon," "tentaculum," or "antenna." This calcar is double in *Tubicolaria* and *Melicerta*. It is very well developed in the genera *Rotifer*, *Philodina*, and others, and is, when so developed, slightly retractile. It appears to be represented in many forms by a pit or depression set with hairs. The calcar has been considered both as an intromittent organ and a respiratory tube for the admission of water. It is now, however, universally considered to be sensory in nature. Various forms present processes in other parts of the body which have doubtless a similar function, *e.g.*, *Microcodon* (Fig. 1, D, *s*) with its pair of lateral organs. *Pedalion* presents a pair of ciliated processes in the posterior region of the body (Fig. 3, B, C, and D, *e*), which it can apparently use as a means of attachment; Dr. Hudson states that he has seen it anchored by these and swimming round and round in a circle. They possibly represent the flaps found on the tail of

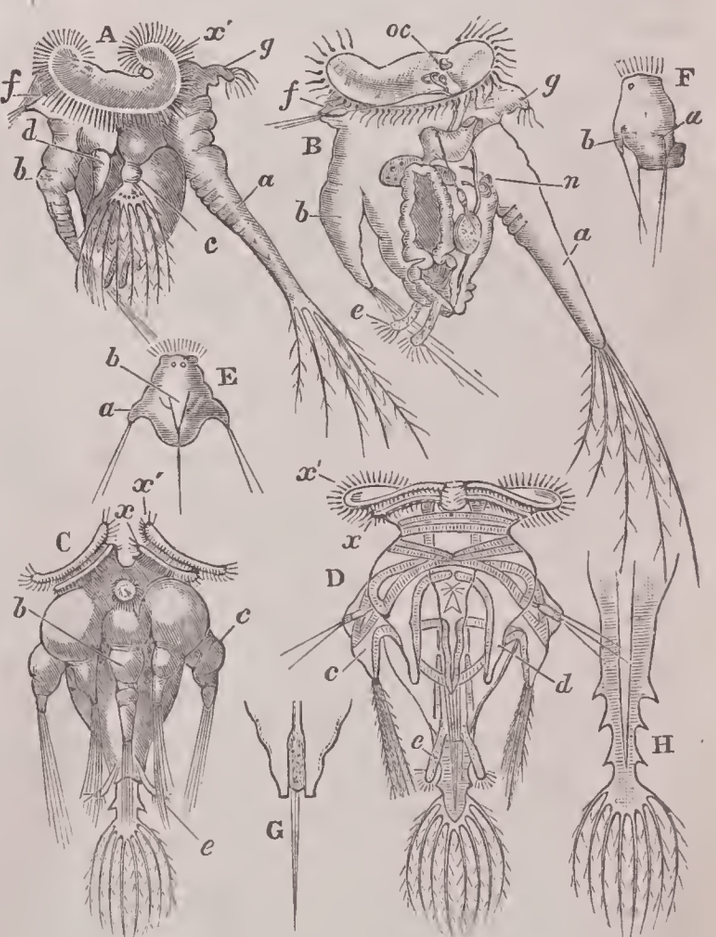


FIG. 3.—*Pedalion mira*. A, Lateral surface view of an adult female; *a*, median ventral appendage; *b*, median dorsal appendage; *c*, inferior ventro-lateral appendage; *d*, superior dorso-lateral appendage; *f*, dorsal sense-organ (calcar); *g*, "chin"; *x*, cephalotroch. B, lateral view, showing the viscera: *oc*, eye-spots; *n*, nephridia; *e*, ciliated processes, probably serving for attachment; other letters as above. C, ventral view: *x'*, cephalotroch; *x*, branchiotroch; other letters as above. D, ventral view, showing the musculature (*cf.* text). E, dorsal view of a male: *a*, lateral appendages; *b*, dorsal appendage. F, lateral view of a male. G, enlarged view of the sense-organ marked *f*. H, enlarged view of the median ventral appendage. (All after Hudson.)

other forms. *Pedalion* also has a small ciliated muscular process (Fig. 3, A, *g*) placed immediately below

the mouth, and termed a "chin," which appears to be merely a greater development of a sort of lower lip which occurs in many Rotifers.

Muscular System.—All the *Rotifera* present a muscular system which is generally very well developed. Transverse striation occurs among the fibres to a varyiug extent, being well marked in cases where the muscle is much used. The muscles which move the body as a whole are arranged as circular and longitudinal series, but they are arranged in special groups and do not form a complete layer of the body-wall as in the various worms. Some of the longitudinal muscles are specially developed in connection with the tail or pedicle. Other muscles are developed in connection with special systems of orgaus,—the trochal disks, the jaw apparatus, and the reproductive system. The muscles in connection with the trochal disk serve to protrude or withdraw it, and to move it about, when extruded, in various directions. The protrusion is probably, however, generally effected by the elasticity of the integument coming into play during the relaxation of the retractor muscles, and by a general coutraction of the body-wall. The tentaculiferous apparatus of *Polyzoa* and *Gephyrea* is protruded in the same manuer.

Trochal Disk.—This structure is the peculiar characteristic of the class. It is homologous with the ciliated bands of the larvæ of Echinoderms, Chætopods, Molluscs, etc., and with the tentaculiferous apparatus of *Polyzoa* and *Gephyrea*, and has been termed in common with these a "velum." This velum presents itself in various stages of complexity. It is found as a single circum-oral ring (*pilidium*), as a single præoral ring (Chætopod larvæ), or as a single præ-oral ring coexisting with one or more post-oral rings (Chætopod larvæ, Holothurian larvæ). We may here assume that the ancestral condition was a single circum-oral ring associated with a terminal mouth and the absence of an anus, and that the existence of other rings posterior to this is an expressiou of metameric segmentation, *i.e.*, a repetition of similar parts. With the development of a prostomiate condition a certaiu change necessarily takes place iu the position of this band: a portion of it comes to lie longitudinally; but it may still remain a single band, as iu the larva of many Echinoderms. How have the other above-mentioned conditions of the velum come about? How has the præ-oral band been developed? Two views have been held with regard to this question. According to the one view, the fact whether the single band is a præ-oral or a post-oral one depends upou the position in which the anus is about to develop. If the anus develops in such a position that mouth and auus lie on one and the same side of the band, the latter becomes præ-oral; if, however, the anus develops so that the mouth and anus lie upon opposite sides of the band, the band becomes post-oral. If we hold this view we must consider any second band, whether præ- or post-oral, to arise as a new development. The other view premises that the anus always forms so as to leave the primitive ring or "architroch" post-oral, *i.e.*, between mouth aud anus. Concurrently with the development of a prostomium this architroch somewhat changes its position and the two lateral portions come to lie longitudinally; these may be supposed to have met in the median dorsal line and to have coalesced so as to leave two rings—the one præ-oral (a "cephalotroch"), the other post-oral (a "branchiotroch"); this latter may atrophy, leaving the single præ-oral ring, or it may become further developed and thrown into more or less elaborate folds. The existing condition of the trochal disk or velum in the *Rotifera* seems to the writer of this article to bear out the latter view as to the way in which modifications of the velum may have come about.

In its simplest condition it forms a single circum-oral ring, as in *Microcodon* (Fig. 1, D). The structures at the sides of the mouth in this form are stated to be bristles, and have therefore nothing to do with the velum (Fig. 4, A, *p*). This simple ring may become thrown into folds, so forming a series of processes standing up arouud the month; this is the condition in *Stephanoceros* (Fig. 4, B, *p*). There are, however, but few forms presenting this simple condition; and it must be remembered that the evidence for the assumption here made, that this is a persisteut architroch and not a branchiotroch persisting where a cephalotroch has vanished, is not at present conclusive. This band may, while remaining single and perfectly continuous, become prolonged around a lobe overhanging the mouth —a prostomium. This condition occurs in *Philodina* (Fig. 4, E, F, *p*); the two sides of the post-oral ring do not meet dorsally, but are carried up and are continuous with the row of cilia lining the "wheels." There is thus one continuous ciliated band, a portion of which runs up in front of the mouth. This condition corresponds to that of the Auricularian larva. The folding of the band has become already somewhat complicated; a hypothetical intermediate condition is shown in Fig. 4, C, D. The next stage in the advancing complexity is that the prostomial portion of the band (Fig. 4, G, H, *p'*) becomes separated as a distinct ring, a cephalotroch; we find such a stage in *Lacinularia* (Fig. 4, G, H), where both cephalotroch and branchiotroch remain fairly simple in shape. Iu *Melicerta* (Fig. 4, I, J) both cephalotroch and branchiotroch are thrown into folds. Lastly, we find that in such forms as *Brachionus* the cephalotroch becomes first convoluted and theu discontinuous (Fig. 4, K, L, *c*), and further it may become so reduced as to be represeuted only by a few isolated tufts, as in *Asplanchna*

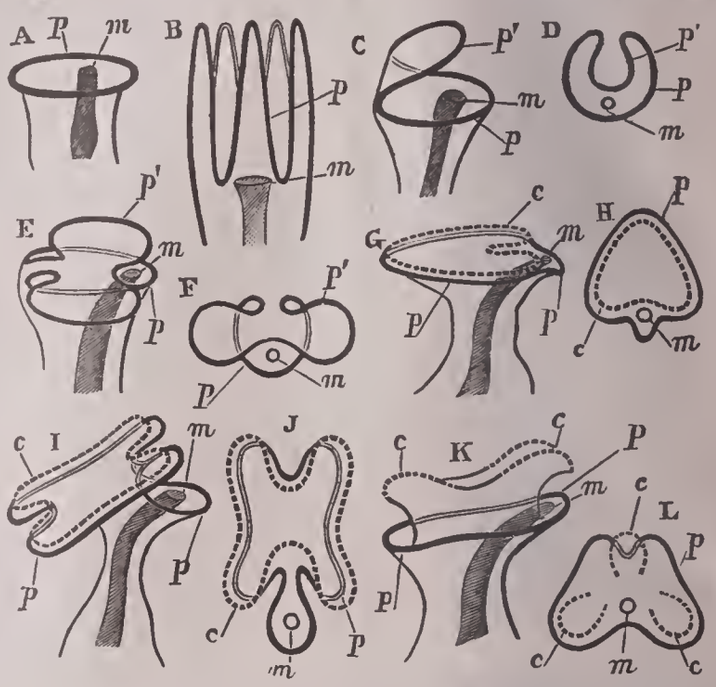


FIG. 4.—Diagrams of the Trochal Disk. A, *Microcodon*. B, *Stephanoceros;* the month lies in the centre of a group of tentacles. C, hypothetical intermediate form between *Microcodon* and *Philodina*, showing the development of a prostomial portion of the velum. D, dorsal view of the same. E, *Philodina*. F, dorsal view of the same. G, *Lacinularia;* the dotted line represents the portion of the velnm which has become separated as a special ring—a cephalotroch. H, dorsal view of the same. I, *Melicerta;* the dotted line represents the cephalotroch; both this and the branchiotroch have become thrown into folds. J, dorsal view of the same. K, *Brachionus;* there is a large præ-oral lobe with three ciliated regions, shown by the dotted lines *c*, *c*, a discontinuous cephalotroch. L, dorsal view of the same.

m, mouth; *p*, *p'*, velnm; *p*, architroch; *p'*, portion of the architroch which becomes carried forward to line the prostomial region, but does not become separated; *c*, cephalotroch. (Original.)

(Fig. 1, I, *x* and *x'*); in such a form as *Lindia* (Fig. 6, C) the branchiotroch has vanished and the cephalotroch has become reduced to the two small patches at the sides of the head.

The trochal apparatus serves the *Rotifera* as a locomotive organ and to briug the food particles to the mouth; the cilia work so as to produce currents towards the mouth.

Digestive System.—This consists of the following regions: (1) the oral cavity; (2) the pharynx; (3) the œsophagus; (4) the stomach; (5) the intestine, which terminates in an anus. The anus is absent in one group.

The pharynx contains the *mastax* with its teeth; these are calcareous structures, and are known as the *trophi*. Iu a typical mastax (**8, 9**) (*Brachionus*, Fig. 5, A) there are a median anvil or *incus* and two hammer-like portions, *mallei*. The incus consists of two *rami* (*e*) resting upon a central *fulcrum* (*f*); each malleus consists of a handle or *manubrium* (*c*) and a head or *uncus* (*d*), which often presents a comb-like structure. Fig. 5 shows some of the most important modifications which the apparatus may exhibit. The parts may become very slender, as in *Diglena forcipata* (Fig. 5, B); the mallei may be absent, as in *Asplanchna* (Fig. 5, C), the rami being highly developed into curved forceps and movable one on the other; or, the manubria being absent and the fulcrum rudimentary, the rami may become massive and subquadratic, as in *Philodina* (Fig. 5, D). All the true Rotifers possess a mastax. Ehrenberg's group of the *Agomphia* consisted of a heterogeneous collection of forms,—*Ichthydium* and *Chætonotus* being *Gastrotricha*, and *Cyphonautes* a Polyzoan larva, while *Enteroplea* is probably a male Rotifer, and, like the other males, in a

reduced condition. There is no reason for considering this mastax as the homologue of either the gastric mill of Crustaceans on the one hand or the teeth in the Chætopods' pharynx on the other: it is merely homoplastic with these structures, but has attained a specialized degree of development. Both the pharynx and the œsophagus which follows it are lined with chitin. The œsophagus varies in length

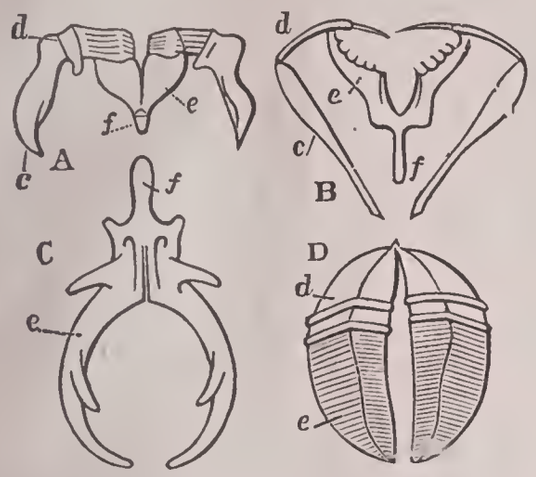


FIG. 5.—Trophi of various forms: A, *Brachionus;* B, *Diglena forcipata;* C, *Asplanchna;* D, *Philodina. f*, fulerum, and *e*, *e*, rami, forming the incus; *c*, manubrium, and *d*, uneus, forming the malleus. (After Hudson.)

and in some genera is absent (*Philodinadæ*), the stomach following immediately upon the pharynx. The stomach is generally large; its wall consists of a layer of very large ciliated cells, which often contain fat globules and yellowish-green or brown particles, and outside these a connective tissue membrane; muscular fibrillæ have also been described. Very constantly a pair of glands open into the stomach, and probably represent the hepato-pancreatic glands of other Invertebrates.

Following upon the stomach there is a longer or shorter intestine, which ends in the cloaca. The intestine is lined by ciliated cells. In forms living in an urceolus the intestine turns round and runs forward, the cloaca being placed so as to debouch over the margin of the urceolus. The cloaca is often very large; the nephridia and oviducts may open into it, and the eggs lodge there on their way outwards; they are thrown out, as are the fæcal masses, by an eversion of the cloaca. *Asplanchna, Notommata sieboldii*, and certain species of *Ascomorpha* are said to be devoid of intestine or anus, excrementitious matters being ejected through the mouth (**11**).

Nephridia.—The cœlom contains a fluid in which very minute corpuscles have been detected. There is no trace of a true vascular system. The Nephridia (Fig. 2, B, *n*) present a very interesting stage of development. They consist of a pair of tubules with an intracellular lumen running up the sides of the body, at times merely sinuous, at others considerably convoluted. From these are given off at irregular intervals short lateral branches, each of which terminates in a flame-cell precisely similar in structure to the flame-cells found in Planarians, Trematodes, and Cestodes; here as there the question whether they are open to the cœlom or not must remain at present undecided. At the base these tubes open either into a permanent bladder which communicates with the cloaca or into a structure presenting apparently no advance in its development upon the contractile vacuole of a ciliate Infusorian.

Nervous System and Sense-Organs.—Various structures have been spoken of as nervous which are now acknowledged to have been erroneously so described (**18**). There is a supra-œsophageal ganglion which often attains considerable dimensions, and presents a lobed appearance (Fig. 2, A and B, *g*). Connected with this are the eye-spots, which are seldom absent. Where these are most highly developed a lens-like structure is present, produced by a thickening of the cuticle. In the genus *Rotifer* and other forms, these are placed upon the protrusible portion of the head, and so appear to have different positions at different moments. The number of eye-spots varies from one to twelve or more. They are usually red, reddish-brown, violet, or black in color. Other structures are found which doubtless act as sense-organs. The calcar above mentioned generally bears at its extremity stiff hairs which have been demonstrated to be in connection with a nerve fibril. On the ventral surface of the body just below the mouth a somewhat similar structure is often developed—the chin. There are besides at times special organs, like the two lateral organs in *Microcodon* (Fig. 1, D, *s*), which no doubt in common with the calcar and chin have a tactile function.

Reproductive Organs and Development.—The *Rotifera* were formerly considered to be hermaphrodite, but, while the ovary was always clear and distinct, there was always some difficulty about the testis, and various structures were put forward as representing that organ. One by one, however, small organisms have been discovered and described as the males of certain species of Rotifers, until at the present time degenerated males are known to occur in all the families except that of the *Philodinadæ*. The male Rotifers are provided with a single circlet of cilia (a peritroch), a nerve ganglion, eye-spots, muscles, and nephridial tubules all in a somewhat reduced condition, but there is usually no trace of mouth or stomach, the main portion of the body being occupied by the testicular sac. There is an aperture corresponding with the cloaca of the female, where the testis opens into the base of an eversible penis. The males of *Floscularia* are shown in Fig. 1. The male of *Pedalion mira* possesses rudimentary appendages. The ovary is usually a large gland lying beside the stomach connected with a short oviduct which opens into the cloaca. The ova often present a reddish hue (*Philodina roseola, Brachionus rubens*), due doubtless, like the red color of many Crustacean ova, to the presence of tetronerythrin.

Up to the present our embryological knowledge of the group is very incomplete. Many Rotifers are known to lay winter and summer eggs of different character. The winter eggs are provided with a thick shell and probably require fertilization. Two or three of them are often carried about attached to the parent (*Brachionus Notommata*), but they are usually laid and fall into the mud, there to remain till the following spring. The summer eggs are of two kinds, the so-called male and female ova, both of which are stated to develop parthenogenetically. They may be carried about in large numbers in the cloaca or oviduct or attached to the body of the parent. The female ova give rise to female and the male ova to male individuals. Male individuals are only formed in the autumn in time to fertilize the winter ova.

Habitat and Mode of Life.—The *Rotifera* are distributed all over the earth's surface, inhabiting both fresh and salt water. The greater number of species inhabit fresh water, occurring in pools, ditches, and streams. A few species will appear in countless numbers in infusions of leaves, etc., but their appearance is generally delayed until the putrefaction is nearly over. Species of *Rotifer* and *Philodina* appear in this way. A few marine forms only have been described—*Brachionus mülleri, B. heptatonus, Synchæta baltica*, and others.

A few forms are parasitic. *Albertia* lives in the intestine of the earthworm; a form has been described as occurring in the body-cavity of *Synapta;* a small form was also observed to constantly occur in the velar and radial canals of the freshwater jelly-fish, *Limnocodium. Notommata parasitica* leads a parasitic existence within the hollow spheres of *Volvox globator*, sufficient oxygen being given off by the *Volvox* for its respiration.

Many rotifers exhibit an extraordinary power of resisting drought. Various observers have dried certain species upon the slide, kept them dry for a certain length of time, and then watched them come to life very shortly after the addition of a drop of water. The animal draws itself together, so that the cuticle completely protects all the softer parts and prevents the animal itself from being thoroughly dried. This process is not without parallel in higher groups; *e.g.*, many land snails will draw themselves far into the shell, and secrete a complete operculum, and can remain in this condition for an almost indefinite amount of time. The eggs are also able to withstand drying, and are probably blown about from place to place. The *Rotifera* can bear great variations of temperature without injury.

Since their removal from among the *Protozoa* various attempts have been made to associate the *Rotifera* with one or other large phylum of the animal kingdom. Huxley, insisting upon the importance of the trochal disk, put forward the view that they were "permanent Echinoderm larvæ," and formed the connecting link between the *Nemertidæ* and the Nematoid worms. Ray Lankester proposed to associate them with the *Chætopoda* and *Arthropoda* in a group *Appendiculata*, the

peculiarities in the structure of *Pedalion* forming the chief reason for such a classification. There is, however, no proof that we thus express any genetic relationship. The well-developed cœlom, absence of metameric segmentation, persistence of the trochal disk in varying stages of development, and the structure of the nephridia are all characters which point to the *Rotifera* as very near representatives of the common ancestors of at any rate the *Mollusca*, *Arthropoda*, and *Chætopoda*. But the high development of the mastax, the specialized character of the lorica in many forms, the movable spines of *Polyarthra*, the limbs of *Pedalion*, and the lateral appendages of *Asplanchna*, the existence of a diminutive male, the formation of two varieties of ova, all point to a specialization in the direction of one or other of the above-mentioned groups. Such specialization is at most a slight one, and does not justify the definite association of the *Rotifera* in a single phylum with any of them.

Classification.—The following classification has been recently put forward by Dr. C. T. Hudson (**19**).

Class ROTIFERA.

Order I.—**Rhizota.**

Fixed forms; foot attached, transversely wrinkled, non-retractile, truncate.

Fam. 1. Floscullariadæ. *Floscularia, Stephanoceros.*
Fam. 2. Melicertadæ. *Melicerta, Cephalosiphon, Megalotrocha, Limnias, Æcistes, Lacinularia, Conochilus.*

Order II.—**Bdelloida.**

Forms which swim and creep like a leech; foot retractile, jointed, telescopic, termination furcate.

Fam. 3. Philodinadæ. *Philodina, Rotifer, Callidina.*

Order III.—**Ploïma.**

Forms which swim only.

Grade A. Illoricata.

Fam. 4. Hydatinadæ. *Hydatina, Rhinops.*
Fam. 5. Synchætadæ. *Synchæta, Polyarthra.*
Fam. 6. Notommatadæ. *Notommata, Diglena, Furcularia, Scaridium, Pleurotrocha, Distemma.*
Fam. 7. Triarthradæ. *Triarthra.*
Fam. 8. Asplanchnadæ. *Asplanchna.*

Grade B. Loricata.

Fam. 9. Brachionidæ. *Brachionus, Noteus, Anuræa, Sacculus.*
Fam. 10. Pterodinadæ. *Pterodina, Pompholyx.*
Fam. 11. Euchlanidæ. *Euchlanis, Salpina, Diplax, Monostyla, Colurus, Monura, Metopodia, Stephanops, Monocerca, Mastigocerca, Dinocharis.*

Order IV.—**Scirtopoda.**

Forms which swim with their ciliary wreath, and skip by means of hollow limbs with internal locomotor muscles.

Fam. 12. Pedalionidæ. *Pedalion.*

The above list includes only the principal genera. There are, however, a number of forms which could not be placed in any of the above families.

Aberrant Forms.

Trochosphæra æquatorialis (Fig. 6, G), found by Semper in the Philippine Islands, closely resembles a monotrochal polychætous larva while possessing undoubtedly Rotiferal characters. Mecznikow has described a remarkable form, *Apsilus lentiformis* (Fig. 6, D, E, and F), the adult female of which is entirely devoid of cilia but possesses a sort of retractile hood; the young female and the males are not thus modified. Claparède discovered fixed to the bodies of small Oligochætes a curious non-ciliated form, *Balatro calvus* (Fig. 6, A), which has a worm-like, very contractile body and a well-developed mastax. As mentioned above, the ciliation is reduced to a minimum in the curious worm-like form *Lindia* (Fig. 6, C). *Seison nebaliæ* (Fig. 6, B), living on the surface of *Nebaliæ*, which was described originally by Grube, is the same form as the *Saccobdella nebaliæ*, which was supposed by Van Beneden and Hesse to be a leech. It has been shown by Claus to be merely an aberrant Rotifer.

Of the curious aquatic forms *Ichthydium, Chætonotus, Turbanella, Dasyditis, Cephalidium, Chætura,* and *Hemidasys,* which Mecznikow and Claparède included under the name

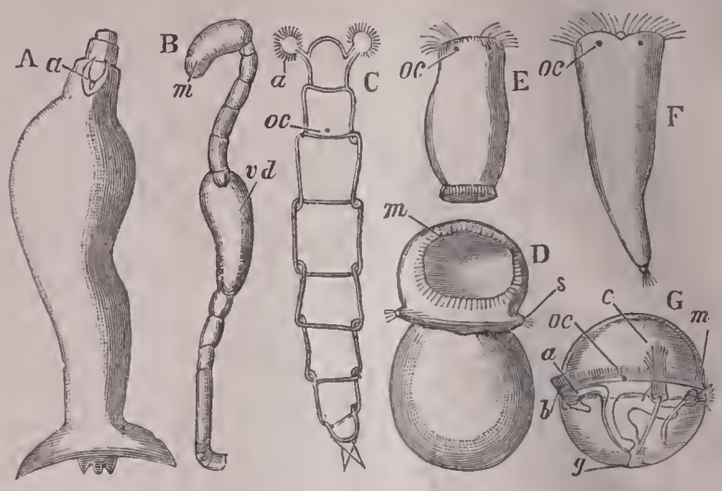


Fig. 6.—Various aberrant forms. A, *Balatro calvus* (after Claparède): *a*, mastax. B, *Seison nebaliæ* (after Claus): *m*, mouth; *vd*, position of the aperture of the vas deferens. C, *Lindia torulosa*: *a*, ciliated processes at the sides of the head representing cephalotroch; *oc*, eye-spots. D, E, and F, *Apsilus lentiformis* (after Mecznikow). D, adult female with expanded proboscis; *m*, position of the mouth; *s*, lateral sense-organs. E, young free-swimming female. F, adult male. G, *Trochosphæra æquatorialis* (after Semper): *m*, mouth; *e*, ganglion; *a*, anus; *b*, velum; *oc*, eye spot; *c*, muscles.

Gastrotricha, no further account can be given here. They are possibly allied to the *Rotifera*, but are devoid of mastax and trochal disk.

The following are some of the more important memoirs, etc., on the *Rotifera*. (1) Lecuwenhoek, *Phil. Trans.*, 1701-1704. (2) Ehrenberg, *Die Infusionsthierchen als volkommene Organismen*, 1838. (3) M. F. Dujardin, *Hist. Nat. des Zoophytes: Infusoires*, 1841. (4) W. C. Williamson, "On *Melicerta ringens*," *Quart. Jour. Micr. Sci.*, 1853. (5) Ph. H. Gosse, "On *Melicerta ringens*," *Quart. Jour. Micr. Sci.*, 1853. (6) T. H. Huxley, "On *Lacinularia socialis*," *Trans. Micr. Soc.*, 1853. (7) Fr. Leydig, "Ueber den Bau und die systematische Stellung der Räderthiere," *Zeit. f. w. Zool.*, vi., 1854. (8) Ph. H. Gosse, *Phil. Trans.*, 1856. (9) F. Cohn, *Zeit. f. w. Zool.*, vii., ix., and xii. (10) Ph. H. Gosse, *Phil. Trans.*, 1858. (11) Pritchard, *Infusoria*, 1861. (12, 13, 14) C. T. Hudson, "On *Pedalion*," *Quart. Jour. Micr. Sci.*, 1872, and *Monthly Micr. Jour.*, 1871 and 1872. (15) E. Ray Lankester, "On *Pedalion*," *Quart. Jour. Micr. Sci.*, 1872. (16) El. Mecznikow, "On *Apsilus lentiformis*," *Zeit. f. w. Zool.*, 1872. (17) C. Semper, "On *Trochosphæra*," *Zeit. f. w. Zool.*, xxii., 1872. (18) K. Eckstein, "Die Rotatorien der Umgegend von Giessen," *Zeit. f. w. Zool.*, 1883. (19) C. T. Hudson, "On an Attempt to reclassify Rotifers," *Quart. Jour. Micr. Sci.*, 1884.

(A. G. B.)

ROTROU, Jean de (1609–1650), the greatest tragic poet of France before Corneille, was born on August 21, 1609, at Dreux in Normandy, and died of the plague at the same place on the 28th June, 1650. His family was of small means but of not inconsiderable station, and seems to have had a kind of hereditary connection with the magistracy of the town of Dreux. He himself was "lieutenant particulier et civil," a post not easy to translate, but apparently possessing some affinity to a Scotch sheriffship substitute. Rotrou, however, went very early to Paris, and, though three years younger than Corneille, with whom he was intimately acquainted, began play-writing before him. With a few exceptions, the only events recorded of his life are the successive appearances of his plays and his enrolment in the band of five poets who had the not very honorable or congenial duty of turning Richelieu's dramatic ideas into shape. Rotrou's own first piece, *L'Hypocondriaque*, appeared when he was only nineteen. His second, *La Bague de l'Oubli*, an adaptation in part from Lope de Vega, was much better, much more suggestive, and much more characteristic. It is the first of several plays in which Rotrou, following or striking out for himself a way which did not lead to much for the time but which was again entered at the Romantic revival, endeavored to naturalize in France the romantic comedy which had flourished in Spain and England instead of the classical tragedy of Seneca and the classical comedy of Terence. Corneille, as is known to readers of his early work, had considerable leanings in the same direction, and yielded but slowly and unwillingly to the pressure

of critical opinion and the public taste. Rotrou's brilliant but hasty and unequal work showed throughout marks of a stronger adhesion to the Spanish (it is needless to say that neither writer is likely to have known the English) model. *Cléagénor et Doristée*, *Diane*, *Les Occasions Perdues*, *L'Heureuse Constance*, pieces which succeeded each other very rapidly, were all in the Spanish style. Then the author changed his school, and, in 1632, imitated very closely the *Menœchmi* of Plautus and the *Hercules Œtœus* of Seneca. A crowd of comedies and tragi-comedies followed, and by the time he was twenty-eight (when documents exist showing the sale of two batches of them to the bookseller Quinet for the sum of 220 livres tournois[1]) Routrou had written nearly a score of plays. He was married in 1640, and had three children, a son and two daughters (none of whom, however, continued the name), and it seems that he went to live at Dreux. Previously, vague and anecdotic tradition describes him as having led rather a wild life in Paris, and especially as having been much addicted to gambling. Among his pieces written before his marriage were a translation of the *Amphitryon* under the title of *Les Deux Sosies*, which was not useless to Molière, *Antigone*, which was not useless to Racine, and *Laure Persécutée* (in the opposite style to these classical pieces), which has much merit. These were followed by others until, in 1646 and 1647, Rotrou produced his three masterpieces, *Saint Genest*, a story of Christian martyrdom, containing some amusing by-play, one noble speech, and a good deal of dignified action; *Don Bernard de Cabrère*, a comedy of merit; and *Venceslas*, which is considered in France his masterpiece, and which in a manner kept the stage till our own times. The subject (in which a father, being constrained to choose between his duty as king and his parental affection, pardons his son for a murder he has committed, but immediately abdicates as feeling himself unworthy to reign) was taken from Francisco de Rojas; the execution, though unequal, is in parts very fine. Rotrou's death and its circumstances are known to many who never read a line of his plays. He was in Paris when the plague broke out at Dreux; the mayor fled, and all was confusion. Rotrou, reversing the conduct of Montaigne in somewhat similar circumstances, at once went to his post, caught the disease, and died in a few hours.

Rotrou's great fertility (he has left thirty-five collected plays besides others lost, strayed, or uncollected), and perhaps the uncertainty of dramatic plan shown by his hesitation almost to the last between the classical and the romantic style, have injured his work. He has no thoroughly good play, hardly one thoroughly good act. But his situations are often pathetic and noble, and as a tragic poet properly so called he is at his best almost the equal of Corneille and perhaps the superior of Racine. His single lines and single phrases have a brilliancy and force not to be found in French drama between Corneille and Hugo.

A complete edition of Rotrou was edited in five volumes by Viollet-le-Duc in 1820. In 1882 M. de Ronchaud published a handsome edition of six plays—*Saint Genest*, *Venceslas*, *Don Bernard de Cabrère*, *Antigone*, *Hercule Mourant*, and *Cosroës*,—the latter Rotrou's last play and a remarkable one. *Venceslas* and *Saint Genest* are also to be found in the *Chefs-d'œuvre Tragiques* of the Collection Didot.

ROTTERDAM, a city of the Netherlands in the province of South Holland, situated in 51° 55′ 19″ N. lat. and 4° 29′ 7″ E. long., on the right bank of the Nieuwe Maas at the point where it is joined by the Rotte, a small stream rising near Moerkapelle. By rail it is 14½ miles southeast of The Hague and 44½ south of Amsterdam. As defined by its 17th-century fortifications the town was an isosceles triangle with a base of 1¼ miles along the river, but in modern times

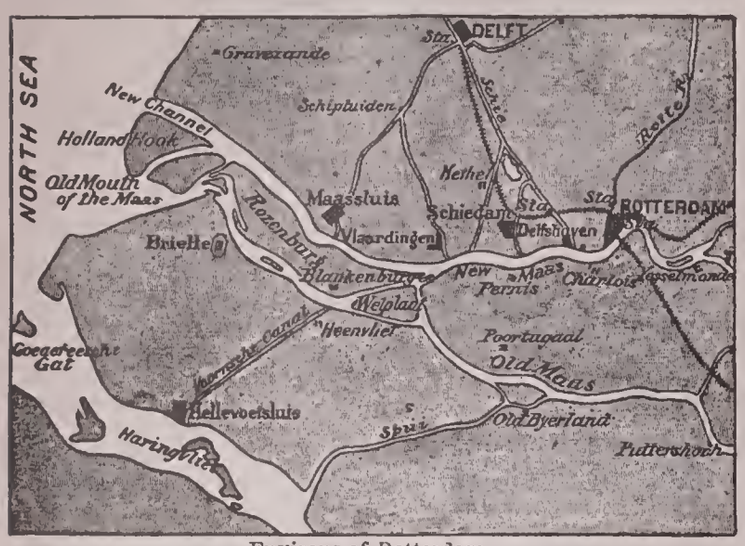
Plan of Rotterdam.

1. Groote Markt and Statue of Erasmus.
2. Bourse.
3. Post Office.
4. Boymans Museum.

it has spread out in all directions beyond the limits of its own commune (which was increased in 1869 by the island of Feijenoord and part of the south bank of the river) into those of Delfshaven, Kralingen, and Hillegersberg. A huge dyke on which stands Hoog Straat or High Street divides the triangular portion into nearly equal parts—the inner and the outer town; and the latter is cut up into a series of peninsulas and islands by the admirable system of harbors to which Rotterdam owes so much of its prosperity. The central part of the river frontage is lined by a broad quay called the Boompjes from the trees with which it is planted. From the apex of the triangle the town is bisected by a great railway viaduct (erected about 1870, and mainly constructed of iron), which is continued across the river to Feijenoord and the south bank by a bridge on a similarly grand scale, the line being the Great Southern Railway which connects Belgium and Holland and crosses the Hollandsch Diep by the Moerdijk bridge. Parallel with the railway bridge the municipality, in 1873, built a road-bridge, and apart from their ordinary function these constructions have proved a sufficient barrier to prevent the ice-blocks of the upper part of the river from descending so as to interfere with the seaward navigation. Tramways, introduced in 1880, are being gradually extended to various suburbs. While some nine or ten Protestant sects, the Roman Catholics, the Old Catholics, and the Jews are all represented in Rotterdam, none of the ecclesiastical buildings are of primary architectural interest. The Groote Kerk or Laurenskerk is a Gothic brick structure of the fifteenth century with a tower 297 feet high; it

[1] [Sommaville and Quinet in 1636 bought four plays for 750 livres, and Sommaville in 1637 bought eight for 1500 livres, or 2250 in all. See Jal's *Dictionnaire*, p. 1087, Ed. 1872.—AM. ED.]

has a fine rood screen and an excellent organ, and contains the monuments of Lambert Hendrikszoon, Egbert Meeuweszoon Kortenaar, Witte Corneliszoon de Witt, Johan van Brakel, Johan van Liefde, and other Dutch naval heroes. Among the more conspicuous secular buildings are the Boymans Museum, the town-house (restored in 1823–1827), the exchange (1723), the



Environs of Rotterdam.

Delft Gate (1766), the court-house, the post and telegraph office (1875), the corn exchange, the seamen's home (1855), the hospital (1846), and the theatres. The Boymans Museum is mainly a picture gallery, which became the property of the town in 1847. When the building, originally erected in 1662–63 as the assembly house of Schieland, was burned down in 1864, most of the pictures perished, but the museum was restored by 1867, and the collection, steadily recruited, is again rich in the works of Dutch artists. The ground floor also contains the city archives and the city library. The maritime museum, established in 1874 by the Yacht Club, is a remarkable collection of ship models, and the Society of Experimental Philosophy has a considerable collection of instruments, books, and specimens. At the northwest corner of the town an area of several acres is occupied by the zoological garden, which dates from 1857. Besides the Erasmus Gymnasium the educational institutions comprise an academy of art and technical science, a naval school, an industrial school, a deaf and dumb asylum, etc. In the Groote Markt (to the south of the Hoog Straat) stands the bronze statue of Erasmus (Gerrit Gerrits), erected by his fellow-citizens in 1662; and his birth-house, now a tavern in Wijde Kerkstraat, is distinguished by a Latin inscription. The statue by Grefs of Gijsbert Karel van Hogendorp (1762–1834), a great Dutch statesman, gives his name to the Hogendorpsplein, formerly Boymansplein, behind the museum; in the "Park," which extends west along the bank of the Maas, is a marble statue by Strackée of Hendrik Tollens, the Dutch poet; and the Nieuwmarkt is adorned with a fountain in memory of the jubilee (1863) of the restoration of Dutch independence (1813). Extensive works for supplying the town with filtered water were constructed between 1870 and 1875, the water in the river and canals being rendered unwholesome by the sewerage, the treatment of which naturally presents great difficulties in a city lying in great part below high-water level. The most important industrial establishment is that of the Netherlands Steamboat Company, who are shipowners, shipbuilders, and engineers; there are also extensive sugar-refineries and a great variety of smaller factories for the production of lead, iron, and copper wares, white lead, varnishes, tobacco and cigars, beer and vinegar, chocolate and confectionery, etc. Rotterdam is, however, not so much a manufacturing as a commercial city, and its commercial progress has been very striking since the middle of the century. While in 1846 it had only 321,764 tons out of the total of 1,024,705 tons which then represented the export trade of the Netherlands, in 1883 it had 1,940,026 tons out of a total of 3,953,009 tons. In 1850 it had only 27.9 per cent. of the outgoing vessels, and 35.77 per cent. of the tonnage; by 1870 it had 35.60 per cent. of the vessels and 50.37 of the tonnage, and by 1883 43.75 per cent. of the vessels, and 49.08 of the tonnage. Rotterdam has thus become what Amsterdam formerly was—the principal port in the country. For steamers it is now, since the opening of the new waterway through the Hoek van Holland in 1872, only two hours distant from the sea, and the channel is deep enough for vessels drawing 22 feet of water.[1] From 4471 vessels with a register tonnage of 1,688,700 tons in 1873, the shipping clearing from the Netherlands by the new waterway had increased by 1884 to 8177 vessels with register tonnage of 4,382,100 tons. Upwards of 18,000 emigrants left Europe by Rotterdam in 1881. Besides its maritime trade Rotterdam commands a most extensive river traffic, not only with the towns of the Netherlands, but with those of Belgium and Germany. With Germany alone its Rhine traffic amounted in 1883 to 1,706,587 tons, against 2,021,644 for all the other ports of the Netherlands. On January 1, 1885, Rotterdam owned 43 sailing vessels and 50 steamships, with a united aggregate burden of 99,018 tons. Owing to the great increase of navigation and commerce the berthing accommodation of the port frequently proves too small, though by the works at Feijenoord the length of the quays has of late years been extended by about 8000 metres. This island, two-thirds of which was purchased by the town in 1591 and the remaining third in 1658, was dyked in 1795, and became the seat of a building which has been in succession a pest-house, a military hospital, a naval college, and a private industrial school. The Netherlands Steamboat Company established its workshops there in 1825; and in 1873 the Rotterdam Trading Company began to construct the harbors and warehouses which have been purchased by the city. The population of the commune of Rotterdam, which did not much exceed 20,000 in 1632, was 53,212 in 1796, 72,294 in 1830, 88,812 in 1850, 105,858 in 1860, 132,054 in 1876, and 148,102 in 1879–80. In 1870 the city contained 111,256 inhabitants, the suburbs 3341, and the ships 2478, and in 1884 the total, exclusive of the shipping, was 169,477.

Rotterdam probably owes its origin to the castles of Wena and Bulgerstein, of which the former was laid in ruins by the Hoek party in 1426. In 1299 Count John I. granted the "good people of Rotterdam" the same rights as the burghers of Beverwijk, and freedom from toll in all his lands. In 1597 a sixth extension of the town's area took place, and a seventh followed in 1609. Francis of Brederode seized the place in 1488, but had to surrender it to the emperor Maximilian in 1489. The Spaniards were in possession from April 9th to July 31st, 1572, having gained entrance partly

[1] Previously the only direct way to the sea was by the Brielle (Brill) Channel, where in 1856 the fairway had gradually diminished in depth to 5 feet at low water and 11 or 12 feet at high water. In 1866 the works for the new waterway were commenced, and by November, 1868, the canal from the Scheur (or northern arm of the Maas) across the Hoek had been dug. The seaward piers were completed to the originally proposed length of (together) 2800 metres [3063 yards], but in 1874 they were prolonged to a total of 4300 metres [4702.5 yards], thus jutting out into the sea for more than a mile. Contrary to expectations the scour was not strong enough to widen the fairway; and works for this purpose were commenced in 1877, and at a later period the width of 900 metres [984 yards] between the piers was reduced to 700 metres [765.5 yards] by constructing an inner pier north of the south pier. The whole work has cost upwards of 23,000,000 guilders (£1,750,000) [or $8,505,000]—15½ millions expended up to 1879, and 7¾ between 1881 and 1884. With the exception of a contribution of not more than 3,000,000 from the city of Rotterdam, the entire sum has been paid by the state.

by treachery and partly by force (see Motley, *Dutch Republic*, ii.). It was at a meeting of the states held at Rotterdam in June, 1574, that the relief of Leyden was determined on, though it was not till 1580 that the town obtained a vote in the assembly.

ROUBAIX, a manufacturing town of France, the second in population in the department of Nord, lies to the northeast of Lille on the Ghent Railway and on the canal connecting the lower Deule with Scheldt by the Marq and Espierre. Several tramway lines traverse the town and connect it with various manufacturing centres in the neighborhood. The population of Roubaix, which in 1881 was 79,700 (the commune 91,757), is almost entirely manufacturing, and the trading firms of the town gave employment besides to an equally large number of hands in the vicinity. The weaving establishments number 300 (250 for woollen or woollen and cotton goods), the leading products being fancy and figured stuffs for waistcoats, trousers, overcoats, and dresses, velvet, barége, orleans, furniture coverings, and the like. The yearly production is estimated at £6,000,000 [$29,160,000], but the annual turnover exceeds £8,000,000 [$38,880,000], if all the industries of the place are taken into account. These include 70 wool-spinning mills, 12 cotton mills, silk-works, wool-combing establishments, carpet manufacturies, dye-houses, soap-works, machine-works, and foundries. Roubaix possesses several interesting churches, a library and art museum, a most interesting museum of local industries, communal schools of art and music, an industrial school for weaving, founded in 1857, a chamber of commerce dating from 1871, a chamber of arts and manufactures, a board of prud'hommes, and an agricultural and horticultural society.

The prosperity of Roubaix has its origin in the first factory franchise, granted in 1469 by Charles the Bold to Peter of Roubaix, a descendant of the royal house of Brittany; but the great development of the manufacturing industries of the town and the growth of its population date from the French Revolution. The population, which in 1804 was only 8700, had risen in 1861 to 40,274, in 1866 to 65,091, and in 1876 to 83,000.

ROUBILIAC, Louis François (1695–1762), an able French sculptor. Born at Lyons in 1695, he became a pupil of Balthasar of Dresden and of N. Coustou. About the year 1720 he settled in London, and soon became the most popular sculptor of the time in England, quite superseding the established success of the Flemish Rysbraeck. He died on January 11, 1762, and was buried in the church of St. Martin-in-the-Fields. Roubiliac was very largely employed for portrait statues and busts, and especially for sepulchral monuments in Westminster Abbey and elsewhere. His chief works in the abbey are the monuments of Handel, Admiral Warren, Marshal Wade, Mrs. Nightingale, and the duke of Argyll, the last of these being the first work which established Roubiliac's fame as a sculptor. The statues of George I., Sir Isaac Newton, and the duke of Somerset at Cambridge, and of George II. in Golden Square, London, were also his work, as well as many other important pieces of portrait sculpture. Trinity College, Cambridge, possesses a series of busts of distinguished members of the college by him.

Roubiliac possessed much skill in portraiture, and was technically a real master of his art, but unhappily he lived at a time when it had reached a very low ebb. His figures are uneasy, devoid of dignity and sculpturesque breadth, and his draperies are treated in a manner more suited to painting than sculpture. His excessive striving after dramatic effect takes away from that repose of attitude which is so necessary for a portrait in marble. His most celebrated work, the Nightingale monument, in the north transept of Westminster Abbey, a marvel of technical skill, is only saved from being ludicrous by its ghastly hideousness. On this the dying wife is represented as sinking in the arms of her husband, who in vain strives to ward off a dart which Death is aiming at her. The lower part of the monument, on which the two portrait figures stand, is shaped like a tomb, out of the opening door of which Death, as a half-veiled skeleton is bursting forth. Wonderful patience and anatomical realism are lavished on the marble bones of this hideous figure, and the whole of the grim conception is carried out with much skill, but in the worst possible taste. The statue of Handel in the south transept is well modelled, but the attitude is affected and the face void of any real expression. It is a striking proof of the degraded taste of the age that these painful works when first set up were enthusiastically admired.

ROUCHER, Jean Antoine (1745–1794), a French poet, to whom a melancholy fate and some descriptive verse equal to anything written during at least three-quarters of a century by any of his countrymen except André Chénier, gave some reputation, was born on February 17th, 1745, at Montpellier, and perished by the guillotine at Paris, on July 25, 1794. He wrote an epithalamium on Louis XVI. and Marie Antoinette, gained the favor of Turgot, and obtained a salt-tax collectorship. His main poem was entitled *Les Mois;* it appeared in 1779, was praised in MS., damned in print, and restored to a just appreciation by the students of literature of the present century. It has the drawbacks of merely didactic-descriptive poetry on the great scale, but much grace and spirit in parts. Roucher was by no means anti-revolutionary, but ill-luck and, perhaps, his unpopular employment made him a victim of the Revolution. He lay in prison for nearly a year before his death, and went to it on the same tumbril with Chénier. The malicious wit of Rivarol's *mot* on the ill-success of *Les Mois*, "C'est le plus beau naufrage du siècle," is not intelligible unless it is said that one of the most elaborate passages describes a shipwreck.

ROUEN, a city of France, the ancient capital of Normandy, and now the administrative centre of the department of Seine Inférieure, the seat of an archbishopric and a court of appeal, and the headquarters of the third corps d'armée, stands on a level site on the right bank of the Seine in 49° 26′ N. lat. and 1° 6′ E. long. at the point where it is joined by the Aubette and the small Rivière de Robec; it has also crept some distance up the hills which enclose the valley on the right, and has an extension on the plain on the left bank. The faubourgs by which it is surrounded are, reckoning from the east, Martainville (on the left bank of the Robec), St. Hilaire, Beauvoisine, Bouvreuil, and Cauchoise; and the portion which lies on the left bank of the Seine is known as the Faubourg St. Sever. Between the old town and the faubourgs runs a line of boulevards. Communication between the two banks of the river is maintained by ferry-boats and by two bridges; the upper bridge, a stone structure, is divided into two parts by the Lacroix island and decorated by a statue of Corneille; the lower is an iron suspension bridge which opens in the middle to let masted vessels pass. The railway from Havre to Paris crosses the Seine a little above Rouen, and having passed by a tunnel under the higher quarters of the city reaches a station on the north at a distance of 87 miles from Paris and 55 from Havre. Another station at Martainville is the terminus of the line from Rouen to Amiens; and at St. Sever are those of the lines to Paris and to Orleans by Elbeuf. Since about 1860 wide streets have been driven through the old town, and tramway lines now traverse the whole city and its environs. Rouen, which is 78 miles from the sea, stands fourth in the list of French ports, coming next to Marseilles, Havre, and Bordeaux. Embankments constructed along the lower Seine have forced the river to deepen its own channel, and the land thus reclaimed has more than repaid the expenses incurred. The port is now accessible to vessels drawing 21 feet of water, and by means of easy dredgings this will be increased to from 25 feet to 28 according to the tide. The expansion of the traffic as the im-

provements have advanced is shown by the following returns: whereas in 1856 the number of vessels entered and cleared was 6220, with an aggregate burden of 570,314 tons, the corresponding figures were 4511 and 748,076 in 1876, and 5189 and 1,438,055 in 1880. What is now wanted is an increased amount of quay accommodation, the old line of quays scarcely exceeding 1 mile in length. The building of new quays and repairing-docks for large vessels is in active progress; the port is being dredged and deepened; and schemes are under consideration for a slip, a petroleum dock, and corn elevators.[1] Rouen has regular steamboat communication with Bordeaux, Spain, Algeria, London, Hull, Goole, Plymouth, Bristol, and Canada. A sunken chain allows boats to be towed up to Paris and beyond.

The population of the six cantons of Rouen in 1881 was 105,906, but if the suburbs are included the figure may be stated at about 150,000.

Scale of ½ English Mile.
(Rive Droit) PARIS STATION
BOULEVARD BEAUVOISINE
BOUVREUIL
PLACE DE L'HOTEL DE VILLE
St Ouen
Hôtel Dieu
Prefecture
Cathedrale
CHAMP DE MARS
CLOS St MARC
RIVER SEINE
QUAI DE PARIS
QUAI DU HAVRE
QUAI CAVELIER DE LA SALLE
BOULEVARD D'ORLEANS
Docks Entrepots
ORLEANS STATION
PLACE St SEVER
LA CROIX
Jardin Solferino
Jardin Public
Hospice Général
Palais de Justice
Bourse
Theatre
Douane
Banque
Hôtel de Ville
Musée d'Antiquités
Tour Jeanne d'Arc
RUE THIERS
RUE GASTERIE
RUE DAMIENS
RUE MARTAINVILLE
RUE ORBE
RUE St HILAIRE
PLACE St HILAIRE
COURS DE St PAUL
PLACE St PAUL
RUE DE LENOSTRE
RUE DUGUAY TROUIN
RUE DU RENARD
RUE DE LA GROSSE HORLOGE
RUE St ROMAIN
RUE St LO
RUE aux JUIFS
RUE aux OURS
RUE DES CHARETTES
RUE DE LA VICOMTE
RUE DU GRAND PONT
RUE DU CAUCHOIS
RUE DU CROSNE
RUE DU CONTRAT SOCIAL
RUE DU CHAMP DE MARS
RUE DE LA REPUBLIQUE
RUE D'ALSACE LORRAINE
RUE CENTRALE
RUE DU COMMERCE
QUAI D'ELBOEUF
GARE DE L'OUEST
Rive Gauche
Rive Droite
Ferry
Ferry
Statue de Corneille
Pont Suspendu
Tour Jeanne d'Arc
Eglise St Maclou
Eglise St Ouen
Eglise St Godard
Eglise St Vivien
Eglise St Andre
Eglise St Vincent
Eglise St Gervais
Eglise St Romain
Eglise St Nicolas
Eglise St Sever
Eglise St Hilaire
Eglise St Patrice
Eglise St Eloi
Eglise St Maclou
Eglise St Marc
Eglise St Paul
Eglise St Jean
Eglise St Sever
Eglise St Hilaire
Eglise St Vivien
Eglise St Godard

sians, a people of secondary rank, and it did not attain to any eminence till it was made the centre of Lugdunensis Secunda at the close of the 3d century, and a little later the see of an archbishop. Rouen was largely indebted to its first bishops—from St. Mello, the apostle of the region, who flourished about 260, to St. Remigius, who died in 772. Ten or twelve of those prelates have the title of saints; they built in their city many churches, and their tombs became in turn the origin of new sanctuaries, so that Rouen was already, at that early period, what it has remained to the present time, and in spite of its political character—a religious city full of ecclesiastical monuments. From this period there has been preserved the precious crypt of St. Gervais, which contains the tomb of the second bishop of Rouen, St. Avitian. Under Louis "le Debonnaire" and his successors, Normans several times sacked the city, but the conversion of Rollo, in 912, made Rouen the capital of Normandy, and raised it to a greater degree of prosperity than ever. The first Norman kings of England rather neglected Rouen in favor first of Caen and afterwards of Poitiers, Le Mans, or Angers; but the monasteries, the local trade and manufactures, and the communal organization, which the people of Rouen had exacted from their sovereigns in 1145, maintained a most flourishing state of affairs, indicated by the rebuilding of several sumptuous churches, and notably of the great abbey which had been erected in the 5th century by St. Victrix, and afterwards took the name of St. Ouen from the bishop whose tomb it contained. Of this restoration there remains in the present building a small apse of two stories, the only Norman fragment of any importance preserved by the ancient capital of Normandy. The union of this province to France by Philip Augustus in 1204 did no damage to the prosperity of Rouen, although its inhabitants submitted to their new master only after a siege of nearly three months. To this period belong, if not the commencement, at least the rapid erection of the most important building in the town, the cathedral of Notre Dame, whose vast pile, erected between 1200 and 1220 by an architect called Ingelram or Enguerrand, underwent so many alterations, restorations, and extensions that it took its final form only in the 16th century. It is in plan a Latin cross 427 feet in length, with aisles completely surrounding it and giving access to the three great chapels of the choir. The west façade and those of the transept are of extreme richness. Each was surmounted by two towers, of which only one—the Butter Tower (Tour de Beurre)—was completed. The western façade, frequently enlarged, embellished, or restored from its first construction to the present time, has two charming side doorways of the close of the 12th century, a great central doorway, a rose window, and countless arcades and Gothic pinnacles and turrets of the close of the 15th and the beginning of the 16th century. The width of the front is increased by the projection of the two towers: that on the left hand, the Tour Saint-Romain, was commenced about 1200, and raised to a greater height in 1465–1477; that on the right hand, the finer, has a height of 260 feet, and takes its name of Butter Tower from the fact that it was erected between 1485 and 1507 by means of the moneys paid by the faithful for permission to eat butter in Lent. On the north side of the cathedral are various accessory buildings dating from the Middle Ages, and the Booksellers' Portal, corresponding to the Portail de la Calende in the south transept. Both portals are adorned with statues, and both, as well as the towers which flank them, date from the reigns of St. Louis and Philip the Fair. Above the transept rises the central tower, which was rebuilt in the 15th and 16th centuries, and had, before its destruction by fire in 1822, a height of 430 feet. The iron spire added in 1876, though unfortunately much too slender, has raised it to a height of 485 feet, and thus made it the highest erection in Europe after the spires of Cologne cathedral. While more harmonious in its style than the exterior, the interior of Notre Dame de Rouen presents nothing peculiar in its architecture, with the exception of the false gallery along the nave with passages running round the pillars; but the artistic curiosities are numerous and varied. In the choir may be noted a fine series of 13th-century stained-glass windows, carved stalls of the 15th century, the tombs of the English kings Henry II. and Richard I., that of Bishop Maurille, who built the larger part of the present structure, an elegant Gothic staircase, and various tombs of archbishops and nobles.

Philip Augustus built a castle at Rouen, but it was rather a fortress than a palace, and the kings of France never treated it as a residence; a round keep called Joan of Arc's Tower still stands. On the other hand, nothing remains of the castle erected by Henry V. of England when he took possession of Rouen in 1419 after a sanguinary siege; he proposed making it one of his Continental residences, but it was never completed. It was in Philip Augustus's castle that Joan of Arc was imprisoned and tried, and one of the public squares was the place where she was burned alive in 1431. From that year began a series of attempts on the part of the French to recapture the town. Ricardville in 1432 and Xaintrailles in 1436 failed in spite of the secret connivance of the inhabitants. In 1449 a stronger and better-planned expedition was successful, and Somerset, the English commander, was obliged, in order to secure an honorable capitulation, to surrender the principal fortified places in Normandy. The English rule, though badly supported by the citizens, had not been without its influence on the prosperity of Rouen. It was then that the present church of St. Ouen was continued and almost completed; the foundation was laid in 1311, but the choir alone had been constructed in the 14th century. In spite of the juxtaposition of the second and third or "radiant" and "flamboyant" styles of Gothic, the building taken altogether presents in its general lines the most perfect unity—a unity which even the modern addition of a façade with two bell towers has failed to mar, though no regard was had to the original plans. St. Ouen is the largest church erected in France during the War of the Hundred Years; in length (450 feet) it exceeds the cathedral. The central tower, not unlike the Butter Tower, with which it is contemporary, is 265 feet high; the two new towers with their spires are somewhat lower. Apart from its enormous dimensions and the richness of its southern portal, St. Ouen has nothing that need long detain the visitor; its style is cold and formal; the interior, bare and stripped of its ancient stained glass, was further despoiled in 1562 and in 1791 of its artistic treasures and of almost all its old church-furniture. The organ dates from 1630, and the rather handsome rood-screen from the 18th century. The close of the 15th century and the first half of the 16th—the reigns of Charles VIII., Louis XII., Francis I., and Henry II., and the episcopates of Cardinal Estouteville (1453–1483), Cardinal Georges d'Amboise (1494–1510), and his nephew of the same name (1511–50)—rendered Rouen for nearly a hundred years the metropolis of art and taste in France; and it was one of the first towns where the splendors of the Renaissance burst forth. At this time the church of St. Maclou was erected, a building that can hardly be brought into comparison with the cathedral and St. Ouen, but is justly celebrated for the value and variety of its artistic treasures, such as the carved work of the principal doors, partly executed by Jean Goujon, the beautiful stained glass, and an organ-loft reached by an open-work staircase. The spire, 285 feet high, is a structure of the present century. Beside the church is the old parish cemetery, called the Aître of St. Maclou, surrounded by charming Renaissance galleries and famous for its *danse macabre* formed by a series of sculptured groups. Other churches of the same period—St. Godard, St. Patrice, St. Vincent—are no less interesting from the profusion of their architectural details than from their magnificent 16th-century stained-glass windows. There are two glass windows in St. Godard, and a regular collection in St. Patrice; but the latter, though the most famous, are in the eyes of connoisseurs of less worth than the stained glass in St. Vincent, due to two incomparable artists of Beauvais, Engrand and Jean Le Prince,—the two principal subjects treated by them being the Gifts of Mercy and the Glorification of the Virgin. St. Godard contains, besides, old frescos worthy of note. The church of St. Laurent, no longer used for worship, and the tower of St. André are both of 16th-century origin. At the same period the cathedral received great embellishments, the central flèche was erected, and the portals were decorated with new sculptures. Georges d'Amboise, the virtuous minister of Louis XII., chose the chapel of the Virgin for his place of burial; he caused his mausoleum, constructed after the plans of the architect Roland le Roux, to be composed entirely of marble, as well as his statue, which he ordered from Jean Goujon. Georges d'Amboise the Second was, according to his desire, interred in his uncle's tomb, but his statue is of much less value. Near this tomb are two others erected for the lords of Brézé; both are very remarkable; the oldest belongs to the Gothic style; the other, the tomb of Diana of Poitiers's husband, is a Renaissance structure of the time of Henry II., but, contrary to what was long believed, contains nothing from the hand of Jean Goujon. Under Louis XII. the archbishops of Rouen also rebuilt their palace at the side of the cathedral; but in spite of the richness of its architecture this lordly mansion cannot compete with the "palace of justice" begun in the same year, 1499, when the exchequer of Normandy, which had been established at Rouen in 1302, was erected into a *parlement*, though the title was not adopted till 1515. This sumptuous building is in the Gothic style; but the Hôtel de Bourgtheroulde, which dates from the time of

Francis I., is undisguisedly of the Renaissance, and is justly celebrated for its bas-reliefs, the subjects of which are borrowed from two quite different orders of things—the allegories from Petrarch's *Triumphs*, and the interview of the Field of the Cloth of Gold between Henry VIII. and Francis I. Many other secular Renaissance buildings in Rouen bear witness to the great commercial prosperity of its citizens and to their keen appreciation of the arts:—numerous private houses in stone and especially in wood; the gate of the great clock; and a unique structure, the "fierte" of St. Romain, a sort of pulpit from which every year a person condemned to death raised before the people the shrine or fierte (*feretrum*) of St. Romain, and then received pardon and liberty.

This splendor of the arts began to decline during the wars of religion; in 1562 the town was sacked by the Protestants, which did not prevent the League from obtaining so firm a footing there that Henry IV., after having vainly besieged it, did not obtain entrance till long after his abjuration. To the 18th century belong the exchange and the claustral buildings of the abbey of St. Ouen, transformed into a hôtel de ville. Much more important works have been executed in recent times, but in great part at the expense of the historic and picturesque features of the town. On the other hand, handsome structures of various kinds have been erected in the interests of public utility or embellishment—churches, civil and military establishments, fountains, statues, etc.; and many old buildings have been carefully restored or completed. Rouen, moreover, has recently been provided with museums of antiquities, of fine arts, of ceramic art, of natural history, and of industry,—the first two being very important. During the Franco-German War the city was occupied by the invaders from 5th December, 1870, to 22d July, 1871, and had to submit to heavy requisitions. Among the famous men born at Rouen are the brothers Corneille, Fontenelle, the journalists Armand Carrel and De Villemessant, the composer Boieldieu, the painters Jouvenet, Restout and Géricault, the architect Blondel, Dulong the physicist, and La Salle the American explorer. (A. S.-P.)

ROUGE. This name is applied to various coloring substances of a brilliant carmine tint, especially when used as cosmetics. The least harmful of these preparations are such as have for their basis carthamine, obtained from the safflower (*Carthamus tinctorius*). The Chinese prepare a rouge, said to be from safflower, which, spread on the cards on which it is sold, has a brilliant metallic green lustre, but when moistened and applied to the skin assumes a delicate carmine tint. Jeweller's rouge for polishing gold and silver plate is a fine red oxide of iron prepared by calcination from sulphate of iron (green vitriol).

ROUGET DE LISLE, Claude Joseph (1760–1836), one of the most noteworthy of those authors whom a single short piece of work has made famous, was born on 10th May, 1760, at Lons-le-Saunier. He entered the army as an engineer and attained the rank of captain. He wrote complimentary verses pretty early, and appears to have been a good musician. The song which has immortalized him, the *Marseillaise*, was composed at Strasburg, where Rouget de Lisle was quartered in April, 1792, and he is said to have composed both the words and the music in a fit of patriotic excitement after a public dinner. The piece was at first called *Chant de l'armée du Rhin*, and only received its name of *Marseillaise* from its adoption by the Provençal volunteers whom Barbaroux introduced into Paris, and who were prominent in the storming of the Tuileries. The author himself was unfavorably affected by that very event. He was a moderate republican, and was cashiered and thrown into prison; but the counter-revolution set him at liberty. Little is recorded of his later years, and he received no pension or other mark of favor till the accession of Louis Philippe. He died at Choisy on the 26th June, 1836.

The *Marseillaise* (of which as usually given six-sevenths only are Rouget's) is so well known that no elaborate criticism of it is necessary. The extraordinarily stirring character of the air and its ingenious adaptation to the words serve to disguise the alternate poverty and bombast of the words themselves. As poetry the sixth stanza alone has much merit. Rouget de Lisle wrote a few other songs of the same kind, and set a good many of others' writing to music. He also produced a play or two and some translations. But his chief literary monument is a slender and rather rare little volume entitled *Essais en Vers et en Prose* (Paris, 1796). This contains the *Marseillaise*, a prose tale of the sentimental kind called *Adélaïde et Monville*, and a collection of occasional poems of various styles and dates, from which the author's poetic faculty can be fairly judged. It is humble enough. Rouget was a mere follower of standard models, imitating by turns J. B. Rousseau, La Fontaine, and Voltaire, and exaggerating the artificial language of his time. In *Tom et Lucy*, which turns on a romantic story of the English army in America, he has contrived without in the least knowing it to make a pathetic subject supremely ludicrous. But he seems to have been a very well meaning and harmless person, and he had one moment of remarkable inspiration.

ROULERS, or Rousselaere, a town of Belgium, in the province of West Flanders, on the Mandelbeke, a tributary of the Lys, 22½ miles south of Ostend on the railway to Courtrai. From time immemorial it has been the seat of a great weaving industry, which now produces both cotton, union, and linen goods; and it also manufactures in various other departments. The principal buildings are the town-house, the college, and the church of St. Michel with its conspicuous Gothic tower. The population was 16,345 in 1874, and 17,219 in 1884.

Roulers is mentioned in 822 as Roslar and in 847 as Rollare. Baldwin VIII., count of Flanders, died in a house in the principal square of the town in 1120 on his return from the battle of Angers. In 1794 Roulers was the scene of a conflict between the Austrians and the French.

ROUM (Rúm) is the name by which the Arabs called the Romans, *i.e.*, all subjects of the Roman power. *Bilád al-Rúm*, "the lands of the Romans," accordingly means the Roman empire. The parts of the old empire conquered by the Arabs were regarded as having ceased to be Roman, but the Western Christian lands were still called lands of the Rúm, without reference to the fact that they had in great part ceased to pay any allegiance to the "king of the Rúm," *i.e.*, the Byzantine emperor. When Ibn Jobair takes a passage in a Genoese vessel he speaks of the crew as Romans; and in Spain a "Rúmíya" meant a "Christian slave-girl." Sometimes all Europe is included in the lands of the Rúm; at other times the northern nations are excluded; sometimes again the word means the Byzantine empire; and, finally, the kingdom founded by the Seljúḳs, in lands won by them from Byzantium, is the kingdom of the Seljúḳs of Rúm, so that Rúm comes to take the restricted sense of Asia Minor. So Albulfeda uses the term. Roumelia and Roumania in like manner mean no more than the "Roman country" in a special limitation.

ROUMANIA, a kingdom in the southeast of Europe between the Carpathians, the Pruth, the Black Sea, and the Danube. Plate I. The Pruth and the Kilia mouth of the Danube now form the frontier with Russia. West of Silistria the Danube is the boundary between Roumania and Bulgaria, while to the east of that point the boundary is formed by an irregular line passing east by south to the coast about ten miles to the south of Mangalia. The territory thus shut off between the Danube and the Black Sea is known as the Dobrudja (*q.v.*), and differs in its physical features and products from the rest of the kingdom. It was given to Roumania at the close of the last Russo-Turkish War as a compensation for the territory of Bessarabia, east of the Pruth, which was then restored to Russia. The area of the kingdom is estimated at about 49,250 square miles, which is rather less than that of England without Wales. The greatest length of the kingdom is from east to west near the parallel of 45°, along which the length is about 350 miles. The line stretching from northwest to southeast between the extreme points of the kingdom is about fifteen miles shorter.

The crescent-shaped portion of the kingdom lying

between the Danube and Pruth and the Carpathians is tolerably uniform in its physical features. The southern part of the area is a plain continuous with that of southern Russia. Towards the interior the surface rises gradually but slowly until we come to the spurs of the Carpathians. The Roumanian frontier on this side runs for the most part along the very crest of the mountains, which have peaks rising to from 6000 to 8000 feet and upwards. The lowest part of this plain is that which stretches along the left bank of the Danube, and this also is the dreariest and least productive. Large tracts of it are marshy and subject to inundation, and even beyond the marshy districts the aspect of the country remains extremely uninviting. Agriculture is neglected; coarse grasses occupy large areas; and the most conspicuous feature in the landscape is probably a rude well, such as is seen in the pusstas of Hungary and some parts of southern Russia, where the general aspect of the country is so like what we find here. Farther inland, however, the appearance of the surface improves; agriculture becomes more general, trees (willows, alders, and poplars) more abundant; on the still higher ground nearer the Carpathians the outward signs of comfort and prosperity become more and more apparent; the vine clothes the hill slopes; plums, peaches, and southern fruits are grown in profusion; large forests of oak, beech, and elm reach to the hill tops, and various minerals form an important addition to the present and prospective resources of the country. At elevations too high for the foliage trees just mentioned these are succeeded by pines and firs, birches and larches, which crown the mountains to a height of 5000 or 6000 feet. Extensive as the plains of Roumania are, 40 per cent. of the entire surface is more than a thousand feet above sea-level, while the greater part of the northern (or Moldavian) half of the crescent varies from 300 to 1000 feet, almost all the rest of Moldavia being still more elevated.

Geology.

The superficial geology of Roumania, so far as it is known, is extremely simple, at least on the left bank of the Danube. Quaternary deposits are spread over all the plains. Among these the most important is the yellow loess, which covers such large areas in Hungary also, and which in Roumania attains in places a depth of 150 to 300 feet. In certain parts the black soil of southern Russia extends into Roumania, and is important on account of its richness, though its depth is nowhere above 3 feet. Advancing inland one meets next with Miocene and Eocene deposits, until, in ascending the slopes of the Carpathians, Secondary, Primary, and crystalline rocks are seen to crop out in succession. The desolate plateau of the Dobrudja contrasts with the region on the left of the Danube in its geology as in other respects. Its basis consists of crystalline rocks, but these are covered with sedimentary formations of various ages. On the north this plateau, which is hilly and even mountainous, sinks down rather abruptly to the delta of the Danube, a congeries of alluvial marshes occupied chiefly by aquatic and marsh-loving birds.

Rivers.

Of the rivers of Roumania by far the most important is the Danube, which is navigable for large vessels throughout its Roumanian reach, the first obstruction to navigation, the celebrated Iron Gates, occurring just where it enters Roumanian territory. The breadth of the river is of some consequence in view of the fact that it is a frontier stream, and the marshes on the left bank have at least this advantage that they enable it to serve all the more effectually as a natural boundary. The plains on the left are traversed by numerous winding tributaries of the Danube, but of these the only one of importance as a means of communication is the Pruth, which is navigable for small grain-carrying vessels. The others—the Sereth, Jalomitza, Dambovitza, Olta—are sluggish streams, often half-dry, but yet at certain seasons subject to inundations, which unfortunately occur at a time when the crops are so far advanced as to be liable to be much damaged. In consequence of this the Government has bestowed much pains on the regulation of these streams, and the works for this purpose are rendered further serviceable by the fact that the Roumanian rivers can be turned to account for irrigation.

Climate.

The climate of Roumania is one of extremes as regards temperature. Winter and summer are almost equally trying. In the former season the thermometer may sink to —15° Fahr., while in the latter it may rise to from 90° to 95°. The mean temperature of spring at Bucharest is 53°, summer 72½°, autumn 65°, winter 27½°. Spring, however, scarcely exists except in name, the interval between the cold winter and hot summer being very short. The autumn, on the other hand, is long and is the most genial season of the year. It lasts to the end of November. Being continuous with the Russian plain, Roumania is exposed to the bitterly cold wind from the northeast by which southern Russia is also scourged. In Roumania this wind, known as *crivets*, blows on an average 155 days in the year, while a west or southwest wind, called the *austru*, equally disagreeable for its scorching heat, blows on an average 126 days. The rainfall is not excessive. The number of rainy days in the year is about 74, or only about two-fifths of the number round London. The summer months are those in which the rains are most abundant. Snow is unfrequent (12 days in the year). As regards salubrity the low-lying plains near the Danube are the worst part of the kingdom. Marsh fever is there prevalent, and the tendency to suffer from disease is increased by the miserable character of the dwellings occupied by the peasantry of that district. The houses are mere pits dug out in the ground and covered over with sloping roofs formed of branches and twigs.

Agriculture.

Three-fourths of the population are dependent upon agriculture. The plains covered by loess and black soil are admirably adapted for the growth of cereals, and of these the most important are maize, wheat, and barley. The methods of cultivation are to a large extent primitive and imperfect, but great improvements are taking place through the application of foreign capital to the development of the native resources. Improved agricultural implements of all kinds have been introduced of late years in great numbers. The old plough, which has a share resembling a lance head, which enters the ground horizontally and thus merely scratches the surface, is being rapidly superseded by ploughs of English and Austrian manufacture. These improvements, which have been greatly stimulated by the alteration in the status of the Roumanian peasantry brought about by the law of 1864, and likewise by the introduction of railways, have resulted in an enormous increase in the amount of the production of cereals. Roumania is one of the principal grain-exporting countries in Europe, and the increase in the production just alluded to is sufficiently well indicated by the figures given below relative to the exports of grain to the United Kingdom. The great variations in these figures, though obviously due in part to political causes, likewise serve to illustrate the chief drawback under which Roumanian agriculture labors—namely, the liability to drought.

Besides forming a valuable article of export maize furnishes the chief food of the people. The great body of Roumanians seldom eat meat except on feast days, and the favorite food is a dish called *mamaliga*, made by boiling maize-meal and flavoring it with a little salt. It thus resembles the hominy of the Americans. In addition to cereals many kinds of vegetables, including garlic, melons, and cucumbers, are grown. Hemp and colza are also important products, and tobacco furnished a considerable article of export until it was made a monopoly of the state in 1872. As already mentioned, wine and numerous fruits are produced on the foot-hills of the Carpathians, but owing to neglect the products are greatly inferior to what they ought to be. Nothing, it is said, but care in the cultivation of the vine and the preparation and preservation of the wine is necessary to make Roumania a wine-growing country of the first rank. As it is, vines are estimated to cover only about 250,000 acres, or about $\frac{1}{125}$ of the entire surface. From plums the Roumanians extract a strong spirit known as

tsuica, and it is chiefly for this that the plum-tree is cultivated.

The rearing of domestic animals is likewise an important industry, but it has not advanced so much of late years as the growth of cereals. The exports of cattle are almost stationary. Oxen are of much more importance than horses, being chiefly used in field labors. Buffaloes also are reared for the purpose, and are much valued for their strength. Sheep and cattle rearing forms the chief occupation of the sparse population of the Dobrudja.

Forests. About one-sixth of the total surface of Roumania is estimated to be covered with forests producing valuable timber trees. Oaks, firs, and beeches are said to be met with having a diameter of more than 8 feet at the height of 33 feet above the ground. The warm summers and cold winters are favorable to the quality of the wood, which is hard and lasting. Unfortunately there is a good deal of recklessness in the way in which the forests are utilized, and they are said to be fast disappearing; but it is to be hoped that the influence of the College of Agriculture and Sylviculture at Ferestreu, 2 miles from Bucharest, will help to put a check upon this improvidence, as it is without doubt contributing greatly to the promotion of Roumanian agriculture.

Minerals. The mineral wealth on the Roumanian side of the Carpathians is considerable, but at present there are only three minerals that have any great industrial importance. These are rock-salt, petroleum, and lignite. The salt mines are a state monopoly, and two of them, at Ocna-Mare and Telega, are partly worked by convicts. The depth from which the salt is extracted nowhere exceeds 300 feet. The average quantity of salt sold annually is about 62,000 tons. Lignite is important inasmuch as it is used along with wood on the railways, as well as in brick and lime kilns. Coal is also found, in some places even at the surface, but, though one or two mines have been opened, the total production is insignificant. Ozocerite, or fossil wax, is frequently found in association with lignite, but is used only in small quantity by the peasantry. Among other minerals are anthracite, iron, gold, copper, lead, sulphur, cobalt, and arsenic; and there is little doubt that some of these at least might be made economically valuable if the resources of the country were adequately developed.

Manufactures. So far the manufacturing industries of Roumania are hardly worthy of mention. There are petroleum refineries, one or two sugar refineries, numerous steam-mills for grinding flour, besides large numbers of floating maize-mills on the Danube; but in addition to these there are only a few manufactories at Galatz.

Trade. From the account just given of the products of Roumania it follows that the exports of the kingdom consist chiefly of raw produce, and above all of cereals, while the imports are mainly composed of manufactured articles. The countries with which the trade is chiefly carried on are Austria (with about 40 per cent. of the whole trade in 1883), Great Britain (about 30 per cent.), France (about 10 per cent.), Germany (about 8 per cent.), Turkey, and Russia. The foreign commerce of Roumania is centred in Galatz, which is situated at the bend of the Danube where the river once more turns eastward on reaching the northern extremity of the Dobrudja plateau. From this centre there is one line of railway leading into Russia, while others pass through the interior of Roumania and connect with the Austrian lines in the north and south of Hungary. The first Roumanian railway was that from Giurgevo to Bucharest, opened in 1869. In 1884 there were about 1000 miles of railway in the kingdom. The internal trade of Roumania is almost entirely in the hands of the Jews. It is greatly hampered by the existence of the octroi in all the large towns, almost all the necessaries of life as well as luxuries being taxed when introduced within the municipal boundaries.

See Samuelson, *Roumania, Past and Present* (London, 1882); Ozanne, *Three Years in Roumania* (London, 1878); Kanitz, *Donau-Bulgarien und der Balkan* (1875); and R. Roesler, *Romänische Studien.*

(G. G. C.)

Statistics.

Produce. The approximate proportion of cultivated and uncultivated land in Roumania is given in pogones (= 1¼ acres) as follows:

Cereals, gardens, vines	4,945,708
Pasture and hay	7,693,910
Forests	4,029,947
Uncultivated	7,574,336

The annual yield of cereals of all kinds is roughly estimated at 15,000,000 quarters [24,000,000 bu.]. The number of horned cattle in the country is about 3,000,000.

In 1883 the following were the values of the principal articles of import and export:

	Imports.	Exports.
Textiles	£4,706,063	£248,504
Metals	2,926,576	73,196
Skins, leather	1,749,674	257,136
Wood and Manufactures	754,754	323,372
Exotic products	713,000	24,080
Minerals, pottery	455,510	12,760
Oils, fat, etc	374,337	5,992
Cereals	281,377	6,902,280
Animals	159,420	465,692
Fruits, vegetables	62,846	171,381

Imports and exports. The total imports of British home produce, mostly cotton goods, etc., and iron, into Roumania in 1883 amounted to £1,344,619 [$6,534,848.34], and the total exports, mostly barley and maize, of Roumania to Great Britain to £3,516,442 [$17,089,908.12].

There were in 1884 about 1000 miles of railway complete in the kingdom, and 3000 miles of telegraph lines.

Population. The estimated population of the country is 5,376,000, including about 400,000 Jews and 200,000 Gipsies. About four and a half millions of the population belong to the Roumanian branch of the Orthodox Greek Church, and there are 114,000 Roman Catholics and 13,800 Protestants.

An official analysis of the occupations of the people gives the following results (the figures representing heads of families):

Agriculturists	684,168
Artisans and laborers	83,061
Traders	30,417
Officials	22,811
Professors and teachers	6,066
Medical and legal professions and druggists	995
Artists, musicians, and publicists	2,156
Priests, monks, and nuns	18,452
Various	125,815
Total	973,941

Of the larger cities Bucharest (Bucurest) numbered in 1879 221,805 inhabitants, Jassy 90,125, and Galatz 80,763.

Education. In 1883 there were 2742 primary schools with 124,130 pupils, 8 normal schools with 830 pupils, and 54 high schools with 7993 pupils, besides the two universities of Bucharest and Jassy, containing 97 professors and readers and 705 students. It is estimated that about 1000 young men receive their university education abroad, mostly at Paris. There is also a ladies' college, called the Asyle Hélène from its founder in its present form, the Princess Helena Cuza, and accommodating 230 girls, many of whom are orphans.

Learned institutions. Amongst learned institutions the Roumanian Academy claims the first place, and excellent contributions on subjects of national and scientific interest will be found amongst its proceedings (*Analele Academiei Romane*, 1878 *sq.*). The academy building at Bucharest contains the national library of over 30,000 volumes and a fine archæological museum containing many Old Dacian antiquities.

Army. The peace strength of the permanent army consists of 1200 officers and 18,532 men, with 180 guns.[1] Besides this, there are the territorial army, consisting of 120,000 men and 84 guns; the militia, consisting of thirty-two regiments of infantry; and finally the *levée en masse*. Every Roumanian, from his twenty-first to his forty-sixth year, is obliged to serve his time in one of the above categories. The total of the Roumanian forces, exclusive of the *levée en masse*, amounts to about 150,000 men and 288 guns.

Mediæval and Modern History of Walachia and Moldavia.

Roumania is the name officially adopted by the united kingdom that comprises the former principalities of Walachia and Moldavia. In its native form it appears simply as "Romania," representing the claim to Roman descent put forward by its inhabitants. These call themselves "Romani" or "Rumeni," but by their neighbors, Slavonic, Greek, Magyar, and German, they are universally known by one or other form of the word "Vlach." As, however, this Vlach or Rouman race occupies a far wider area than that included in the present Roumanian kingdom, it may be convenient to postpone the vexed questions connected with its origin,

[1] [*Almanach de Gotha* for 1886, p. 932, gives standing army: officers, 1249; men, 31,627; horses, 5,558; cannon, 312.—Am. Ed.]

migrations, and distribution for more general treatmeut uuder the headiug VLACHS, and to confine ourselves on this occasion to Roumania proper—the country between the Carpathians, the Lower Danube, and the Black Sea. It may be sufficieut here to observe that, according to the concurreut accounts from various sources, the great plains of the later Walachian aud Moldavian principalities were first occupied by an immigrant Rouman population comiug from the Carpathian lands and the preseut Transylvania in the early Middle Ages. According to the Russian Nestor and the earliest Hungarian chroniclers, the Carpathiau rcgion, including tracts of eastern Hungary, were occupied by a Rouman ("Roman") population at the time of the Magyar invasion in the 9th century. On the other haud, the meagre annals of the plains that lie on the left bauk of the Lower Danube are exclusively occupied till at least the 11th century with Slovenes, Petchenegs, Cumans, and Bulgarians. Whatever title the Carpathian Roumans may have to be considered the descendants *in situ* of the Romanized provincials of Trajan's Dacia, it seems fairly ascertained that the present extension of this easternmost branch of the Latiu peoples over the Walachian and Moldavian plains is due to a colonizing movement from the Alpine regions to the west, effected for the most part in the 12th and succeeding ceuturies.

Walachia.—For the early history of the Walachian (Valachian, or Wallachian) principality the native sources are late and untrustworthy. These sources really reduce themselves to a single chronicle, a part of which appears to have been drawn up in the 16th century in Bulgaro-Slovene, and of which two Rouman translations have seen the light. This "History of the Rouman land since the arrival of the Roumans" (*Istoria tierei Romanesci de cândŭ au descălicata Romanii*) gives a precise account of the founding of the Walachian state by Radul Negru, voivode of the Roumans of Fogaras in Transylvania, who in 1290 descended with a uumerous people into the Transalpine plain and established his capital first at Cîmpulungŭ and then at Argish. Radul dies in 1314 and is succeeded by a series of voivodes whose names and dates are duly given; but this early chapter of Walachian history has been rudely handled by Roesler in his essay on the oldest history of the Walachian voivodeship (*Românische Studien*, p. 261 *sq.*). The so-called "Chronicle of Hurul" is a modern forgery, and our only real authorities for the beginnings of Roumanian history are Hungarian, Polish, and Byzantine.

Radul Negru.

Iu 1330 the voivode Alexander Bazarad or Bassaraba succeeded in inflicting a crushiug defeat on his suzerain King Charles of Huugary, and for fourtcen years Wallachia enjoyed complete independence. Louis the Great succeeded for a while in restoring the Hungarian supremacy, but in 1367 the voivodc Vlad or Vladislav inflicted another severe defeat on the Hungarians, and succeeded for a time in ousting the Magyar ban of Sevcrin aud thus incorporating Little Walachia, the country west of the Aluta, in his dominions. Subsequently, in order to retain a hold on the loyalty of the Walachian voivode, the kiug of Hungary invested him with the title of Duke of Fogaras and Omlas, Rouman districts situate in Transylvania, and this investiture seems to have left its impress on the traditional account of Radul Negru.

Hungarian supremaey.

Under the voivode Mircea (1383–1419), whose prowess is still celebrated in the national folk-songs, Walachia played for a while a more ambitious part. This prince, during the earlier part of his reign, sought a counterpoise to Hungarian influence in the close alliance with King Vladislav Jagiełło of Poland. He added to his other titles that of "count of Severin, despot of the Dobrudja, and lord of Silistria," and both Widin and Sistov appear in his possession. A Walachian contingent, apparently Mircea's, aided the Servian Kniaz Lazar on the fatal field of Kosovo; later he was led by the force of circumstances to ally himself with his former enemy Sigismuud of Hungary against Bajazet, and in 1396 shared with him the disaster of Nikopolis. Bajazet subsequently invaded and laid waste a largc part of Walachia, but the voivode succeeded in inflicting considerable loss on the retiring Turks, and the capture of Bajazet by Timur in 1402 gave the couutry a reprieve. In the internecine struggle that followed amongst the sons of Bajazet, Mircca espoused the cause of Musa; but, though he thus obtained for a while considerable influence in the Turkish couucils, this policy eventually drew on him the vengeance of Sultan Mahomet I., who succeeded in reducing him to a tributary position.

Mireea.

During the succeeding period the Walachian princes appear alternately as the allies of Hungary or the creatures of the Turk. In the later battle of Kosovo of 1448, betwcen Hunyadi and Sultan Murad, the Walachian contingent treacherously surrendered to the Turks, but this did not hinder the victorious sultan from massacreing the prisoners and adding to the tribute a yearly contribution of 3000 javelins and 4000 shields. Iu 1453 Constantinople fell; in 1454 Hunyadi died; and two years later the sultan iuvaded Walachia to set up Vlad IV., the son of a former voivode. The father of this Vlad had himself been notorious for his ferocity, but his son, duriug his Turkish sojourn, had improved ou his father's example. He was known in Walachia as "Dracul," or the Devil, and has left a name iu history as Vlad the Impaler. The stories of his ferocious savagery exceed belief. He is said to have feasted amongst his impaled victims. When the sultan Mahomet, infuriated at the impalement of his cnvoy, the pasha Widin, who had been charged with Vlad's deposition, invaded Walachia in person with an immense host, he is said to have found at one spot a forest of pales on which were the bodies of men, women, and children. The voivode Radul, who was uow substitutcd for this monster by Turkish influence, was constraiued to pay a tribute of 12,000 ducats.

Vlad the Impaler.

The shifting policy of the Walachian princes at this time is well described in a letter of the Hungarian king Matthias to Casimir of Poland. "The voivodes," he writes, "of Walachia and Moldavia fawn alternately upon the Turks, the Tatars, thc Poles, and the Hungarians, that among so many masters their perfidy may remain unpunished." The prevalent laxity of marriage, the frequency of divorce, and the fact that illegitimate childreu could succeed as well as those born iu lawful wedlock, by multiplying the candidates for the voivodeship and preventing auy regular system of succession, contributed much to the interual confusion of the country. The elections, though often controlled by the Divan, were still constitutionally in the hauds of the boiars, who were split up into various factions, each with its own pretender to the throne. The princes followed one another in rapid succession, and a large proportion met with violent ends. A large part of the populatiou led a pastoral life, and at the time of Verantius's visit to Walachia iu the early part of the 16th century the towus and villages were built of wood and wattle and daub. Tirgovist alone, at this time the capital of the country, was a considerable town, with two stone castles. Nagul Bassaraba, who succeeded in 1512, was a great builder of monasteries, and, besides erecting a monastic church at Argish, which he coated with white marble, and a new cathedral at Tirgovist, adorned Mount Athos with his pious works. He transferred the direct allegiauce of the Walachian Church to Constantinople. On Nagul's death, however, in 1521, the brief period of comparative prosperity which his architectural works attest was tragically interrupted, and it seemed for a time that Walachia was doomed to sink into a Turkish pashalic. The Turkish commander, Mahmoud Bey, became treacherously possessed of Nagul's young son and successor, and, seudiug him a prisoner to Stamboul, proceeded to nominate Turkish governors in the towns and villages of Walachia. The Walachians resisted desperately, elected Radul, a kinsman of Nagul, voivode, and succeeded with Hungarian help in defeating Mahmoud Bey at Grumatz in 1522. The couflict was prolonged with varying fortunes, but in 1524 the dogged opposition of the Walachians finally triumphed in the sultan's recognition of Radul.

State of Walachia *circ.* 1500.

Turkish oppressions.

But, though Walachia thus escaped conversion into a Turkish pashalic, the battle of Mohacs in 1526 decided the long preponderance of Turkish control. The unfortuuate province served as a transit route for Turkish expeditious against Hungary and Transylvania, and was exhausted by continual requisitions. Turkish settlers were gradually making good their footing on Walachian soil, and mosques were rising in the towns and villages. The voivode Alexander, who succeeded in 1591, and who like his predecessors had bought his post of the Divan, carried the oppression still further by introducing against the capitulations a janizary guard, and farming out his possessions to his Turkish supporters. Meanwhile the Turkish governors on the Bulgarian bank never ceased to ravage the country, and again it seemed as if Walachia must share the fate of the Balkan states and succumb to the direct government of the Ottoman. In the depth of the national distress the choice of the people fell on Michael, the son of Petrushko, ban of Krajova, the first dignitary of the realm, who had fled to Transylvania to escape Alexander's machinations. Supported at Constantinople by two at that time influential personages, Sigmund Báthori and the English ambassador, Edward Barton, and aided by a loan of 200,000 florins [gold coin= $334,000], Michael succeeded in procuring from the Divan the deposition of his enemy and his own nomination.

The genius of Michael "the Brave" (1593–1601) secured Walachia for a time a place in universal history. The

moment for action was favorable. The emperor Rudolph II. had gained some successes over the Turks, and Sigmund Báthori, prince of Transylvania, had been driven by Turkish extortions to throw off the allegiance to the sultan. But the first obstacle to be dealt with was the presence of the enemy within the walls, and Michael had recourse to the same desperate expedient as the Montenegrins at a later date. By previous concert with the Moldavian voivode Aarou, on November 13, 1594, the Turkish guards and settlers in the two principalities were massacred at a given signal. Michael followed up these "Walachian Vespers" by an actual invasion of Turkish territory, and, aided by Sigmund Báthori, succeeded in carrying by assault Rustchuk, Silistria, and other places on the right bank of the lower Danube. A simultaneous invasion of Walachia by a large Turkish and Crim-Tatar host was successfully defeated; the Tatar khan withdrew with the loss of his bravest followers, and, in the great victory of Mantin on the Danube (1595), the Turkish army was annihilated, and its leader Mustafa slain. The sultan now sent Sinan Pasha "the Renegade" to invade Walachia with 100,000 men. Michael withdrew to the mountains before this overwhelming force, but, being joined by Báthori with a Transylvanian contingent, the voivode resumed the offensive, stormed Bucharest, where Sinan had entrenched a Turkish detachment, and, pursuing the main body of his forces to the Danube, overtook the rearguard and cut it to pieces, capturing enormous booty. Sinan Pasha returned to Constantinople to die, it is said, of vexation, and in 1597 the sultan, weary of a disastrous contest, sent Michael a red flag in token of reconciliation, reinvested him for life in an office of which he had been unable to deprive him, and granted the succession to his son.

Michael the Brave.

In 1599, on the definitive abdication of Sigmund Báthori in Transylvania, Michael, in league with the imperialist forces under General Basta, and in connivance with the Saxon burghers, attacked and defeated his successor Andreas Báthori near Hermannstadt, and, seizing himself the reins of government, secured his proclamation as prince of Transylvania. The emperor consented to appoint him his "locum tenens per Transylvaniam," and the sultan ratified his election. As prince of Transylvania he summoned diets in 1599 and 1600, and, having expelled the voivode of Moldavia, united under his sceptre three principalities. The partiality that he showed for the Rouman and Szekler parts of the population alienated, however, the Transylvanian Saxons, who preferred the direct government of the emperor. The imperial commissioner, General Basta, lent his support to the disaffected party, and Michael was driven out of Transylvania by a successful revolt, while a Polish army under Zamoyski invaded Walachia from the Moldavian side. Michael's coolness and resource, however, never for a moment deserted him. He resolved to throw himself on the emperor, rode to Prague, won over Rudolph by his singular address, and, richly supplied with funds, reappeared in Transylvania as imperial governor. In conjunction with Basta he defeated the superior Transylvanian forces at Gorosló, expelling Sigmund Báthori, who had again aspired to the crown, and taking one hundred and fifty flags and forty-five cannon. But at the moment of his returning prosperity Basta, who had quarrelled with him about the supreme command of the imperial forces, procured his murder (August 19, 1601). Thus perished Michael the Brave in the forty-third year of his age, after performing in the course of his short reign achievements which, considering the small resources at his disposal, must place his name beside those of Hunyadi and Sobieski in the annals of eastern Europe. Not only did he succeed in rolling back for a time the tide of Turkish conquest, but for the first and last time in modern history he united what once had been Trajan's Dacia, in its widest extent, and with it the whole Rouman race north of the Danube, under a single sceptre.

Conquest of Transylvania.

Michael's wife Florika and his son Petrushko were carried off into Tatar captivity, and Serban, of the Bassaraba family, was raised to the voivodeship of Walachia by imperialist influences. On his deposition by the Porte in 1610, there followed a succession of princes who, though still for the most part of Rouman origin, bought their appointment at Stamboul. Walachian contingents were continually employed by the Turks in their Polish wars, and the settlement of Greeks in an official or mercantile capacity in the principality provoked grave discontent, which on one occasion took the form of a massacre. The reign of the voivode Matthias Bassaraba, who succeeded in 1633, was an interval of comparative prosperity, and its length, twenty-one years, forms itself a

Turkish domination.

Matthias Bassaraba.

panegyric. He defended himself successfully against his powerful rival Vasilje Lupul, the voivode of Moldavia, and his Tatar and Cossack allies, and found a golden key to Turkish tolerance. He appears as a lawgiver, translating the *Basilica* of Jo. Comnenus, and founded many churches and monasteries. His last days were embittered, however, by an outbreak of military anarchy. On his death the Turkish yoke again weighed heavier on Walachia. The old capital Tirgovist was considered by the Divan to be too near the Transylvanian frontier, and the voivodes were accordingly compelled to transfer their residence to Bucharest. The mechanical skill of the Walachians was found useful by the Turks, who employed them as carpenters and pontonniers; and during the siege of Vienna by Kara Mustafa in 1683 the Walachian contingent, which, under the voivode Serban Cantacuzene, had been forced to coöperate with the Turks, was entrusted with the construction of the two bridges over the Danube above and below Vienna. The Walachian as well as the Moldavian prince, who had been also forced to bring his contingent, maintained a secret intelligence with the besieged, an intelligence continued by the voivode Serban after his return to Walachia. The emperor granted him a diploma creating him count of the empire and recognizing his descent from the imperial house of Cantacuzene, Serban meanwhile collecting his forces for an open breach with the Porte. His prudence, however, perpetually postponed the occasion, and Walachia enjoyed peace to his death in 1688. This peaceful state of the country gave the voivode leisure to promote its internal culture, and in the year of his death he had the satisfaction of seeing the first part of a Walachian Bible issue from the first printing-press of the country, which he had established at Bucharest. He had also caused to be compiled a history of Walachia, and had called to the country many teachers of the Greek language, whose business it was to instruct the sons of the boiars in "grammar, rhetoric, and philosophy."

Serban Cantacuzene.

Immediately on Serban's death the boiars, to prevent the Porte from handing over the office to the Greek adventurer who bid the highest, proceeded to elect his sister's son Constantine Brancovan. The Turkish capidji pasha, then in Bucharest, was persuaded to put the caftan on his head in token of Turkish approval, and the patriarch of Constantinople, who was also present, and the archbishop of Walachia, Theodosius, consecrated him together at the high altar of the cathedral, where he took the coronation oath to devote his whole strength to the good of his country and received the boiar's oath of submission. Brancovan, it is true, found it expedient to devote his predecessor's treasure to purchasing the confirmation of his title from the Divan, but the account of his coronation ceremony remains an interesting landmark in the constitutional history of the country. In his foreign relations with the Hapsburg power he displayed the same caution as the voivode Serban. In spite of the victories of the margrave of Baden at Pojarevatz, Nish, and Widiń in 1689, it was only by an exercise of force that the imperial troops secured winter quarters in Walachia, and, though after the battle of Pultava in 1709 Brancovan concluded a secret treaty with Czar Peter, he avoided giving open effect to it. The tranquillity which he thus obtained was employed by Brancovan as by his predecessor in furthering the internal well-being of the country, with what success is best apparent from the description of Walachia left by the Florentine Del Chiaro, who visited the country in 1709 and spent seven years there. He described the stoneless Walachian plain, with its rich pastures, its crops of maize and millet, and woods so symmetrically planted and carefully kept by Brancovan's orders that hiding in them was out of the question. Butter and honey were exported to supply the Grand Signor's kitchen at Stamboul; wax and cattle to Venice; and the red and white wine of Walachia, notably that of Pitesti, to Transylvania. The Walachian horses were in demand amongst the Turks and Poles. Near Ribnik and elsewhere were salt mines which supplied all the wants of the Transdanubian provinces; there were considerable copper mines at Maidan; and iron was worked near Tirgovist. The Gipsy community was bound to bring fifteen pounds weight of gold from the washings of the Argish. The boiars were many of them wealthy, but the common people were so ground down with taxation that "of their ancient Roman valor only the name remained." To avoid the extortion of their rulers numbers had emigrated to Transylvania and even to the Turkish provinces. The principal Walachian city was Bucharest (Bucurest), containing a population of about 50,000; but, except for two large "hans" or merchants' halls built by Brancovan and his predecessor, and the recently-

Constantine Brancovan.

Del Chiaro's description of Walachia.

erected palace, which had a marble staircase and a fine garden, the houses were of wood. The other principal towns were Tirgovist, the old capital, Cernetz, Fokshani, supplied by Braucovau with an aqueduct, Ploiesti, Ghierghitza, Rusi di Vede, and Krajova, the capital of the banat of that name, where a fine han had also been built. At Cîmpuluugu was a great annual fair. The dress of the men was thoroughly Turkish except for their lambskin caps, that of the women half-Greek half-Turkish. The houses were scrupulously clean aud strewn with sweet herbs. Del Chiaro notices the great imitative capacity of the race, both artistic and mechanical. A Walachian in Venice had copied several of the pictures there with great skill; the copper-plates and wood engravings for the new press were executed by native hands. The Walachians imitated every kind of Turkish and European manufacture; and, though the boiars imported finer glass from Venice aud Bohemia, a glass manufactory had been established near Tirgovist which produced a better quality than the Polish. From the Bucharest press, besides a variety of ecclesiastical books, there were issued in the Rouman tongue a trauslation of a French work entitled "The Maxims of the Orientals" and "The Romance of Alexander the Great." In 1700 Brancovan had a map of the country made and a copper-plate engraving of it executed at Padua.

Fall of Brancovan.

The prosperity of Walachia, however, under its "Golden Bey," as Brancovan was known at Stamboul, only increased the Turkish exactions. In 1701 the tribute was increased to 80,500 purses of 500 florins each [silver coin=$16,502,500]. In 1703 the voivode was summoned in person to Adrianople, and again must resort to extraordinary means to mollify the Divan. Shortly after, the Walachians were called on to supply masons, carpenters, and other workmen for the fortification of Bender, and though these and other demands were punctually met and the increased tribute regularly paid, the sultan finally resolved on the removal of his too prosperous vassal. Brancovan was accused of secret correspondence with the emperor, the czar, the king of Poland, and the Venetian republic, of betraying the Porte's secrets, of preferring Tirgovist to Bucharest as a residence, of acquiring lands and palaces in Transylvania, of keeping agents at Venice and Vienna, in both of which cities he had invested large sums, and of striking gold coins with his effigy, one of which, with the legend CONSTANTINVS BASSARABA DE BRANCOVAN D. G. VOEVODA ET PRINCEPS VALACHIÆ TRANSALPINÆ, and having on the reverse the crowned shield of Walachia containing a raven holding a cross in its beak between a moon and a star, is engraved by Del Chiaro. They were of 2, 3, and 10 ducats weight. A capidji pasha arrived at Bucharest on April 4, 1714, and proclaimed Brancovan "mazil," *i.e.*, deposed. He was conducted to Constantinople and beheaded, together with his four sons. A scion of the rival Cantacuzenian family was elected by the pasha's orders, and he, after exhausting the principality for the benefit of the Divan, was in turn deposed and executed in 1716.

The Fanariote regime.

From this period onwards the Porte introduced a new system with regard to its Walachian vassals. The line of national princes ceases. The office of voivode or hospodar was sold to the highest bidder at Stamboul, to be farmed out from a purely mercenary point of view. The princes who now succeeded one another in rapid succession were mostly Greeks from the Fanar quarter of Constantinople who had served the palace in the quality of dragoman, or held some other court appointment. They were nominated by imperial firman without a shadow of free election, and were deposed and transferred from one principality to another, executed or reappointed, like so many pashas. Like pashas they rarely held their office more than three years, it being the natural policy of the Porte to multiply such lucrative nominations. The same hospodar was often reappointed again and again as he succeeded in raising the sum necessary to buy back his title. Constantine Mavrocordato was in this way hospodar of Walachia at six different times, and paid on one occasion as much as a million lion-dollars[1] for the office. The princes thus imposed on the country were generally men of intelligence and culture. Nicholas Mavrocordato, the first of the series, was himself the author of a Greek work on duties, and maintained at his court Demeter Prokopios of Moschopolis, who wrote a review of Greek literature during the 17th and beginning of the 18th centuries. Constantine Mavrocordato was the author of really liberal reforms. He introduced an "urbarium" for the peasants, limiting the days of "angaria," or forced labor for the landlord, to twenty-four, and iu 1747 decreed the abolition of serfdom. But the new system could not but be productive of grinding oppression, and the swarms of "hungry Greeklings" who accompanied the Fanariote rulers from Stamboul made their rule doubly hateful. Numbers of the peasantry emigrated, and the population rapidly diminished. In 1745 the number of tax-paying families, which a few years before had amounted to 147,000, had sunk to 70,000. Yet the taxes were continually on the increase, and the hospodar Scarlatŭ Ghika (1758–61), though he tried to win some popularity by the removal of Turkish settlers and the abolition of the "vakarit," or tax on cattle and horses, which was peculiarly hateful to the peasantry, raised the total amount of taxation to 25,000,000 lion-dollars.[1] The Turks meantime maintained their iron grip on the country by holding on the Walachian bank of the Danube the fortresses of Giurgevo, Turnul, and Orsova, with the surrounding districts.

[1] [The Roumanian laws of the 17th century recognized a silver lion coin worth about 57 cents, and one of gold equal to $1.04.—AM. ED.].

But the tide of Ottoman dominion was ebbing fast. Already, by the peace of Passarovitz (Pojarevatz) in 1718, the banat of Krajova had been ceded to the emperor, though by the peace of Belgrade in 1739 it was recovered by the Porte for its Walachian vassal. In 1769 the Russian general Romanzoff occupied the principality, the bishops and clergy took an oath of fidelity to the empress Catherine, and a deputation of boiars followed. The liberties of the country were guaranteed, taxation reformed, and in 1772 the negotiations at Fokshani between Russia and the Porte broke down because the czarina's representatives insisted on the sultan's recognition of the independence of Walachia and Moldavia under an European guarantee.

Treaty of Kutshuk Kainardji.

By the treaty of Kutshuk Kainardji, concluded in 1774, Russia consented to hand back the principalities to the sultan, but by Art. xvi. several stipulations were made in favor of the Walachians and Moldavians. The people of the principalities were to enjoy all the privileges that they had possessed under Mahomet IV.; they were to be freed from tribute for two years, as some compensation for the ruinous effects of the last war; they were to pay a moderate tribute; the agents of Walachia and Moldavia at Constantinople were to enjoy the rights of nations, and the Russian minister at the Porte should on occasion watch over the interests of the principalities. The stipulations of the treaty of Kutshuk Kainardji, though deficient in precision (the Walachians, for instance, had no authentic record of the privileges enjoyed under Mahomet IV.), formed the basis of the future liberties in both principalities; and, as from this period onwards Walachian history is closely connected with that of Moldavia, it may be convenient before continuing this review to turn to the earlier history of the sister principality.

Early Moldavian history.

Moldavia. — The mention of Vlachs on the borders of Galicia in 1160 (Nic. Chon., p. 171) gives just ground for believing that a Rouman population existed in Moldavia at least as early as the first half of the 12th century. Under the successive domination, however, of Petchenegs, Cumans, and Tatars, it occupied as yet a subordinate positiou. It was not till 1352 that the Tatars, already weakened by Polish assaults on the Podolian side, were expelled from this Cumanian region by the Transylvanian voivode Andreas Laszkovich. It is in fact to the period immediately succeeding this event that the first establishment of an independent Rouman state in Moldavia is referred by the concurrent testimony of Moldavian, Russian, and Hungarian sources.

According to the native traditional account, as first given by the Moldavian chrouiclers of the 17th and 18th centuries (Grigorie Urechie and Miron Costin), Dragosh the son of Bogdan, the founder of the new principality, emigrated with his followers towards the end of the 14th century from the Hungarian district of Marmaros in the North Carpathians. The story is related with various fabulous accompaniments. From the aurochs (*zimbru*), in pursuit of which Dragosh first arrived on the banks of the Molda, is derived the ox-head of the Moldavian national arms, and from his favorite hound who perished in the waters the name of the river. From the Hungarian and Russian sources, which are somewhat more precise, the date of the arrival of Dragosh, who otherwise appears as Bogdan, in Moldavia appears to have been 1359, and his departure from Marmaros was carried out in defiance of his Hungarian suzerain.

Rival claims of Poland and Hungary.

In the agreement arrived at between King Louis of Hungary and the emperor Charles IV. in 1372 the voivodate of Moldavia was recognized as a dependency of the crown of St. Stephen. The overlordship over the country was, however, contested by the king of Poland, and their rival claims were a continual source of dispute between the two kingdoms. In 1412 a remarkable agreement was arrived at between Sigismund, in his quality of king of Hungary,

and King Jagiełło of Poland, by which both parties consented to postpone the question of suzerainship in Moldavia. Should, however, the Turks invade the country, the Polish and Hungarian forces were to unite in expelling them, the voivode was to be deposed, and the Moldavian territories divided between the allies. During the first half of the 15th century Polish influence was preponderant, and it was customary for the voivodes of Moldavia to do homage to the king of Poland at Kameniec or Suyatiu.

Stephen the Great.

In 1456 the voivode Peter, alarmed at the progress of the Turks, who were now dominant in Servia and Walachia, offered Sultan Mahomet a yearly tribute of 2000 ducats [Russian gold coin = $4540]. On his deposition, however, in 1458 by Stephen, known as "the Great," Moldavia became a power formidable alike to Turk, Pole, and Hungarian. Throughout the long reign of this voivode, which lasted forty-six years, from 1458 to 1504, his courage and resources never failed him. In the early part of his reign he appears, in agreement with the Turkish sultan and the king of Poland, turning out the Hungarian vassal, the ferocious Vlad, from the Walachian throne, and annexing the coast cities of Kilia and Cetatea Alba or Bielogorod, the Turkish Akierman. In the autumn of 1474 the sultan Mahomet entered Moldavia at the head of an army estimated by the Polish historian Dlugoss at 120,000 men. Voivode Stephen withdrew into the interior at the approach of this overwhelming host, but on January 17, 1475, turned at bay on the banks of Lake Rakovietz and gained a complete victory over the Turks. Four pashas were among the slain; over a hundred banners fell into the Moldavian hands; and only a few survivors succeeded in reaching the Danube. In 1476 Mahomet again entered Moldavia, thirsting for vengeance, but, though successful in the open field, the Turks were sorely harassed by Stephen's guerilla onslaughts, and, being thinned by pestilence, were again constrained to retire. In 1484 the same tactics proved successful against an invasion of Bajazet. Three years later a Polish invasion of Moldavia under John Albert with 80,000 men ended in disaster, and shortly afterwards the voivode Stephen, aided by a Turkish and Tatar contingent, laid waste the Polish territories to the upper waters of the Vistula, and succeeded in annexing for a time the Polish province of Pokutia that lay between the Carpathians and the Dniester.

Moldavia *circ.* 1500.

Exclusive of this temporary acquisition, the Moldavian territory at this period extended from the river Milcov, which formed the boundary of Walachia, to the Dniester. It included the Carpathian region of the Bukovina, literally "the beechwood," where lay Sereth and Suciava, the earliest residences of the voivodes, the maritime district of Budzak (the later Bessarabia), with Kilia and Bielogorod, and the left bank of the lower Danube from Galatz to the Sulina mouth. The government, civil and ecclesiastical, was practically the same as that described in the case of Walachia, the officials bearing for the most part Slavonic titles derived from the practice of the Bulgaro-Vlachian czardom. The church was Orthodox Oriental, and depended from the patriarch of Ohrida. In official documents the language used was the old Slovene, the style of a Moldavian ruler being *Natchalnik i Voievoda Moldovlasi*, prince and duke (= Germ. "Fürst" and "Herzog") of the Moldovlachs. The election of the voivodes, though in the hands of the boiars, was strictly regulated by hereditary principles, and Cantemir describes the extinction of the house of Dragosh in the 16th century as one of the unsettling causes that most contributed to the ruin of the country. The Moldavian army was reckoned 40,000 strong, and the cavalry arm was especially formidable. Verantius of Sebenico, an eyewitness of the state of Moldavia at the beginning of the 16th century, mentions three towns of the interior provided with stone walls—Suciava, Chotim, and Njamtz; the people were barbarous, but more warlike than the Walachians and more tenacious of their national costume, punishing with death any who adopted the Turkish.

Moldavia tributary to the Turks.

In 1504 Stephen the Great died, and was succeeded by his son, Bogdan "the One-eyed." At feud with Poland about Pokutia, despairing of efficacious support from hard-pressed Hungary, the new voivode saw no hope of safety except in a dependent alliance with the advancing Ottoman Power, which already hemmed Moldavia in on the Walachian and Crimean sides. In 1513 he agreed to pay an annual tribute to Sultan Selim in return for the sultan's guarantee to preserve the national constitution and religion of Moldavia, to which country the Turks now gave the name of Kara Bogdan, from their first vassal. The terms of Moldavian submission were further regulated by a firman signed by Sultan Suleiman at Buda in 1529 by which the yearly present or "backshish," as the tribute was euphemistically called, was fixed at 4000 ducats [$9080], 40 horses, and 25 falcons, and the voivode was bound at need to supply the Turkish army with a contingent of a thousand men. The Turks pursued much the same policy as in Walachia. The tribute was gradually increased. A hold was obtained on the country by the occupation of various strongholds on Moldavian soil with the surrounding territory,—in 1538 Cetatea Alba (Akierman), in 1592 Bender, in 1702 Chotim (Khotin). Already by the middle of the 16th century the yoke was so heavy that the voivode Elias (1546–1551) became Mohammedan to avoid the sultan's anger.

The impostor Jacob Basilicus.

At this period occurs a curious interlude in Moldavian history. In 1561 the adventurer and impostor Jacob Basilicus succeeded with Hungarian help in turning out the voivode Alexander and seizing on the reins of government. A Greek by birth, adopted son of Jacob Heraklides, despot of Paros, Samos, and other Ægean islands, acquainted with Greek and Latin literature, and master of most European languages, appearing alternately as a student of astronomy at Wittenberg, whither he had been invited by Count Mansfeld, as a correspondent of Melanchthon and as a writer of historical works which he dedicated to Philip II. of Spain, Basilicus, finding that his Ægean sovereignty *in partibus* was of little practical value beyond the crowning of poet laureates, fixed his roving ambition on a more substantial dominion. He published an astounding pedigree, in which, starting from "Hercules Triptolemus" he wound his way through the royal Servian line to the kinship of Moldavian voivodes, and, having won the Emperor Ferdinand and Albert Lasky to his financial and military support, succeeded, though at the head of only 1600 cavalry, in routing by a bold dash the vastly superior forces of the voivode, and even in purchasing the Turkish confirmation of his usurped title. He assumed the style of Βασιλεύς Μολδαβίας, and eluded the Turkish stipulation that he should dismiss his foreign guards. In Moldavia he appeared as a moral reformer, endeavoring to put down the prevalent vices of bigamy and divorce. He erected a school, placed it under a German master, and collected children from every part of the country to be maintained and educated at his expense. He also busied himself with the collection of a library. But his taxes—a ducat for each family—were considered heavy; his orthodoxy was suspected, his foreign counsellors detested. In 1563 the people rose, massacred the Hungarian guards, the foreign settlers, and finally Jacob himself.

The expelled voivode Alexander was now restored by the Porte, the schools were destroyed, and the country relapsed into its normal state of barbarism. His successor Ivonia was provoked by the Porte's demand for 120,000 ducats [$272,400] as tribute instead of 60,000 as heretofore to rise against the oppressor, but after gaining three victories he was finally defeated and slain (1574), and the country was left more than ever at the mercy of the Ottoman. Voivodes were now created and deposed in rapid succession by the Divan, but the victories of Michael the Brave in Walachia infused a more independent spirit into the Moldavians. The Moldavian dominion was now disputed by the Transylvanians and Poles, and in 1600 Michael succeeded in annexing it to his "Great Dacian" realm. On Michael's murder the Poles under Zamoyski again asserted their supremacy, but in 1618 the Porte once more recovered its dominion and set up successively two creatures of its own as voivoides—Gratiani, an Italian who had been court jeweller, and a Greek custom-house official, Alexander.

The Fanariote regime.

As in Walachia at a somewhat later date the Fanariote regime seemed now thoroughly established in Moldavia, and it became the rule that every three years the voivoide should procure his confirmation by a large backshish, and every year by a smaller one. The prince Vasilje Lupul, however, an Albanian, who succeeded in 1634, showed great abilities, and for twenty years succeeded in maintaining his position on the Moldavian throne. He introduced several internal reforms, codified the written and unwritten laws of the country, established a printing press, Greek monastic schools, and also a Latin School. He brought the Moldavian Church into more direct relation with the patriarch of Constantinople, but also showed considerable favor to the Latins, allowing them to erect churches at Suciava, Jassy, and Galatz.

During the wars between Sobieski and the Turks Moldavia found itself between hammer and anvil, and suffered frightfully moreover from Tatar devastations. The voivode Duka was forced like his Walachian contemporary to supply a contingent for the siege of Vienna in 1683. After Sobieski's death in 1696, the hopes of Moldavia turned to the advanc-

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ing Muscovite power. In 1711 the voivode Demetriu Cantemir, rendered desperate by the Turkish exactions, concluded an agreement with the czar Peter by which Moldavia was to become a protected and vassal state of Russia, with the enjoyment of its traditional liberties, the voivodeship to be hereditary in the family of Cantemir. On the approach of the Russian army the prince issued a proclamation containing the terms of the Russian protectorate and calling on the boiars and people to aid their Orthodox deliverers. But the iron had entered into the people's soul. The long Turkish terrorism had done its work, and at the approach of a Turkish and Tatar host the greater part of the Moldavians deserted their voivode. The Russian campaign was unsuccessful, and all that Czar Peter could offer Cantemir and the boiars who had stood by him was an asylum on Russian soil.

Demetriu Cantemir.

In his Russian exile Cantemir composed in a fair Latin style his *Descriptio Moldaviæ*, the counterpart so far as Moldavia is concerned to Del Chiaro's contemporary description of Walachia. The capital of the country was now Jassy, to which city Stephen the Great had transferred his court from Suciava, the earlier residence of the voivodes. It had at this time forty churches—some of stone, some of wood. Fifty years before it had contained 12,000 houses, but Tatar devastations had reduced it to a third of its former size. The most important commercial emporium was the Danubian port of Galatz, which was frequented by vessels from the whole of the Levant from Trebizond to Barbary. The cargoes which they here took in consisted of Moldavian timber (oak, deal, and cornel), grain, butter, honey and wax, salt, and nitre; Kilia at the north mouth of the Danube was also frequented by trading vessels, including Venetian and Ragusan. Moldavian wine was exported to Poland, Russia, Transylvania, and Hungary; that of Cotnar was in Cantemir's opinion superior to Tokay. The excellence of the Moldavian horses is attested by a Turkish proverb; and annual droves of as many as 40,000 Moldavian oxen were sent across Poland to Dantzic. Moldavia proper was divided into the upper country or *T'erra de sus*, and the lower country, or *T'erra de josu*. Bessarabia had been detached from the rest of the principality and placed under the direct control of the seraskier. It was divided into four provinces: that of Budzak, inhabited by the Nogai Tatars; that of Akierman or Cetatea Alba, the Greek Monkastron, a strongly fortified place; and those of Ismaila and Kilia. The voivodes owed their nomination entirely to the Porte, and the great officers of the realm were appointed at their discretion.

Cantemir's description of Moldavia.

Officers of state.

These were the Great Logothete (*Marele Logofetu*) or chancellor; the governor of Lower Moldavia—*Vorniculu de t'erra de josu;* the governor of Upper Moldavia—*Vorniculu de t'erra de sus;* the *Hatman* or commander in chief; the high chamberlain—*Marele Postelnicu;* the great *Spathar*, or swordbearer; the great cupbearer—*Marele Paharnicu;* and the treasurer, or *Vistiernicu*, who together formed the prince's council and were known as *Boiari de Svatu*. Below these were a number of subordinate officers who acted as their assessors and were known as boiars of the Divan (*Boiari de Divanu*). The high court of justice was formed by the prince, metropolitan, and boiars; the *Boiari de Svatu* decided on the verdict; the metropolitan declared the law; and the prince pronounced sentence. The boiars were able to try minor cases in their own residences, but subject to the right of appeal to the prince's tribunal. Of the character of the Moldavian people Cantemir does not give a very favorable account. Their best points were their hospitality and, in Lower Moldavia, their valor. They cared little for letters and were generally indolent, and their prejudice against mercantile pursuits left the commerce of the country in the hands of Armenians, Jews, Greeks, and Turks. The pure-blood Rouman population, noble and plebeian, inhabited the cities and towns or larger villages; the peasantry were mostly of Little Russian and Hungarian race and were in a servile condition. There was a considerable Gipsy population, almost every boiar having several Zingar families in his possession; these were mostly smiths.

From this period onwards the character of the Ottoman domination in Moldavia is in every respect analogous to that of Walachia. The office of voivode or hospodar was farmed out by the Porte to a succession of wealthy Greeks from the Fanar quarter of Constantinople. All formality of election by the boiars was now dispensed with, and the princes received their caftan of office at Constantinople, where they were consecrated by the Greek patriarch. The system favored Turkish extortion in two ways: the presence of the voivode's family connections at Stamboul gave the Porte so many hostages for his obedience; on the other hand the princes themselves could not rely on any support due to family influence in Moldavia itself. They were thus mere puppets of the Divan, and could be deposed and shifted with the same facility as so many pashas—an object of Turkish policy, as each change was a pretext for a new levy of "backshish." The chief families that shared the office during this period were those of Mavrocordato, Ghika, Callimachi, Ypsilanti, and Murusi. Although from the very conditions of their creation they regarded the country as a field for exploitations, they were themselves often men of education and ability, and unquestionably made some praiseworthy attempts to promote the general culture and wellbeing of their subjects. In this respect, even the Fanariote regime was preferable to mere pasha rule, while it had the further consequence of preserving intact the national form of administration and the historic offices of Moldavia. Gregory Ghika (1774–1777), who himself spoke French and Italian, founded a school or "gymnasium" at Jassy, where Greek, Latin, and theology were taught in a fashion. He encouraged the settlement of German Protestant colonists in the country, some of whom set up as watchmakers in Jassy, where they were further allowed to build an evangelical church. Carra, a Swiss who had been tutor to Prince Ghika's children, and who published in 1781 an account of the actual state of the principalities, speaks of some of the boiars as possessing a taste for French literature and even for the works of Voltaire, a tendency actively combated by the patriarch of Constantinople.

Continuation of Fanariote regime.

The Russo-Turkish War, which ended in the peace of Kutshuk Kainardji, was fatal to the integrity of Moldavian territory. The house of Austria, which had already annexed Galicia in 1772, profited by the situation to arrange with both contending parties for the peaceful cession of the Bukovina to the Hapsburg monarchy. This richly-wooded Moldavian province, containing Suciava, the earliest seat of the voivodes, and Cernautii or Czernovitz, was in 1774 occupied by Hapsburg troops with Russian connivance, and in 1777 Baron Thugut procured its formal cession from the sultan. The Bukovina is still an Austrian province.

Cession of Bukovina.

Walachian and Moldavian History from the Treaty of Kutshuk Kainardji in 1774 *to the Establishment of the Roumanian Kingdom.*—The treaty of Kutshuk Kainardji was hardly concluded when it was violated by the Porte, which refused to recognize the right of the Walachian boiars to elect their voivode, and nominated Alexander Ypsilanti, a creature of its own. In 1777 Constantine Murusi was made voivode of Moldavia in the same high-handed fashion. The Divan seemed intent on restoring the old system of government in its entirety, but in 1783 the Russian representative extracted from the sultan a hattisherif defining more precisely the liberties of the principalities and fixing the amount of the annual tribute—for Walachia 619 purses [$126,895] exclusive of the bairam and other presents amounting to 130,000 piasters [*c.* $110,500], and for Moldavia 135 purses [$27,675] and further gifts to the extent of 115,000 piasters [*c.* $97,750]. By the peace of Jassy in 1792 the Dniester was recognized as the Russian frontier, and the privileges of the principalities as specified in the hattisherif confirmed. In defiance of treaties, however, the Porte continued to change the hospodars almost yearly and to exact extraordinary installation presents. The revolt of Pasvan Oglu in Bulgaria was the cause of great injury to Walachia. The rebels ravaged Little Walachia in 1801–2, and their ravages were succeeded by those of the Turkish troops, who now swarmed over the country. Exaction followed exaction, and in 1802 Russia resolved to assert her treaty rights in favor of the oppressed inhabitants of the principalities. On the accession of Constantine Ypsilanti the Porte was constrained to issue a new hattisherif by which every prince was to hold his office for at least seven years, unless the Porte satisfied the Russian minister that there were good and sufficient grounds for his deposition. All irregular contributions were to cease, and all citizens, with the exception of the boiars and clergy, were to pay their share of the tribute. The Turkish troops then employed in the principalities were to be paid off, and one year's tribute remitted for the purpose. The boiars were to be responsible for the maintenance of schools, hospitals, and roads; they and the prince together for the militia. The number of Turkish merchants resident in the country was limited. Finally, the hospodars were to be amenable to representations made to them by the Russian envoy at Constantinople, to whom was entrusted the task of watching over the Walachian and Moldavian liberties. This, it will be seen, was a veiled Russian protectorate.

Russian protection.

In 1804 the Serbs under Karageorge rose against the Turkish dominion, and were secretly aided by the Wala-

chian voivode Ypsilanti. The Porte, instigated by Napoleon's ambassador Sebastiani, resolved on Ypsilanti's deposition, but the hospodar succeeded in escaping to St. Petersburg. In the war that now ensued between the Russians and the Turks, the former were for a time successful, and even demanded that the Russian territory should extend to the Danube. In 1808 the Russians, then in occupation of the principalities, formed a governing committee consisting of the metropolitan, another bishop, and four or five boiars under the presidency of General Kusnikoff. The seat of the president was at Jassy, and General Engelhart was appointed as vice-president at Bucharest. By the peace of Bucharest, however, in 1812, the principalities were restored to the sultan under the former conditions, with the exception of Bessarabia, which was ceded to the czar. The Pruth thus became the Russian boundary.

"Hetærist" movement.

The growing solidarity between the two Rouman principalities received a striking illustration in 1816, when the Walachian and Moldavian hospodars published together a code applicable to both countries, and which had been elaborated by a joint commission. The Greek movement was now beginning, and in 1821 Alexander Ypsilanti entered Moldavia at the head of the Hetærists, and prevailed on the hospodar Michael Sutzu to aid him in invadiug the Ottoman dominions. To secure Walachian help, Ypsilanti advanced on Bucharest, but the prince, Theodore Vladimirescu, who represented the national Rouman reaction against the Fanariotes, repulsed his overtures with the remark "that his business was not to march against the Turks, but to clear the country of Fanariotes." Vladimirescu was slain by a Greek revolutionary agent, but Ypsilanti's legion was totally routed by the Turks at Drăgăshani, and the result of his enterprise was a Turkish occupation of the principalities. In 1822 the Turkish troops, who had committed great excesses, were withdrawn on the combined representations of Russia, Austria, and Great Britain. The country, however, was again ravaged by the retiring troops, quarters of Jassy and Bucharest burnt, and the complete evacuation delayed till 1824, when the British Government again remonstrated with the Porte. By the convention of Akierman between the Russians and the Turks in 1826 the privileges of the principalities were once more confirmed, and they were again ratified in 1829, under Russian guarantee, by the peace of Adrianople. By this peace all the towns on the left bank of the Danube were restored to the principalities, and the Porte undertook to refrain from fortifying any position on the Walachian side of the river. The principalities were to enjoy commercial freedom, and the right of establishing a quarantine cordon along the Danube or elsewhere. The internal constitution of the countries was to be regulated by an "Organic Law," which was drawn up by assemblies of bishops and boiars at Jassy and Bucharest, acting, however, under Russian control. The Organic Law thus elaborated was by no means of a liberal character, and amongst other abuses maintained the feudal privileges of the boiars. It was ratified by the Porte in 1834, and the Russian army of occupation thereupon withdrew.

Peace of Adrianople, 1829.

The revolutionary movement of 1848 extended from the Roumans of Hungary and Transylvania to their kinsmen of the Transalpine regions. In Moldavia the agitation was mostly confined to the boiars, and the hospodar Michael Sturdza succeeded in arresting the ringleaders. In Walachia, however, the outbreak took a more violent form. The people assembled at Bucharest, and demanded a constitution. The prince Bibescu, after setting his signature to the constitution submitted to him, fled to Transylvania, and a provisional government was formed. The Turks, however, urged thereto by Russian diplomacy, crossed the Danube, and a joint Russo-Turkish dictatorship restored the "Organic Law." By the Balta-Liman convention of 1849 the two Governments agreed to the appointment of Barbŭ Stirbeiŭ as prince of Walachia, and Gregoriŭ Ghika for Moldavia.

Movement of 1848.

On the entry of the Russian troops into the principalities in 1853, the hospodars fled to Vienna, leaving the government in the hands of their ministers. During the Danubian campaign that now ensued great suffering was inflicted on the inhabitants, but in 1854 the cabinet of Vienna induced the Russians to withdraw. Austrian troops occupied the principalities, and the hospodars returned to their posts.

Russian and Austrian occupation, 1853–54.

By the treaty of Paris in 1856 the principalities with their existing privileges were placed under the collective guarantee of the contracting powers, while remaining under the suzerainty of the Porte,—the Porte on its part engaging to respect the complete independence of their internal administration. A strip of southern Bessarabia was restored to Moldavia, so as to push back the Russian frontier from the Danube mouth. The existing laws and statutes of both principalities were to be revised by a European commission sitting at Bucharest, and their work was to be assisted by a Divan or national council which the Porte was to convoke *ad hoc* in each of the two provinces, and in which all classes of Walachian and Moldavian society were to be represented. The European commission, in arriving at its conclusions, was to take into consideration the opinion expressed by the representative councils; the Powers were to come to terms with the Porte as to the recommendations of the commission; and the final result was to be embodied in a hattisherif of the sultan, which was to lay down the definitive organization of the two principalities. In 1857 the commission arrived, and the representative councils of the two peoples were convoked. On their meeting in September they at once proceeded to vote with unanimity the union of the two principalities into a single state under the name of Romania (Roumania), to be governed by a foreign prince elected from one of the reigning dynasties of Europe, and having a single representative assembly. The Powers decided to undo the work of national union. By the convention concluded by the European congress at Paris in 1858, it was decided that the principalities should continue as heretofore to be governed each by its own prince. Walachia and Moldavia were to have separate assemblies, but a central commission was to be established at Fokshani for the preparation of laws of common interest, which were afterwards to be submitted to the respective assemblies. In accordance with this convention the deputies of Moldavia and Walachia met in separate assemblies at Bucharest and Jassy, but the choice of both fell unanimously on Prince Alexander John Cuza, thus ensuring the personal union of the two principalities (January, 1859). A new conference was now summoned to Paris to discuss the affairs of the principalities, and the election of Prince Cuza finally ratified by the Powers and the Porte. The two assemblies and the central commission were preserved till 1862, when a single assembly met at Bucharest and a single ministry was formed for the two countries. The central commission was at the same time abolished, and a council of state charged with preparing bills substituted for it. In May, 1864, owing to difficulties between the Government and the general assembly, the latter was dissolved, and a statute was submitted to universal suffrage giving greater authority to the prince, and creating two chambers (of senators and of deputies). The franchise was now extended to all citizens, a cumulative voting power being reserved, however, for property, and the peasantry were emancipated from forced labor.

Union of the two principalities proclaimed.

Attempt to disunite them.

It fails.

Prince Cuza.

In 1865 a conflict broke out between the Government and the people in Bucharest, and in February, 1866, Prince Cuza, whose personal vices had rendered him detestable, was forced to abdicate. The chambers chose first as his successor the count of Flanders, but on his declining the office proceeded to elect Prince Charles of Hohenzollern-Sigmaringen, who was proclaimed hospodar or *Domnu* of Roumania April 29, 1866. A new constitution was at the same time introduced. Its provisions secure the universal suffrage of tax-paying citizens, ministerial responsibility, trial by jury, freedom of meeting and petition, of speech and of the press (except as regards breaches of the criminal code), gratuitous and compulsory primary education, and the right of asylum for political exiles. Legislative power is shared between the prince and chambers, but bills relating to the budget and army must originate with the chamber of deputies. There are two chambers—the senate and the chamber of deputies. Both houses are elective, and the election is carried out by means of electoral colleges classified according to property and professional qualifications. For the house of deputies each constituency is divided in this way into four colleges, each of which elects a member. The two highest of these colleges also elect the senators, each senator being elected for a term of eight years. The senate also includes *ex officio* certain high officials and ecclesiastics, and members for the universities. The senate consists at present of 120 members, the chamber of deputies of 178. The sovereign has a right of veto reserved to him on all measures. The judicial system is based on the *Code Napoléon*, with some modifications.

Charles of Hohenzollern.

New constitution.

On the outbreak of the Russo-Turkish war in 1877 Roumania found herself once more between hammer and anvil. Yielding to *force majeure* the Government of Prince Charles consented to the passage of Russian troops

across Roumanian territory, on the understanding that the scene of hostilities was as far as possible to be removed outside the limits of the principality. The Porte, however, refusing to recognize that Roumania had acted under constraint, proclaimed the Roumanians rebels, and the prince's Government accordingly resolved to offer active assistance to the Russians. A Roumanian division of 32,000 men under General Cernat, took part in the siege of Plevna, and the Roumanian soldiers distinguished themselves in the opinion of the most competent judges alike for their heroism and endurance. The successful assault by the Roumanian troops on the "indomitable redoubt" of Grivitza formed in fact the turning point of the siege and of the war. In the peace of S. Stefano, however, Russia insisted on the retrocession of the strip of Bessarabia that had been restored to Moldavia by the treaty of Paris, giving Roumania "in exchange" the islands of the Danubian delta, and the Dobrudja, which had been ceded by the sultan. This territorial readjustment was ratified by the treaty of Berlin (1878). The high contracting powers at the same time consented by Art. xliii. to recognize the independence of the principality subject to the provision (Art. xliv.) that all the inhabitants should enjoy complete religious freedom, a clause inserted on account of the Jewish persecutions that had previously taken place, and that foreigners in the country should be treated on a footing of perfect equality. All Danubian fortresses were to be razed, and the jurisdiction of the European commission to regulate the Danubian navigation, on which Roumania now acquired the right of representation, was extended from the mouth to the Iron Gates. The coping-stone to Roumanian independence was set by the proclamation on March 26, 1881, of Prince Charles as king of Roumania, and on May 22d of the same year his coronation took place with the European sanction. The crown placed on King Carol's head was made from the captured cannon of the Plevna redoubts.

Roumania in Russo-Turkish War.

Roumanian feats at Plevna.

Berlin treaty.

Prince Charles crowned king.

Authorities.—As the questions regarding the first appearance of the Roumans north of the Danube are reserved for the article VLACHS, it may be sufficient here to refer the reader to the works of Roesler, especially *Romänische Studien;* J. Jung, *Anfänge der Romänen,* and *Roemer und Romänen;* Lad. Pič, *Abstammung der Rumänen;* A. D. Xenopol, *Les Roumains au Moyen Âge.* For the history of the principalities down to the end of the last century J. C. Engel's works, *Die Geschichte der Walachei* and *Geschichte der Moldau,* are still the most trustworthy authorities. J. A. Vaillant, *La Romainie: Histoire, Langue,* etc., and A. T. Laurianu, *Istoria Romaniloru,* etc., may be consulted for the later history, but a really critical history of the principalities has yet to be written. The materials for it are, however, being rapidly amassed—thanks to the publications of the Roumanian Academy and the documents collected by native scholars; *cf.* especially Hurmuzaki, *Documente privitore la Istoria Romanitor,* and Hasdeu, *Publicationi istorico-filologice,* etc. For a useful account of the present state of Roumania, see James Samuelson, *Roumania Past and Present,* 1882. For views of Walachia and Moldavia, as they existed from the 15th century onwards, reference has already been made to the works of Verantius and Del Chiaro, and Cantemir's *Descriptio Moldaviæ.*

(A. J. E.)

ROUMANIAN LITERATURE. See VLACHS.

ROUMELIA. The name of Rounili, "the land of the Romans," was applied from the 15th century downwards to all that portion of the Balkan peninsula westwards from the Black Sea which was subject to Turkey. More precisely it was the country bounded N. by Bulgaria, W. by Albania, and S. by the Morea, or in other words the ancient provinces, including Constantinople and Salonica, of Thrace, Thessaly, and Macedonia. The name was ultimately applied more especially to an eyalet or province composed of Central Albania and Western Macedonia, having Monastir for its chief town and including Kesrie (Castoria), Ocri (Ochrida), and Scodra (Scutari); and at length it disappeared altogether in the administrative alterations effected between 1870 and 1875. Eastern Roumelia was constituted an autonomous province of the Turkish empire by the Berlin treaty of 1878, to be governed by a Christian governor-general appointed by the sultan for a term of five years. In 1879, in obedience to an international commission, it was divided into six departments and twenty-eight cantons, the departments being Philippopolis (187,095), Tatarbazarjik (117,063), Hasskŏi (134,268), Eski-Zagra (158,905) Kazanlik, Slivno or Sliven (130,136), and Burgas (88,046). On the N. and N.W. East Roumelia was bounded by Bulgaria, the frontier running along the line of the Balkans though not keeping to the watershed; on the S.W. and S. lay the vilayets of Salonika and Adrianople, the borderlands forming part of the Rhodope or Despoto mountain system. The direct distance between the northmost and southmost point on the Black Sea is only 40 miles, but the actual coastline is lengthened by the ramifications of the Bay of Burgas, which is the only part of the Black Sea affording several good anchorages. The great bulk of the country belongs to the basin of the Maritza and its tributary the Tunja (confluence at Adrianople, to the south of Roumelia), though a certain part drains northeastwards by several small streams. The whole area is estimated at 14,858 square miles, and the population in 1880 was 815,513, of whom 573,231 were Bulgarians, 176,759 Turks, 42,526 Greeks, 19,524 Gipsies, 4177 Jews, and 1306 Armenians. This preponderance of Bulgarians led in September, 1885, to the Philippopolis revolution, which resulted in the principality of Bulgaria declaring East Roumelia part and parcel of United Bulgaria; and the United Bulgarians have since been successful in a war with the Servians, who invaded their territory.[1]

ROUND TOWERS. A peculiar class of round tower exists scattered throughout Ireland; about one hundred and twenty examples still remain, mostly in a ruined state, but eighteen or twenty are almost perfect. These towers were built either near or adjoining a church; they are of various dates from perhaps the 8th to the 13th century; though varying in size and detail, they have many characteristics which are common to all. They are built with walls slightly battering inwards, so that the tower tapers towards the top. The lower part is formed of solid masonry, the one doorway being raised from 6 to 20 feet above the ground, and so only accessible by means of a ladder. The towers within are divided into several stories by two or more floors, usually of wood, but in some cases, as at Keneith, of stone slightly arched. The access from floor to floor was by ladders, no stone staircase being provided. The windows, which are always high up, are single lights, mostly arched or with a flat stone lintel. In some of the oldest towers they have triangular tops, formed by two stones leaning together, like the windows at Deerhurst and other pre-Norman buildings in England. One peculiarity of the door and window openings in the Irish round towers is that the jambs are frequently set sloping, so that the opening grows narrower towards the top, as in the temples of ancient Egypt. The later examples of these towers, dating from the 12th and 13th centuries, are often decorated with chevron, billet, and other Norman enrichments round the jambs and arches. The roof is of stone, usually conical in shape, and some of the later towers are crowned by a circle of battlements. The height of the round towers varies from about 60 feet to 132; that at Kilcullen is the highest. The masonry differs according to its date,—the oldest examples being built of almost uncut rubble work, and the later ones of neatly-jointed ashlar.

Much has been written as to the use of these towers, and the most conflicting theories as to their origin have been propounded. It is, however, fairly certain that they were constructed by Christian builders, both from the fact that they always are or once were near to a church, and also because crosses and other Christian emblems frequently occur among the sculptured decorations of their doors and windows. The original purpose of these towers was probably for places of refuge, for which the solid base and the door high above the ground seem specially adapted. They may

[1] [At Russian instigation a band of conspirators on the 20th August, 1886, seized the Bulgarian reigning prince Alexander, and transported him across the frontiers, but, recalled by a popular reaction, he returned to Sofia. He abdicated on the 7th of September at the dictation of the czar, and the Sobranje met in November to select a new ruler in the face of Russian interposition.—AM. ED.]

also have been watch-towers, and in later times often contained bells. Their circular form was probably for the sake of strength, angles which could be attacked by a battering ram being thus avoided, and also because no quoins or dressed stones were needed, except for the openings—an important point at a time when tools for working stone were scarce and imperfect. Both these reasons may also account for the Norman round towers which are so common at the west end of churches in Norfolk, Suffolk, and Essex, though these have little resemblance to those of Ireland except in the use of a circular plan. One example exactly like those of Ireland still exists in the Isle of Man, within the precincts of Peel Castle adjacent to the cathedral of St. German; it was probably the work of Irish builders. There are also three in Scotland, viz., at Egilshay in Orkney, and at Abernethy and Brechin.

Round towers wider and lower in proportion than those of Ireland appear to have been built by many prehistoric races at different parts of Europe. Many examples exist in Scotland, and in the islands of Corsica and Sardinia. The towers of this class in Scotland are called "brochs;" they average about 50 feet high and 30 feet in internal diameter. Their walls which are usually about 15 feet thick at the bottom, are built hollow, of rubble masonry, with series of passages one over the other running all round the tower. As in the Irish towers, the entrance is placed at some distance from the ground; and the whole structure is designed as a stronghold. The brochs appear to have been the work of a pre-Christian Celtic race. Many objects in bronze and iron and fragments of hand-made pottery have been found in and near these towers, all bearing witness of a very early date. See Anderson, *Scotland in Pagan Times*, 1883, and *Scotland in Early Christian Times*, 1881. During the 6th century church towers at and near Ravenna were usually built round in plan, and not unlike those of Ireland in their proportions. The finest existing example is that which stands by the church of S. Apollinare in Classe, the old port of the city of Ravenna (see BASILICA, vol. iii. p. 358, Fig. 5). It is of brick, divided into nine stories, with single-light windows below, three-light windows in the upper stories, and two-lights in the intermediate ones. The most magnificent example of a round tower is the well-known leaning tower of Pisa, begun in the year 1174. It is richly decorated with tiers of open marble arcades, supported on free columns. The circular plan was much used by Moslem races for their minarets. The finest of these is the 13th century minar of Kootub at Old Delhi, built of limestone with bands of marble. It is richly fluted on plan, and when complete was at least 250 feet high.

The best account of the Irish round towers is that given by Petrie, in his *Ecclesiastical Architecture of Ireland* (Dublin, 1845). See also Keane, *Towers and Temples of Ancient Ireland* (Dublin, 1850); Brash, *Ecclesiastical Architecture of Ireland* (Dublin, 1875); and Stokes, *Early Architecture in Ireland* (Dublin, 1878).

ROUNDEL. See RONDEAU.

ROUS, or ROUSE, FRANCIS (1579–1659), known by his translation of the Psalms; see vol. xii. p. 625. His works appeared at London in 1657.

ROUSSEAU, JACQUES (1630–1693), painter, a member of a Huguenot family, was born at Paris in 1630. He was remarkable as a painter of decorative landscapes and classic ruins, somewhat in the style of Canaletto, but without his delicacy of touch; he appears also to have been influenced by Nicolas Poussin. While quite young Rousseau went to Rome, where he was fascinated by the noble picturesqueness of the ancient ruins, and spent some years in painting them, together with the surrounding landscapes. He thus formed his style, which was highly artificial and conventionally decorative. His coloring for the most part is unpleasing, partly owing to his violent treatment of skies with crude blues and orange, and his chiaroscuro usually is much exaggerated. On his return to Paris he soon became distinguished as a painter, and was employed by Louis XIV. to decorate the walls of his palaces at St. Germain and Marly. He was soon admitted a member of the French Academy of Fine Arts, but on the revocation of the edict of Nantes he was obliged to take refuge in Holland, and his name was struck off the Academy roll. From Holland he was invited to England by the duke of Montague, who employed him, together with other French painters, to paint the walls of his palace, Montague House.[1] Rousseau was also employed to paint architectural subjects and landscapes in the palace of Hampton Court, where many of his decorative panels still exist. He spent the latter part of his life in London, where he died in 1693.

Besides being a painter in oil and fresco Rousseau was an etcher of some ability; many etchings by his hand from the works of the Caracci and from his own designs still exist; they are vigorous, though too coarse in execution.

ROUSSEAU, JEAN BAPTISTE (1670–1741), a poet of some merit and a wit of considerable dexterity, was born at Paris on the 10th of April, 1670; he died at Brussels on the 17th March, 1741. The son of a shoemaker, he is said to have been ashamed of his parentage and relations when he acquired a certain popularity, but the abundance of literary quarrels in which he spent his life, and the malicious inventiveness of his chief enemy, Voltaire, make any such stories of small account. He was certainly well educated and early gained favor with Boileau, who did not regard many people favorably; but authentic intelligence as to his youth is very scarce. He does not seem to have attempted literature very young, and when he began he began with the theatre, for which at no part of his life does he seem to have had any aptitude. A one-act comedy, *Le Café*, failed in 1694, and he was not much happier with a more ambitious play, *Les Flatteurs*, or with the opera of *Venus and Adonis*. He would not take these warnings, and tried in 1700 another comedy, *Le Capricieux*, which had the same fate. By this time he had already (it is not quite clear how) obtained influential patrons, such as Breteuil and Tallard, had gone with Tallard as an attaché to London, and, in days when literature still led to high position, seemed likely to achieve success. To tell the whole story of his misfortunes would take far more space than can be spared him here. They began with what may be called a club squabble at a certain Café Laurent, which was much frequented by literary men, and where Rousseau indulged in lampoons on his companions. A shower of libellous and sometimes obscene verses was written by or attributed to him, and at last he was practically turned out of the café. At the same time his poems, as yet only singly printed or in manuscript, acquired him a great reputation, and not unjustly, for Rousseau is certainly the best French writer of serious lyrics between Racine and Chénier. He had in 1701 been made a member of the Académie des Inscriptions; he had been offered, though he had not accepted, profitable places in the revenue department; he had become a favorite of the libertine but not uninfluential coterie of the Temple; and in 1710 he presented himself as a candidate for the Académie Française. Then began the second chapter (the first had lasted ten years) of a history of the animosities of authors which is almost the strangest though not the most important on record. A copy of verses, more offensive than ever, was handed to the original object of Rousseau's jealousy, and, getting wind, occasioned the bastinadoing of the reputed author by a certain La Faye or La Faille, a soldier who was reflected on. Legal proceedings of various kinds followed, and Rousseau either had or thought he had ground for ascribing the lampoon to Joseph Saurin. More law ensued, and the end of it was that

[1] Montague House stood on the site of the British Museum.

in 1712 Rousseau, not appearing, was condemned *par contumace* to perpetual exile. He actually suffered it, remaining for the rest of his life in foreign countries except for a short time in 1738, when he returned clandestinely to Paris to try for a recall. It should be said that he might have had this if he had not steadfastly protested his innocence and refused to accept a mere pardon. No one has ever completely cleared up the story, and it must be admitted that, except as exhibiting very strikingly the strange idiosyncrasies of the 18th century in France, and as having affected the fortunes of a man of letters of some eminence, it is not worth much attention.

Rousseau's good and ill luck did not cease with his exile. First Prince Eugene and then other persons of distinction took him under their protection, and he printed at Soleure the first edition of his poetical works. But by fault or misfortune he still continued to quarrel. Voltaire and he met at Brussels in 1722, and though Voltaire had hitherto pretended or felt a great admiration for him, something happened which turned this admiration into hatred. Voltaire's *Le Pour et Le Contre* is said to have shocked Rousseau, who expressed his sentiments freely. At any rate the latter had thenceforward no fiercer enemy than Voltaire. Rousseau, however, was not much affected by Voltaire's enmity, and pursued for nearly twenty years a life of literary work, of courtiership, and of other obscure speculation and business. Although he never made his fortune, it does not seem that he was ever in want. When he died his death had the singular result of eliciting from a poetaster, Lefranc de Pompignan, an ode of real excellence and perhaps better than anything of Rousseau's own work. That work, however, has high merits, and is divided, roughly speaking, into two strangely contrasted divisions. One consists of formal and partly sacred odes and *cantates* of the stiffest character, the other of brief epigrams, sometimes licentious and always or almost always ill-natured. In the latter class of work Rousseau is only inferior to his friend Piron. In the former he stands almost alone. The frigidity of conventional diction and the disuse of all really lyrical rhythm which characterize his period do not prevent his odes and cantates from showing true poetical faculty, grievously cramped no doubt, but still existing.

Besides the Soleure edition mentioned above Rousseau published (visiting England for the purpose) another issue of his work at London in 1723. The chief edition since is that of Amar in 1820. M. A. de Latour has published (Paris, Garnier, 1869) a useful though not complete edition, with notes of merit and a biographical introduction which would have been better if the facts had been more punctually and precisely stated.

ROUSSEAU, Jean Jacques (1712–1778), was born at Geneva on the 28th June, 1712. His family had established themselves in that city at the time of the religious wars, but they were of pure French origin. Rousseau's father Isaac was a watchmaker; his mother, Suzanne Bernard, was the daughter of a minister; she died in childbirth, and Rousseau, who was the second son, was brought up in a very haphazard fashion, his father being a dissipated, violent-tempered, and foolish person. He, however, taught him to read early, and seems to have laid the foundation of the flighty sentimentalism in morals and politics, which Rousseau afterwards illustrated with his genius. When the boy was ten years old his father got entangled in a disgraceful brawl and fled from Geneva, apparently without troubling himself about Jean Jacques. The father and son had little more to do with each other and rarely met. Rousseau was, however, taken charge of by his mother's relations, and was in the first place committed by them to the tutorship of a M. Lambercier, pastor at Bossey. Of these times, as of the greater part of his life, there are ample details in the *Confessions*, but it may be as well to remark at once that this famous book, however charming as literature, is to be used as documentary evidence only with great reserve. In 1724 he was removed from this school and taken into the house of his Uncle Bernard, by whom he was shortly afterwards apprenticed to a notary. His master, however, found or thought him quite incapable and sent him back. After a short time (April 25, 1725) he was apprenticed afresh, this time to an engraver. He did not dislike the work, but was or thought himself cruelly treated by his master. At last in 1728 when he was sixteen he ran away, the truancy being by his own account unintentional in the first instance, and due to the fact of the city gates being shut earlier than usual. Then began a very extraordinary series of wanderings and adventures, for much of which there is no authority but his own. He first fell in with some proselytizers of the Roman faith at Confignon in Savoy, and by them he was sent to Madame de Warens at Annecy, a young and pretty widow who was herself a convert. Her influence, however, which was to be so great, was not immediately exercised, and he was, so to speak, passed on to Turin, where there was an institution specially devoted to the reception of neophytes. His experiences here were (according to his own account, it must always be understood) sufficiently unsatisfactory, but he abjured duly, and was rewarded by being presented with twenty francs and sent about his business. He wandered about in Turin for some time, and at last established himself as footman to a Madame de Vercellis. Here occurred the famous incident of the theft of a ribbon, of which he accused a fellow servant —a girl too. But, though he kept his place by this piece of cowardice, Madame de Vercellis died not long afterwards and he was turned off. He found, however, another place with the Comte de Gouvon, but lost this also through coxcombry. Then he resolved to return to Madame de Warens at Annecy. The chronology of all these events is somewhat obscure, but they seem to have occupied about three years.

Even then Rousseau did not settle at once in the anomalous but to him charming position of domestic lover to this lady, who, nominally a converted Protestant, was in reality, as many women of her time were, a kind of deist, with a theory of noble sentiment and a practice of libertinism tempered by good nature. It used to be held that in her conjugal relations she was even more sinned against than sinning. But recent investigations seem to show that M. de Vuarrens (which is said to be the correct spelling of the name) was a very unfortunate husband, and was deserted and robbed by his wife. However, she welcomed Rousseau kindly, thought it necessary to complete his education, and he was sent to the seminarists of St. Lazare to be improved in classics, and also to a music master. In one of his incomprehensible freaks he set off for Lyons, and, after abandoning his companion in an epileptic fit, returned to Annecy to find Madame de Warens gone no one knew whither. Then for some months he relapsed into the life of vagabondage, varied by improbable adventures, which (according to his own statement) he so often pursued. Hardly knowing anything of music, he attempted to give lessons and a concert at Lausanne; and he actually taught at Neuchâtel. Then he became or says he became secretary to a Greek archimandrite who was travelling in Switzerland to collect subscriptions for the rebuilding of the Holy Sepulchre; then he went to Paris, and, with recommendations from the French ambassador at Soleure, saw something of good society; then he returned on foot through Lyons to Savoy, hearing that Madame de Warens was at Chambéry. This was in 1732, and Rousseau, who for a time had unimportant employments in the service of the Sardinian crown, was shortly installed by Madame de Warens, whom he still called Maman, as *amant en titre* in her singular household, wherein she diverted herself with him, with music, and with chemistry. In 1736 Madame de

Warens, partly for Rousseau's health, took a country house, Les Charmettes, a short distance from Chambéry. Here in summer, and in the town during winter, Rousseau led a delightful life, which he has delightfully described. In a desultory way he did a good deal of reading, but in 1738 his health again became bad, and he was recommended to go to Montpelier. By his own account this journey to Montpelier was in reality a *voyage à Cythère* in company with a certain Madame de Larnage. This being so, he could hardly complain when on returning he found that his official position in Madame de Warens's household had been taken by a person named Vintzenried. He was, however, less likely than most men to endure the position of second in command, and in 1740 he became tutor at Lyons to the children of M. de Mably, not the well-known writer of that name, but his and Condillac's elder brother. But Rousseau did not like teaching and was a bad teacher, and after a visit to Les Charmettes, finding that his place there was finally occupied, he once more went to Paris in 1741. He was not without recommendations. But a new system of musical notation which he thought he had discovered was unfavorably received by the Académie des Sciences, where it was read in August, 1742, and he was unable to obtain pupils. Madame Dupin, however, to whose house he had obtained the entry, procured him the honorable if not very lucrative post of secretary to M. de Montaigu, ambassador at Venice. With him he stayed for about eighteen months, and has as usual infinite complaints to make of his employer and some strange stories to tell. At length he threw up his situation and returned to Paris (1745).

Up to this time—that is to say, till his thirty-third year—Rousseau's life, though continuously described by himself, was of the kind called subterranean, and the account of it must be taken with considerable allowances. There are, to say the least, grave improbabilities in it; there are some chronological difficulties; and in one or two instances his accounts have been flatly denied by persons more or less entitled to be heard. He had written nothing, and if he was known at all it was as an eccentric vagabond. From this time, however, he is more or less in view; and, though at least two events of his life—his quarrel with Diderot and his death—are and are likely long to be subjects of dispute, its general history can be checked and followed with reasonable confidence. On his return to Paris he renewed his relations with the Dupin family and with the literary group of Diderot, to which he had already been introduced by M. de Mably's letters. He had an opera, *Les Muses Galantes*, privately represented; he copied music for money, and received from Madame Dupin and her son-in-law M. de Francueil a small but regular salary as secretary. He lived at the Hotel St. Quentin for a time, and once more arranged for himself an equivocal domestic establishment. His mistress, whom towards the close of his life he married after a fashion, was Thérèse le Vasseur, a servant at the inn. She had little beauty, no education or understanding, and few charms of any kind that his friends could discover, besides which she had a detestable mother, who was the bane of Rousseau's life. But he made himself at any rate for a time quite happy with her, and (according to Rousseau's account, the accuracy of which has been questioned) five children were born to them, who were all consigned to the foundling hospital. This disregard of responsibility was partly punished by the use his critics made of it when he became celebrated as a writer on education and a preacher of the domestic affections. Diderot, with whom he became more and more familiar, admitted him as a contributor to the *Encyclopédie*. He formed new musical projects, and he was introduced by degrees to many people of rank and influence, among whom his warmest patron for a time was Madame d'Épinay. It was not, however, till 1749 that Rousseau made his mark. The academy of Dijon offered a prize for an essay on the effect of the progress of civilization on morals. Rousseau took up the subject, developed his famous paradox of the superiority of the savage state, won the prize, and, publishing his essay next year, became famous. The anecdotage as to the origin of this famous essay is voluminous. It is agreed that the idea was suggested when Rousseau went to pay a visit to Diderot, who was in prison at Vincennes for his *Lettre sur les Aveugles*. Rousseau says he thought of the paradox on his way down; Morellet and others say that he thought of treating the subject in the ordinary fashion and was laughed at by Diderot, who showed him the advantages of the less obvious treatment. Diderot himself, who in such matters is almost absolutely trustworthy, does not claim the suggestion, but uses words which imply that it was at least partly his. It is very like him. The essay, however, took the artifical and crotchety society of the day by storm. Francueil gave Rousseau a valuable post as cashier in the receiver-general's office. But he resigned it either from conscientiousness, or crotchet, or nervousness at responsibility, or indolence, or more probably from a mixture of all four. He went back to his music copying, but the salons of the day were determined to have his society, and for a time they had it. In 1752 he brought out at Fontainebleau an operetta, the *Devin du Village*, which was very successful. He received a hundred louis [*c.* $400] for it, and he was ordered to come to court next day. This meant the certainty of a pension. But Rousseau's shyness or his perversity (as before, probably both) made him disobey the command. His comedy *Narcisse*, written long before, was also acted, but unsuccessfully. In the same year, however, a letter *Sur la Musique Française* again had a great vogue.[1] Finally, for this was an important year with him, the Dijon academy, which had founded his fame, announced the subject of "The Origin of Inequality," on which he wrote a discourse which was unsuccessful, but at least equal to the former in merit. During a visit to Geneva in 1754 Rousseau saw his old friend and love Madame de Warens (now reduced in circumstances and having lost all her charms), while after abjuring his abjuration of Protestantism he was

[1] Rousseau's influence on French music was greater than might have been expected from his very imperfect education; in truth, he was a musician by natural instinct only, but his feeling for art was very strong, and, though capricious, based upon true perceptions of the good and beautiful. The system of notation (by figures) concerning which he read a paper before the Académie des Sciences, August 22, 1742, was ingenious, but practically worse than useless, and failed to attract attention, though the paper was published in 1743 under the title of *Dissertation sur la musique moderne*. In the famous "guerre des buffons," he took the part of the "buffonists," so named in consequence of their attachment to the Italian "opera buffa," as opposed to the true French opera; and, in his *Lettre sur la musique Française*, published in 1753, he indulged in a violent tirade against French music, which he declared to be so contemptible as to lead to the conclusion "that the French neither have, nor ever will have, any music of their own, or at least that, if they ever do have any, it will be so much the worse for them." This silly libel so enraged the performers at the Opera that they hanged and burned its author in effigy. Rousseau revenged himself by printing his clever satire entitled *Lettre d'un symphoniste de l'Académie Royale de Musique à ses camarades de l'orchestre*. His *Lettre à M. Burney* is of a very different type, and does full justice to the genius of Glück. His articles on music in the *Encyclopédie* deal very superficially with the subject; and his *Dictionnaire de Musique* (Geneva, 1767), though admirably written, is not trustworthy, either as a record of facts or as a collection of critical essays. In all these works the imperfection of his musical education is painfully apparent, and his compositions betray an equal lack of knowledge, though his refined taste is as clearly displayed there as his literary power in the *Letters* and *Dictionary*. His first opera, *Les Muses Galantes*, privately prepared at the house of La Popelinière, attracted very little attention; but *Le Devin du Village*, given at Fontainebleau in 1752, and at the Académie in 1753, achieved a great and well-deserved success. Though very unequal, and exceedingly simple both in style and construction, it contains some charming melodies, and is written throughout in the most refined taste. His *Pygmalion* (1775) is a melodrama without singing. Some posthumous fragments of another opera, *Daphnis et Chloé*, were printed in 1780; and in 1781 appeared *Les Consolations des Misères de ma Vie*, a collection of about one hundred songs and other fugitive pieces of very unequal merit. The popular air known as *Rousseau's Dream* is not contained in this collection, and cannot be traced back farther than J. B. Cramer's celebrated "Variations." M. Castil-Blaze has accused Rousseau of extensive plagiarisms (or worse) in *Le Devin du Village* and *Pygmalion*, but apparently without sufficient cause. (W. S. R.)

enabled to take up his freedom as citizen of Geneva, to which his birth entitled him and of which he was proud. Some time afterwards, returning to Paris, he accepted a cottage near Montmorency (the celebrated Hermitage) which Madame d'Épinay had fitted up for him, and established himself there in April, 1756. He spent little more than a year there, but it was a very important year. Here he wrote *La Nouvelle Héloïse;* here he indulged in the passion which that novel partly represents, his love for Madame d'Houdetot, sister-in-law of Madame d'Épinay, a lady still young and extremely amiable but very plain, who had a husband and a lover (St. Lambert), and whom Rousseau's burning devotion seems to have partly pleased and partly annoyed. Here too rose the incomprehensible triangular quarrel between Diderot, Rousseau, and Grimm, which ended Rousseau's sojourn at the Hermitage. It is impossible to discuss this at length here. The supposition least favorable to Rousseau is that it was due to one of his numerous fits of half-insane petulance and indignation at the obligations which he was nevertheless always ready to incur. That most favorable to him is that he was expected to lend himself in a more or less complaisant manner to assist and cover Madame d'Épinay's adulterous affection for Grimm. It need only be said that Madame d'Épinay's morals and Rousseau's temper are equally indefensible by any one who knows anything about either, but that the evidence as to the exact influence of both on this particular transaction is hopelessly inconclusive. Diderot seems to have been guilty of nothing but thoughtlessness (if of that) in lending himself to a scheme of the Le Vasseurs, mother and daughter, for getting Rousseau out of the solitude of the Hermitage. At any rate Rousseau quitted the Hermitage in the winter, and established himself at Montlouis in the neighborhood.

Hitherto Rousseau's behavior had frequently made him enemies, but his writings had for the most part made him friends. The quarrel with Madame d'Épinay, with Diderot, and through them with the philosophe party reversed this. In 1758 appeared his *Lettre à d'Alembert contre les Spectacles*, written in the winter of the previous year at Montlouis. This was at once an attack on Voltaire, who was giving theatrical representations at Les Délices, on D'Alembert, who had condemned the prejudice against the stage in the *Encyclopédie*, and on one of the favorite amusements of the society of the day. Diderot personally would have been forgiving enough. But Voltaire's strong point was not forgiveness, and, though Rousseau no doubt exaggerated the efforts of his "enemies," he was certainly henceforward as obnoxious to the philosophe coterie as to the orthodox party. He still, however, had no lack of patrons—he never had—though his unsurpassable perversity made him quarrel with all in turn. The amiable duke and duchess of Luxembourg, who were his neighbors at Montlouis, made his acquaintance, or rather forced theirs upon him, and he was eagerly industrious in his literary work—indeed most of his best books were produced during his stay in the neighborhood of Montmorency. A letter to Voltaire on his poem about the Lisbon earthquake embittered the dislike between the two, being surreptitiously published. *La Nouvelle Héloïse* appeared in the same year (1760), and it was immensely popular. In 1762 appeared the *Contrat Social* at Amsterdam, and *Émile*, which was published both in the Low Countries and at Paris. For the latter the author received 6000 livres [*c.* $1140], for the *Contrat* 1000 [*c.* $190].

Julie, ou La Nouvelle Héloïse, is a novel written in letters describing the loves of a man of low position and a girl of rank, her subsequent marriage to a respectable freethinker of her own station, the mental agonies of her lover, and the partial appeasing of the distresses of the lover by the influence of noble sentiment and the good offices of a philanthropic Englishman. It is too long, the sentiment is overstrained, and severe moralists have accused it of a certain complaisance in dealing with amatory errors; but it is full of pathos and knowledge of the human heart. The *Contrat Social*, as its title implies, endeavors to base all government on the consent, direct or implied, of the governed, and indulges in much ingenious argument to get rid of the practical inconveniences of such a suggestion. *Émile*, the second title of which is *De l'Éducation*, is much more of a treatise than of a novel, though a certain amount of narrative interest is kept up throughout.

Rousseau's reputation was now higher than ever, but the term of the comparative prosperity which he had enjoyed for nearly ten years was at hand. The *Contrat Social* was obviously anti-monarchic; the *Nouvelle Héloïse* was said to be immoral; the sentimental deism of the "Profession du vicaire Savoyard" in *Émile* irritated equally the philosophe party and the church. On June 11, 1762, *Émile* was condemned by the parlement of Paris, and two days previously Madame de Luxembourg and the Prince de Conti gave the author information that he would be arrested if he did not fly. They also furnished him with means of flight, and he made for Yverdun in the territory of Bern, whence he transferred himself to Motiers in Neuchâtel, which then belonged to Prussia. Frederick II. was not indisposed to protect the persecuted when it cost him nothing and might bring him fame, and in Marshal Keith, the governor of Neuchâtel, Rousseau found a true and firm friend. He was, however, unable to be quiet or to practice any of those more or less pious frauds which were customary at the time with the unorthodox. The archbishop of Paris had published a pastoral against him, and Rousseau did not let the year pass without a *Lettre à M. de Beaumont.* The council of Geneva had joined in the condemnation of *Émile*, and Rousseau first solemnly renounced his citizenship, and then, in the *Lettres de la Montagne* (1763), attacked the council and the Genevan constitution unsparingly. All this excited public opinion against him, and gradually he grew unpopular in his own neighborhood. This unpopularity is said on very uncertain authority to have culminated in a nocturnal attack on his house, which reminds the reader remarkably of an incident in the life of the greatest French man of letters of the present century. At any rate he thought he was menaced if he was not, and migrated to the Île St. Pierre in the Lake of Bienne, where he once more for a short, and the last, time enjoyed that idyllic existence which he loved. But the Bernese Government ordered him to quit its territory. He was for some time uncertain where to go, and thought of Corsica (to join Paoli) and Berlin. But finally David Hume offered him, late in 1765, an asylum in England, and he accepted. He passed through Paris, where his presence was tolerated for a time, and landed in England on January 13, 1766. Thérèse travelled separately, and was entrusted to the charge of James Boswell, who had already made Rousseau's acquaintance. Here he had once more a chance of settling peaceably. Severe English moralists like Johnson thought but ill of him, but the public generally was not unwilling to testify against French intolerance, and regarded his sentimentalism with favor. He was lionized in London to his heart's content and discontent, for it may truly be said of Rousseau that he was equally indignant at neglect and intolerant of attention. When, after not a few displays of his strange humor, he professed himself tired of the capital, Hume procured him a country abode in the house of Mr. Davenport, at Wootton in Derbyshire. Here, though the place was bleak and lonely, he might have been happy enough, and he actually employed himself in writing the greater part of his *Confessions.* But his habit of self-tormenting and tormenting others never left him. His own caprices interposed

some delay in the conferring of a pension which George III. was induced to grant him, and he took this as a crime of Hume's. The publication of a spiteful letter (really by Horace Walpole, one of whose worst deeds it was) in the name of the king of Prussia made Rousseau believe that plots of the most terrible kind were on foot against him. Finally he quarrelled with Hume because the latter would not acknowledge all his own friends and Rousseau's supposed enemies of the philosophe circle to be rascals. He remained, however, at Wootton during the year and through the winter. In May, 1767, he fled to France, addressing letters to the lord chancellor and to General Conway, which can only be described as the letters of a lunatic. He was received in France by the Marquis de Mirabeau (father of the great Mirabeau), of whom he soon had enough, then by the Prince de Conti at Trye. From this place he again fled and wandered about for some time in a wretched fashion, still writing the *Confessions*, constantly receiving generous help, and always quarrelling with, or at least suspecting, the helpers. In the summer of 1770 he returned to Paris, resumed music copying, and was on the whole happier than he had been since he had to leave Montlouis. He had by this time married Thérèse le Vasseur, or had at least gone through some form of marriage with her.

Many of the best-known stories of Rousseau's life date from this last time, when he was tolerably accessible to visitors, though clearly half-insane. He finished his *Confessions*, wrote his *Dialogues* (the interest of which is not quite equal to the promise of their curious sub-title *Rousseau juge de Jean Jacques*), and began his *Rêveries du Promeneur Solitaire*, intended as a sequel and complement to the *Confessions*, and one of the best of all his books. It should be said that besides these, which complete the list of his principal works, he has left a very large number of minor works and a considerable correspondence. During this time he lived in the Rue Platière, which is now named after him. But his suspicions of secret enemies grew stronger rather than weaker, and at the beginning of 1778 he was glad to accept the offer of M. de Girardin, a rich financier, and occupy a cottage at Ermenonville. The country was beautiful; but his old terrors revived, and his woes were complicated by the alleged inclination of Thérèse for one of M. de Girardin's stable boys. On July 2d he died in a manner which has been much discussed, suspicions of suicide having at the time and since been frequent. On the whole the theory of a natural death due to a fit of apoplexy and perhaps to injuries inflicted accidentally during that fit seems most probable. He had always suffered from internal and constitutional ailments not unlikely to bring about such an end.

Rousseau's character, the history of his reputation, and the intrinsic value of his literary work are all subjects of much interest. There is little doubt that for the last ten or fifteen years of his life, if not from the time of his quarrel with Diderot and Madame d'Épinay, he was not wholly sane—the combined influence of late and unexpected literary fame and of constant solitude and discomfort acting upon his excitable temperament so as to overthrow the balance, never very stable, of his fine and acute but unrobust intellect. He was by no means the only man of letters of his time who had to submit to something like persecution. Fréron on the orthodox side had his share of it, as well as Voltaire, Helvétius, Diderot, and Montesquieu on that of the innovators. But Rousseau had not, like Montesquieu, a position which guaranteed him from serious danger; he was not wealthy like Helvétius; he had not the wonderful suppleness and trickiness which even without his wealth would probably have defended Voltaire himself; and he lacked entirely the "bottom" of Fréron and Diderot. When he was molested he could only shriek at his enemies and suspect his friends, and, being more given than any man whom history mentions to this latter weakness, he suffered intensely from it. His moral character was undoubtedly weak in other ways than this, but it is fair to remember that but for his astounding *Confessions* the more disgusting parts of it would not have been known, and that these *Confessions* were written, if not under hallucination, at any rate in circumstances entitling the self-condemned criminal to the benefit of very considerable doubt. If Rousseau had held his tongue, he might have stood lower as a man of letters; he would pretty certainly have stood higher as a man. He was, moreover, really sinned against, if still more sinning. The conduct of Grimm to him was certainly very bad; and, though Walpole was not his personal friend, a worse action than his famous letter, considering the well-known idiosyncrasy of the subject, would be difficult to find. It was his own fault that he saddled himself with the Le Vasseurs, but their conduct was probably if not certainly ungrateful in the extreme. Only excuses can be made for him; but the excuses for a man born, as Hume after the quarrel said of him, "without a skin" are numerous and strong.

It was to be expected that his peculiar reputation would increase rather than diminish after his death; and it did so. During his life his personal peculiarities and the fact that his opinions were nearly as obnoxious to the one party as to the other worked against him, but it was not so after his death. The men of the Revolution regarded him with something like idolatry, and his literary merits conciliated many who were very far from idolizing him as a revolutionist. His style was taken up by Bernardin de Saint Pierre and by Chateaubriand. It was employed for purposes quite different from those to which he had himself applied it, and the reaction triumphed by the very arms which had been most powerful in the hands of the Revolution. Byron's fervid panegyric enlisted on his side all who admired Byron—that is to say, the majority of the younger men and women of Europe between 1820 and 1850—and thus different sides of his tradition were continued for a full century after the publication of his chief books. His religious unorthodoxy was condoned because he never scoffed; his political heresies, after their first effect was over, seemed harmless from the very want of logic and practical spirit in them, while part at least of his literary secret was the common property of almost every one who attempted literature. At the present day persons as different as M. Renan and Mr. Ruskin are children of Rousseau.

It is therefore important to characterize this influence which was and is so powerful, and there are three points of view—those of religion, politics, and literature—which it is necessary to take in doing this. In religion Rousseau was undoubtedly what he has been called above—a sentimental deist; but no one who reads him with the smallest attention can fail to see that sentimentalism was the essence, deism the accident of his creed. In his time orthodoxy at once generous and intelligent hardly existed in France. There were ignorant persons who were sincerely orthodox; there were intelligent persons who pretended to be so. But between the time of Massillon and D'Aguesseau and the time of Lamennais and Joseph de Maistre the class of men of whom in England Berkeley, Butler, and Johnson were representatives simply did not exist in France. Little inclined by nature to any but the emotional side of religion, and utterly undisciplined in any other by education, course of life, or the general tendency of public opinion, Rousseau naturally took refuge in the nebulous kind of natural religion which was at once fashionable and convenient. If his practice fell very far short even of his own very arbitrary standard of morality, as much may be said of persons far more dogmatically orthodox.

In politics, on the other hand, there is no doubt that Rousseau was a sincere and, as far as in him lay, a convinced republican. He had no great tincture of learning, he was by no means a profound logician, and he was impulsive and emotional in the extreme—characteristics which in political matters undoubtedly predispose the subject to the preference of equality above all political requisites. He saw that under the French monarchy the actual result was the greatest misery of the greatest number, and he did not look much further. The *Contrat Social* is for the political student one of the most curious and interesting books existing. Historically it is null; logically it is full of gaping flaws; practically its manipulations of the *volonté de tous* and the *volonté générale* are clearly insufficient to obviate anarchy. But its mixture of real eloquence and apparent cogency is exactly such as always carries a multitude with it, if only for a time. Moreover, in some minor branches of politics and economics Rousseau was a real reformer. Visionary as his educational schemes (chiefly promulgated in *Émile*) are in parts, they are admirable in others, and his protest against mothers refusing to nurse their children hit a blot in French life which is not removed yet, and has always been a source of weakness to the nation.

But it is as a literary man pure and simple—that is to say, as an expouent rather than as an originator of ideas—

that Rousseau is most noteworthy, and that he has exercised most influence. The first thing noticeable about him is that he defies all customary and mechanical classification. He is not a dramatist—his work as such is insignificant—nor a novelist, for, though his two chief works except the *Confessions* are called novels, *Émile* is one only in name, and *La Nouvelle Héloïse* is as a story diffuse, prosy, and awkward to a degree. He was perfectly without command of poetic form, and he could only be called a philosopher in an age when the term was used with such meaningless laxity as was customary in the 18th century. If he must be classed, he was before all things a describer—a describer of the passions of the human heart and of the beauties of nature. In the first part of his vocation the novelists of his own youth, such as Marivaux, Richardson, and Prévost, may be said to have shown him the way, though he improved greatly upon them; in the second he was almost a creator. In combining the two and expressing the effect of nature on the feelings and of the feelings on the aspect of nature he was absolutely without a forerunner or a model. And, as literature since his time has been chiefly differentiated from literature before it by the color and tone resulting from this combination, Rousseau may be said to hold, as an influence, a place almost unrivalled in literary history. The defects of all sentimental writing—occasional triviality and exaggeration of trivial things, diffuseness, overstrained emotion, false sentiment, disregard of the intellectual and the practical—are of course noticeable in him, but they are excused and palliated by his wonderful feeling, and by what may be called the passionate sincerity even of his insincere passages. Some cavils have been made against his French, but none of much weight or importance. And in such passages as the famous "Voilá de la pervenche" of the *Confessions*, as the description of the isle of St. Pierre in the *Rêveries*, as some of the letters in the *Nouvelle Héloïse* and others, he has achieved the greatest success possible—that of absolute perfection in doing what he intended to do. The reader, as it has been said, may think he might have done something else with advantage, but he can hardly think that he could have done this thing better.

The dates of most of Rousseau's works published during his lifetime have been given above. The *Confessions* and *Rêveries*, which, read in private, had given much umbrage to persons concerned, and which the author did not intend to be published until the end of the century, appeared at Geneva in 1782. In the same year and the following appeared a complete edition in forty-seven small volumes. There have been many since, the most important of them being that of Musset-Pathay (Paris, 1823). Some unpublished works, chiefly letters, were added by Bosscha (Paris, 1858) and Streckeisen Moultou (Paris, 1861). The most convenient edition is perhaps that of Didot in 4 vols. large 8vo, but a handsome and well-edited collection is still something of a desideratum. Works on Rousseau are innumerable. The chief are—in French that of Saint Marc Girardin (1874), in English the excellent book of Mr. John Morley. (G. SA.)

ROUSSEAU, THÉODORE (1812–1867), a distinguished landscape painter, was born at Paris, and studied in the École des Beaux-Arts, after which he spent some time in travelling and making studies of landscape and sky effects. He first exhibited at the Salon in 1834, obtained gold medals in 1849 and 1854, and in 1852 received the Legion of Honor. His paintings became very popular in France, and Rousseau grew to be the acknowledged founder of the modern realistic school of landscape. He was largely influenced in style by Constable and Turner, the former of whom was perhaps more thoroughly appreciated in France than in England. The influence of Turner is clearly seen in some of Rousseau's pictures, with striking effects of cloud or storm,—as, for example, in his Effet de Soleil and Après la Pluie (1852), in the Matinée Orageuse (1857), the Coucher de Soleil (1866), and one of his last works, the Soleil par un Temps Orageux, which appeared in the exhibition of 1867. Rousseau's study of Constable is more especially apparent in some of his fine forest scenes near Fontainebleau, and in some magnificently painted views on the banks of the Loire and other French rivers. His execution was of extraordinary brilliance, and he was a thorough master of atmospheric effect and glowing sunset colors. Though in some respects a realistic painter, he treated nature in a strongly dramatic way and showed great imaginative power. His style is broad and dashing, with rapid and at times apparently careless handling. His fame has increased rather than diminished since his death in 1867; and one of his paintings has recently received the high distinction of being transferred from the Luxembourg Palace to the Louvre, an honor which is but rarely conferred. It is not, however, one of the best specimens of his work. Most of Théodore Rousseau's pictures are in private collections in Paris and elsewhere in France.

ROUSSILLON, a province of France, which now forms the greater part of the department of PYRÉNÉES ORIENTALES (*q.v.*). It was bounded on the south by the Pyrenees, on the west by the county of Foix, on the north by Languedoc, and on the east by the Mediterranean. The province derived its name from a small bourg near Perpignan, the capital, called Ruscino (Rosceliona, Castel Rossello), where the Gallic chieftains met to consider Hannibal's request for a conference. The district formed part of the Roman province of Gallia Narbonensis from 121 B.C. to 462 A.D., when it was ceded with the rest of Septimania to Theodoric II., king of the Visigoths. His successor, Amalaric, on his defeat by Clovis in 531 retired to Spain, leaving a governor in Septimania. In 719 the Saracens crossed the Pyrenees, and Septimania was held by them until their defeat by Pippin in 756. On the invasion of Spain by Charlemagne in 778 he found the borderlands wasted by the Saracenic wars, and the inhabitants hiding among the mountains. He accordingly made grants of land to Visigothic refugees from Spain, and founded several monasteries, round which the people gathered for protection. In 792 the Saracens again invaded France, but were repulsed by Louis, king of Aquitaine, whose rule extended over all Catalonia as far as Barcelona. The different portions of his kingdom in time grew into allodial fiefs, and in 893 Suniaire II. became the first hereditary count of Roussillon. But his rule only extended over the eastern part of what became the later province. The western part, or Cerdagne, was ruled in 900 by Miron as first count, and one of his grandsons, Bernard, was the first hereditary count of the middle portion, or Bésalu. In 1111 Raymond-Bérenger III., count of Barcelona, inherited the fief of Bésalu, to which was added in 1117 that of Cerdagne; and in 1172 his grandson, Alphonso II., king of Aragon, united Roussillon to his other states on the death of the last count, Gerard II. The counts of Roussillon, Cerdagne, and Bésalu were not sufficiently powerful to indulge in any wars of ambition. Their energies had been accordingly devoted to furthering the welfare of their people, who enjoyed both peace and prosperity under their rule. Under the Aragonese monarchs the progress of the united province still continued, and Collioure, the port of Perpignan, became a centre of Mediterranean trade. But the country was in time destined to pay the penalty of its position on the frontiers of France and Spain in the long struggle for ascendency between these two powers. James I. of Aragon had wrested the Balearic Isles from the Moors and left them with Roussillon to his son James (1276), with the title of king of Majorca. The consequent disputes of this monarch with his brother Pedro III. of Aragon were not lost sight of by Philip III. of France in his quarrel with the latter about the crown of the Two Sicilies. Philip espoused James's cause and led his army into Spain, but retreating died at Perpignan in 1285. James then became reconciled to his brother, and in 1311 was succeeded by his son Sancho, who founded the cathedral of Perpignan shortly before his death in 1324. His successor James II. refused to do homage to Philip VI. of France for the seigniory of Montpellier, and applied to Pedro IV. of Aragon for aid. Pedro not only refused it, but on various pretexts declared war against him, and seized Majorca and Roussillon in 1344. The province was now again united to Aragon, and enjoyed peace until 1462. In this year the disputes between John II. and his son about the crown of Navarre gave Louis XI. of France an excuse to support John against his subjects,

who had risen in revolt. Louis at the fitting time turned traitor, and the province having been pawned to him for 300,000 crowns [*c.* $171,000 for silver coin] was occupied by the French troops until 1493, when Charles VIII. restored it to Ferdinand and Isabella. During the war between France and Spain (1496–98) the people suffered equally from the Spanish garrisons and the French invaders. But dislike of the Spaniards was soon effaced in the pride of sharing in the glory of Charles V., and in 1542, when Perpignan was besieged by the dauphin, the Roussillonnais remained true to their allegiance. Afterwards the decay of Spain was France's opportunity, and, on the revolt of the Catalans against the Castilians in 1641, Louis XIII. espoused the cause of the former, and by the treaty of 1659 Roussillon was secured to the French crown.

ROVEREDO (in German sometimes *Rofreit*), one of the chief industrial cities in South Tyrol, and, after Trent, the chief seat of the Tyrolese silk industry, is situated on the left bank of the Adige (Etsch), in the fertile Val Lagarina, 35 miles north of Verona and 100 miles south of Innsbruck. Though there are several open places within the town, the streets, except in the newer quarters, are narrow, crooked, and uneven. Of the two parish churches, S. Marco dates from the 15th century and Sta. Maria del Carmine from 1678. The only other interesting building is the quaint old castle known as Castell Junk. As an active trading town and administrative centre Roveredo is well equipped with commercial, judicial, educational, and benevolent institutions. Though the district between Trent and Verona yields about 120,000 lbs. of silk annually, the silk industry of Roveredo, introduced in the 16th century, has declined during the last fifty years. The establishments in which the cocoons are unwound (*filande*) are distinct from those in which the silk is spun (*filatoje*). The silk is not woven at Roveredo. Paper and leather are the other chief manufactures of the place; and a brisk trade in southern fruits and red wine is carried on. The population is 8864.

The origin of Roveredo is probably to be traced to the foundiug of the castle by William of Castelbarco-Lizzana about 1300. Later it passed to the emperor Frederick of the Empty Pockets, who sold it to Venice in 1413. The treaty of Cambray transferred it from Venice to the emperor Maximilian in 1510, since which time it has shared the fate of southern Tyrol, finally passing to Austria iu 1814. In September, 1796, the French under Masséua won a victory over the Austrians near Roveredo. Near the neighboring village of St. Marco are the traces of a destructive landslip in 883, described in the *Inferno* (xii. 4–9) by Dante, who spent part of his exile in 1302 iu a castle near Lizzaua.

ROVIGNO, a city of Austria, in the province of Istria, is picturesquely situated on the coast of the Adriatic, about 12 miles south of Parenzo, and 10 miles by rail from Canfanaro, a junction on the railway between Divazza (Trieste) and Pola. It has two harbors, with shipbuilding yards; and it carries on several industries and a good export trade, especially in olive-oil and a cement manufactured in the little island of Sant' Andrea. The population was 9564 in 1869 and 9522 in 1880.

According to tradition Rovigno was originally built on an island, Cissa by name, which disappeared during the earthquakes about 737. In the 6th century, as the local legend has it, the body of St. Euphemia of Chalcedon was miraculously conveyed to the island; and at a later date it was transported to the summit of the promontory, Monte di Sant' Eufemia, whither it was restored by the Venetians in 1410 after being in the possession of the Genoese from 1380. The diocese of Rovigno was merged in 1008 in the bishopric of Parenzo; but its church continued to have the title of cathedral. Rovigno passed definitely into the hands of the Venetians in 1330, and it remained true to the republic till the treaty of Campo Formio (1797).

ROVIGO, a city of Italy, the chief town of a province, and the seat of the bishop of Adria, lies between the Po and the Adige, and is traversed by the Adigetto, a navigable branch of the Adige. By rail it is 27 miles south-southwest of Padua. The architecture bears the stamp both of Venetian and Ferrarese influence. The cathedral church of Santo Stefano (1696) is of less interest than La Madonna del Soccorso, an octagon (with a fine campanile), begun in 1594. The town-hall contains a library of 80,000 volumes belonging to the Accademia de' Concordi, founded in 1580, and a picture gallery enriched with the spoils of the monasteries. Wool, silk, linen, and leather are among the local manufactures. The population of the city proper was 7452 in 1871 and 7272 in 1881; the commune in 1881 had 11,460 inhabitants.

Rovigo (Neo-Latiu *Rhodigium*) appears to be mentioned as Rudigo iu 838. It was selected as his resideuce by the bishop of Adria on the destruction of his city by the Huus. From the 11th to the 14th ceutnry the Este family was usually iu authority; but the Venetians who obtained the town and castle in pledge between 1390 and 1400 took the place by siege in 1482, and, thongh the Este more than once recovered it, the Venctiaus, returning in 1514, retained possession till the Freuch Revolution. In 1806 the city was made a duchy iu favor of General Savary. The Austriaus in 1815 created it a royal city.

ROVIGO, Duke of. See Savary.

ROWE, Nicholas (1674–1718), the descendant of a family long resident at Lamerton in Devon, was born at Little Barford in Bedfordshire, June 30, 1674. The house in which he was born is close to the Great North Road, and a small stone to his memory has been erected in the centre of the garden. His father, John Rowe, took to the law as his profession, and at his death in 1692 (by which time he had attained to the dignity of being a serjeant at law) had amassed sufficient property to leave to his son an income of £300 [$1458] a year. Nicholas Rowe passed some time in a private school at Highgate, and then proceeded to Westminster School, at that time under the charge of the celebrated master Dr. Busby. In 1688 he became a king's scholar in this foundation, but three years later he was called away from school and entered as a student at the Middle Temple. The study of the law had little attraction for a young man of good person and lively manners, and at his father's death in the following year he devoted himself to society and to literature. His first play, *The Ambitious Stepmother*, was produced when he was twenty-five years old. It was followed by *Tamerlane*, a patriotic composition in which the virtues of William III. were lauded under the disguise of Tamerlane and the vices of the French king, Louis XIV., were denounced in the person of Bajazet. The popularity of this production soon declined, but for many years it was acted once every year, on the anniversary of the landing at Torbay of the Dutch prince. His next play, *The Fair Penitent*, long retained the favorable reception which marked its first appearance, and was pronounced by the great critic of the 18th century one of the most pleasing tragedies which had ever been written. Through its success the name of the principal male character Lothario became identified in popular language as the embodiment of the manners and habits of a fashionable rake. After the production of two more tragedies, *Ulysses* and *The Royal Convert*, of slight account at the time and long since forgotten, Rowe tried his hand on a comedy, *The Biter*. Much to the author's surprise his attempt in this new direction proved a failure, but Rowe recognized the justice of the verdict of the audience sufficiently to abstain from risking a second disappointment. His two last dramatic works were entitled *Jane Shore* and *Lady Jane Grey*, and the former of them, from the popularity of its subject and the elegance of its language, kept its position on the stage longer than any other of his works.

Rowe excelled most of his contemporaries in the knowledge of languages. He was acquainted more or less thoroughly with Greek, Latin, French, Italian, and Spanish. The latter tongue he is said to have

acquired on the recommendation of Harley and with the expectation that he would afterwards be rewarded by some high office. When, however, he reported his new acquisition to the new minister he was met with the dry remark from Harley—"How I envy you the pleasure of reading Don Quixote in the original!" Notwithstanding this disappointment, Rowe enjoyed many lucrative posts during his short life. When the duke of Queensberry was principal secretary of state for Scotland (1708–10), Rowe acted as his under-secretary. On the accession of George I. he was made a surveyor of customs, and on the death of Tate he became poet laureate. He was also appointed clerk of the council to the prince of Wales, and the list of preferments was closed by his nomination by Lord-Chancellor Parker (5th May, 1718) as secretary of presentations in Chancery. He died 6th December, 1718, and was buried in the south cross of Westminster Abbey. By his first wife, a daughter of Mr. Parsons, one of the auditors of the revenue, he left a son John; and by his second wife, Anne, the daughter of Joseph Devenish of a Dorsetshire family, he had an only daughter, Charlotte, born in 1718, who married Henry Fane, a younger brother of Thomas, eighth earl of Westmoreland. The burials of mother and daughter are recorded in Colonel Chester's *Registers of Westminster Abbey*.

Rowe's tragedies were marked by passionate feeling set off by a graceful diction, and were well adapted for stage effect. If *The Fair Penitent* and *Jane Shore* have been expelled from the stage, their historic reputation and their style will repay perusal.

Among Rowe's other literary efforts may be mentioned an edition of the works of Shakespeare (1709), for which he received from Lintot the bookseller the sum of £36 10s. [$177.39], a rate of pay not out of proportion to the labor which was bestowed upon the task. At the time of his death he had also finished a translation of Lucan's *Pharsalia*, a work then much praised and not yet superseded by any competitor. Rowe's minor poems were beneath the level of his age. An edition of his works was published in 1720 under the care of Mr. (afterwards Bishop) Newton. His translation of Lucan was edited by Dr. Welwood.

ROWING is the act of driving forward or propelling a boat along the surface of the water by means of oars. It is remarkable how scanty, until quite recent times, are the records of this art, which at certain epochs has played no insignificant part in the world's history. It was the oar that brought Phœnician letters and civilization to Greece; it was the oar that propelled the Hellenic fleet to Troy; it was the oar that saved Europe from Persian despotism; it was the skilful use of the oar by free citizens which was the glory of Athens in her prime. It is to be regretted that so little is known of the details connected with it, or of the disposal of the rowers on board the splendid fleet which started in its pride for Sicily, when 17,000 oars at a given signal smote the brine, and 100 long ships raced as far as Ægina. The vessels of the ancient Greeks and Romans—the biremes, quadriremes, quinquiremes, and hexiremes—owed their pace to the exertions of men who plied the oar rather than to the sails with which they were fitted, and which were only used when the wind was favorable. Professor Gardner has shown that boat racing was not uncommon among the Greeks;[1] and that it was practiced among the Romans Virgil testifies in the well-known passage in the fifth book of the *Æneid*. And the Venetian galleys which were subsequently used on the shores of the Mediterranean in mediæval times were only a modified form of the older kind of craft. These were for the most part manned by slaves and criminals, and were in constant employment in most European countries.

Rowing was understood by the ancient Britons, as they trusted themselves to the mercy of the waves in coracles composed of wicker-work covered with leather, similar no doubt in many respects to those now used in Wales; but these frail vessels were propelled by paddles and not by oars. The Saxons seem to have been expert in the management of the oar, as well as the Danes and Norwegians, as it is recorded that the highest nobles in the land devoted themselves to it. Alfred the Great introduced long galleys from the Mediterranean, which were propelled by forty or sixty oars on each side, and for some time these vessels were used for war purposes. It is stated by William of Malmesbury that Edgar the Peaceable was rowed in state on the river Dee from his palace, in the city of West Chester, to the church of St. John and back again, by eight tributary kings, himself acting as coxswain.

Boat quintain, or tilting at one another on the water, was first brought into England by the Normans as an amusement for the spring and summer season, and probably much of the success of the champions depended upon the skill of those who managed the boats. Before the beginning of the 12th century the rivers were commonly used for conveying passengers and merchandise on board barges and boats, and until the introduction of coaches they were almost the only means of transit for royalty, and for the nobility and gentry who had mansions and watergates on the banks of the Thames. It is, however, impossible to trace the first employment of bargemen, wherrymen, or watermen, but they seem to have been well established by that time, and were engaged in ferrying and other waterside duties. During the long frosts of the early part of the 13th century, frequent mention is made in the chronicles of the distress among the watermen, from which we may assume that their numbers were large. They were employed in conveying the nobles and their retinues to Runnymede, where they met King John and where Magna Charta was signed. Towards the close of this century the watermen of Greenwich were frequently fined for overcharging at the established ferries, and about the same time some of the city companies established barges for water processions. We learn from Fabian and Middleton that in 1454 "Sir John Norman, then lord mayor of London, built a noble barge at his own expense, and was rowed by watermen with silver oars, attended by such of the city companies as possessed barges, in a splendid manner," and further "that he made the barge he sat in burn on the water;" but there is no explanation of this statement. Sir John Norman was highly commended for this action by the members of the craft, as no doubt it helped to popularize the fashion then coming into vogue of being rowed on the Thames by the watermen who plied for hire in their wherries. The lord mayor's procession by water to Westminster, which figures on the front page of the *Illustrated London News*, was made annually until the year 1856, when it was discontinued. The lord mayor's state barge was a magnificent species of shallop rowed by watermen; and the city companies had for the most part barges of their own, all rowed double-banked with oars in the fore half, the after part consisting of a cabin something like that of a gondola. The watermen became by degrees so large and numerous a body that in the sixth year of the reign of Henry VIII. (1514) an Act was passed making regulations for them. This Act has from time to time been amended by various statutes, and the last was passed in 1858. Much time seems to have been spent in pleasuring on the water in the 15th and 16th centuries, and no doubt competitions among the watermen were not uncommon, though there is no record of them. The principal occupation of watermen, who were obliged to serve an apprenticeship, used to be ferrying and rowing fares on the Thames, but in process of time the introduction of bridges and steamers drove them from this employment, and the majority of them now work as bargemen, lightermen, and steamboat hands, having still to serve an apprenticeship. For many years matches for money stakes were frequent (1831 to 1880),

[1] *Journal of Hellenic Studies*, 1881.

but the old race of watermen, of which Phelps, the senior Kelley, Campbell, Coombes, Newell, the MacKinneys, Messenger, Pocock, and Henry Kelley were prominent members, has almost died out, and some of the best English scullers during the last fifteen years have been landsmen.

Apart from the reference already made to the ancients, we do not find any records of boat-racing before the establishment in England of the coat and badge, instituted by the celebrated comedian Thomas Doggett, in 1715, in honor of the house of Hanover, to commemorate the anniversary of "King George I.'s happy accession to the throne of Great Britain." The prize was a red coat with a large silver badge on the arm, bearing the white horse of Hanover, and the race had to be rowed on the 1st of August annually on the Thames, by six young watermen who were not to have exceeded the time of their apprenticeship by twelve months. Although the first contest took place in the year above mentioned, the names of the winners have only been preserved since 1791. The race continues at the present day, but under slight modifications. The first regatta appears to have occurred about sixty years later, for we learn from the *Annual Register* of the year 1775 that an entertainment called by that name (Ital., *regata*), introduced from Venice into England, was exhibited on the Thames off Ranelagh Gardens, and a lengthy account of it is given at the end of the work. The lord mayor's and several of the city companies' pleasure barges were conspicuous, and, although we learn very little indeed of the competing wager boats, it seems clear they were rowed by watermen. We find from Strutt's *Sports and Pastimes* (first published in 1801) that the proprietor of Vauxhall Gardens had for some years given a new wherry to be rowed for by watermen, two in a boat, which is perhaps the first pair-oared race on record. Similar prizes were also given by Astley, the celebrated horseman and circus proprietor of the Westminster Bridge Road, about the same period; but thus far rowing was apparently viewed as a laborious exercise, and the rowers were paid. At the commencement of the present century, however, rowing associations were formed, and the "Star," "Arrow," "Shark," and "Siren" Clubs had races amongst themselves, generally over long courses and in heavy six-oared boats. The Star and Arrow Clubs ceased to exist in the early years of this century, and were merged in the newly formed Leander Club. The date of its establishment cannot be fixed exactly, but it was probably about 1818 or 1819. It ranked high, because the majority of its members had frequently distinguished themselves in matches with the oar and sculls. They were the first to patronize and lend a helping hand to young watermen who showed promise of aquatic fame, and they likewise instituted a coat and badge for scullers.

The first record of public-school racing which can now be seen is the Water Ledger of Westminster School, which commences in the year 1813 with a list of the crew of the six-oared Fly. This craft continued for some time to be the only boat of the school, and in 1816 beat the Temple six-oar in a race from Johnson's Dock to Westminster Bridge by half a length. Eton possessed a fleet of boats in 1811, if not at an earlier date, consisting of a ten-oar and three boats with eight oars. In those days some of the crews had a waterman to pull stroke and drill the crew, but this practice was abolished in 1828, as the waterman frequently rowed a bad stroke and the crew were obliged to subscribe for his day's pay, beer, and clothes; thenceforward the captain of each crew rowed the stroke-oar. The earliest record of a race at Eton is when Mr. Carter's four rowed against the watermen and beat them in 1817; but the professionals had a boat too small for them. In 1818 Eton challenged Westminster School to row from Westminster to Kew Bridge against the tide, but the match was stopped by the authorities; and it was not until 1829 that the first contest between the two schools was brought to an issue.

Rowing appears to have commenced at the universities soon after the beginning of the century, but earlier at Oxford than at Cambridge. There were college boats on the river for some time before there were any races. Those first recorded at Oxford were in 1815, said to be college eights, but the boats used are more likely to have been fours, when Brasenose was "head of the river" and Jesus their chief opponent. These two clubs were constantly rowing races, but they were not very particular about the oarsmen in the boats, as the Brasenose crew in 1824 was composed of two members of the college, a Worcester man, and a waterman. The first authentic records commence in 1836, and the Oxford University Boat Club was established in 1839. At Cambridge eight-oared rowing was not in fashion so soon as at Oxford, the first eight (belonging to St. John's College) not having been launched until 1826; and between that year and 1829 the Cambridge University Boat Club was formed. Eight-oared races were established on the Cam in 1827, when First Trinity was "head of the river," and in 1828 the first Oxford and Cambridge University boat race was proposed and fixed for June 10th, 1829, on the Thames, from Hambledon Lock to Henley Bridge. The race was rowed at intermittent periods up to 1856, since which year it has been annual. In 1830 the amateur championship of the Thames was instituted by Mr. Henry C. Wingfield, who presented a pair of silver sculls to be rowed for annually by the amateur scullers of the Thames on the 10th August, from Westminster to Putney at half flood, but the course and date of the race have been changed since then. The first scullers' race for the professional championship of the Thames was rowed from Westminster to Putney on the 8th September, 1831, Charles Campbell, of Westminster, defeating John Williams, of Waterloo Bridge. During the next eight years rowing increased in favor among amateurs, and, as it had taken its proper place among the national pastimes, and the want of a central spot for a regatta was much felt, Henley-on-Thames was chosen, and it was decided that a regatta should be held there in 1839, and the Grand Challenge cup for eight oars was established. This has been an annual fixture ever since, prizes being given for four oars, pair oars, and scullers, as well as for eight oars. In 1843 the Royal Thames Regatta was started at Putney, and it gave a gold challenge cup for eight oars and a silver challenge cup for four oars, to be rowed by amateurs. In 1844 Oxford beat Cambridge at this regatta, and in the same year the committee added a champion prize for watermen. About this time the Old Thames Club was established, and they carried off the gold challenge cup by winning it for three years in succession, viz., 1846 to 1848. In 1852 the Argonauts Club first appeared at Henley and won the visitors' cup, and in 1853 the Royal Chester Rowing Club were successful in the Stewards' cup for four oars, and won the Grand Challenge cup for eight oars the next year. In 1856 the London Rowing Club was established, but those members of it who rowed at Henley were obliged to enter under the name of the Argonauts Club, as, not having been in existence a year, its crew could not compete under its name. The next year, however, they carried off the Grand Challenge cup from Oxford University, and were successful in the Stewards' cup as well. Many more clubs, such as the Kingston, Radley, West London, Twickenham, Thames, Moulsey, and other metropolitan and provincial clubs, were subsequently established, and have met with varied success.

Boats.—The boats of the present day differ very much from those formerly used, and the heavy lumbering craft which alone were known to our forefathers have been superseded by a lighter description,—skiffs, gigs, and racing outriggers. The old Thames wherry with its long projecting bow is now seldom seen, and a roomy skiff, often used with a sail when the wind is favorable, has taken its place. The gig is an open boat with several strakes, having the rowlocks, or pieces of wood between which the oar works, fixed upon the gunwale, which is level all round. The skiff is wider and longer than the gig and of greater depth, and, rising higher fore and aft, with rowlocks placed on a curved and elevated gunwale, has greater carrying power and rows lighter than the gig. The wherry rises high at the bows with a long nose pointed upwards and a very low stern, being consequently unsuited for rough water. The modern racing boat differs much from the foregoing, as its width has been decreased so as to offer as little resistance to the water as possible, while it is propelled by oars working between rowlocks fixed on projecting iron rods and cross pieces which are made fast to the timbers. These rods and cross pieces are rigged out from the side of the boats, and hence the term outriggers. These boats are constructed for single scullers, for pairs, for fours, for eights, and occasionally for twelve oars. The outrigger was first brought to perfection by the late Henry Clasper, of Newcastle-on-Tyne, who is generally believed to have been its inventor; but the first outriggers, which were only rude pieces of wood fastened on the boat's sides, were used in 1828, and

were fixed to a boat at Ouseburn-on-Tyne. The first iron outriggers were affixed to a boat in 1830 at Dents' Hole on Tyne. In 1844 Clasper, who had been improving upon these inventious, made his first boat of the kind and brought her to London; but her outriggers were ouly 8 inches in length, and she was built of several strakes, with a small keel. In process of time keels were dispensed with, the outriggers were lengthened, aud the skin of the boat is now composed of a single strake of cedar plaued very thin and bent by means of hot water to take the form of the timbers of the boat. It is fastened hy copper nails to curved timbers of ash, one extremity of which is fixed into the keelsou, while the other is made fast to long pieces of deal that run from end to end of the boat aud are called inwales. The timbers in the middle are thicker than the rest, so as to support the iron outriggers which are fastened to them, and the thwart, which is wider than it nsed to be in order to carry the sliding seat, which works backward and forward with the oarsman, is screwed to the inwales. This seat moves to and fro on rollers made of steel, wood, or brass, and travels over a distauce varying from 12 to 6 inches, according to the judgment of the instructor. The sliding seat seems to have been the invention of an American oarsmau, who fixed one to a sculling boat in 1857, hut it was not uutil 1870 that he had mastered the principles sufficiently to discover how much was gained mechanically and physically. The value of the improvement is now universally recoguized, but it was some little time before it was nnderstood and came into geueral use. The members of the London Rowing Club, who defeated the representatives of the New York Atalanta Club, at Putney, in June, 1872, nsed sliding seats, and the club also had them fitted to their eight, which easily carried off the Grand Challenge cup at Henley a few days afterwards. In 1873 the sliding seat was adopted by the crews rowing in the University boat race. The Americans have also the credit of two other inventions, viz., the steering apparatus, which enables a crew to dispense with a coxswain, and the swivel rowloek; but, though the former is now fitted to the majority of non-coxswain pairs and fours, the nse of the latter is confined for the most part to sculling boats. In outrigged eights, fours, and pairs the outriggers are placed, one for each thwart, at each side alternately, but in gigs, skiffs, wherries and funnies they are placed opposite one another, so as to be used on either side at discretion. The oars generally used are about twelve feet long, varying with the width of the boat, and sculls are as much as 10 feet long.

Directions for Rowing.—In modern rowing the oarsman, graspiug the handle of the oar with both hands, sits forward on the edge of his seat, stretches out his arms uutil they are fully extended—the blade of the oar being, just previous to entering the water, at right angles to its surface. It is then dipped into the water just so far as to cover it, and the handle pulled towards the oarsman's body, the weight of the latter being thrown backward at the same time, so as to make one movement, and the legs pressed hard against the stretcher, aud the handle finally pulled home to the chest with the arms, the elbows being allowed to pass the sides until the handle of the oar just touches the lower extremity of the breast. The blade of the oar thus appears to be forced through the water, but in reality this is very slightly the case, as the water, which is the fulcrum, remains almost immovable. In sculling, the operation is the same, except that the sculler has a scull in each haud and drives the boat himself, whereas a man rowing an oar must have one or more comrades to assist him. Rowing is made up of two parts, the stroke and the feather. Feathering is turning the oar at the end of the stroke by lowering the hands and dropping the wrists, thus bringing the flat blade of the oar parallel with the surface of the water, and is generally considered to include the driving forward of the handle of the oar and the conseqneut carrying back of the blade previous to the begiuning of a new stroke.

When prepared to embark, the pupil should lay his oar on the water if an outside or upon the land if a shoreside oar, and step into the boat with his face to the stern, when he should at once seat himself and ship his oar, and then try the length of his stretcher to see that it suits his length of leg. This arranged, he should proceed to settle himself firmly upon his thwart, sitting quite square aud upright, but not too near the edge of it, because if so the chauces are that the lower part of the back will not be straight, and if his seat is not firm he cannot aid in balancing the boat. He should sit about three-qnarters of the thwart aft iu an ordinary racing boat, about an inch and a half from the edge, and he mnst be exactly opposite the handle of his oar. His feet must be planted firmly against the stretcher and immediately opposite his body and oar,—the heel as well as the ball of the foot pressing agaiust the stretcher, and the two heels close together with the toes wide apart so as to keep the knees open and separate. Of course if the pupil sits fair aud square, and immediately opposite the haudle of his oar, he will be at one side and not in the ceutre of the boat. The stretcher, it may be added, should be as short as possible conveniently for clearing the knees and for exercising complete control over the oar. The body should be upright, not bent forward and sunk down upon the trunk; the shoulders should be thrown back, the chest out, and the elbows down close alongside the flanks. The oar should be held firmly, but withal lightly, in both hands, not clutched and cramped as in a vice—the outside hand close to the end of the handle, with the fingers above and the thumb underneath it, aud the inside hand, or that nearest the body of the oar, from an inch and a half to two inches away from its fellow, but grasping the oar more convexly than the latter, the thumb being kept underneath. The forearms should be below the level of the handle, and the wrists dropped and relaxed, the oar lying flat and feathered upon the surface of the water. The diverse positions of the two hands and wrists enable the oar to be wielded with greater facility than if they were alike, and allow both arms to be stretched out perfectly straight, a crooked arm being perhaps the least pardonable fault in rowing. In taking the stroke the body should be inclined forwards with the backbone straight, the stomach well out and down between the legs, the chest forward and elevated as much as possible. The knees must be pressed slightly outwards; and the shoulders should come moderately forward, but perfectly level, and at an equal height. The arms should play freely in the shoulder joints, and should be perfectly straight from the shoulders to the wrists; the action of the hips also should be free. The inside wrist, however, must be somewhat raised, and the outside one be bent slightly round, in order that the knuckles may be parallel to the oar, and the oar itself be firmly grasped with both hands, not with the tips of the fingers, but with the whole of the fingers well round it, and each one feeling the handle distinctly; the knuckles of the thumbs should be about an inch and a half or two inches apart. In reaching forward the hands should be shot out straight from the body without the least pause, and as soon as the oar has passed the knees the wrists should be raised to bring the blade at right angles to the water preparatory to dipping it, and when the arms are at their extreme limit, which will be just over the stretcher, the oar should be struck down firmly and decisively into the water until covered up to the shoulder, and the weight of the body be thrown entirely upon it, by which the beginning of the stroke is caught, and the stroke itself pulled through; in a word, the pupil should, as it were, knit himself up, and then spring back like a bow when the string is loosened, bringing the muscles of his back and legs into play. The stroke should be finished with the arms and shoulders, the elbows being kept close to the sides, and the shoulders down and back, the head still up, and the chest out, and the oar itself be brought straight home to the chest, the knuckles touching the body about an inch or less below the bottom of the breast bone where the ribs branch off; when there the hands should be dropped down aud then turned over, and shot out again close along the legs, the body following at once. Care should likewise be taken not to lessen the force applied to the oar as the stroke draws to a conclusion, but to put the whole strength of the arms and shoulders into the finish of the stroke, where it will naturally diminish quite fast enough, as the oar forms au obtuse angle with that portion of the boat before the rowlock. To effect a quick recovery the back must be kept straight, the knees must not be dropped too low, and the muscles of the body, especially of the stomach, must be used to enable the pupil to get forward for the next stroke. At the same time, no matter how minute and precise written instructions may be, they can never impart the knowledge that can be picked up by watching the actions of an accomplished oarsman for the space of five miuutes; hence, the imperative necessity of a practical exponent of the principles of the art iu contradistinction to a merely theoretical "coach."

The foregoiug are the essentials of rowing, and have been given at some length and in detail as the motions are necessarily very complicated. The operations are much the same whether a person be rowing on a fixed or sliding seat, but a novice should be taught to row on a fixed seat, and he will afterwards be easily able to acquire the art of sliding, which may soon be done from following the accompanying directions. The oarsman, in getting forward, should extend his arms to their full length, and with the assistance of the straps on the stretcher, simultaneously draw himself as close up to the latter as he can, his knees being slightly and symmetrically opened, and the body reached forward as much as possible, the back being kept

quite straight. On catching hold of the water the knees must be gradually straightened and the body thrown back, the two actions going on simultaneously, so that the legs are straight out by the time the stroke is finished and not before, the body and shoulders at the end of the stroke being thrown well back. The body is then recovered to the upright position from the hips, the hands thrown forward, and by the time they are just past the knees the body is being drawn forward, and the knees bent. The motion then begins the same as before. (E. D. B.)

Boat-Racing in America.—This pastime can be traced back to the beginning of the present century. The earliest important affair was in 1811,—a sectional match, New York City against all Long Island, four-oared barges, with coxswains, from Harsimus, New Jersey, to the flag-staff on the Battery. New York won easily, and such was the popular enthusiasm over the race that its boat, the "Knickerbocker," was suspended in a public museum, where it remained for fifty-four years, a constant recipient of public admiration until destroyed by fire in July, 1865. Since this historic contest no year has been without boat races. At that time the words amateur and professional were unknown on the water; the Castle Garden Amateur Boat Club Association—America's first avowedly amateur club—was founded in 1834.

There had been informal clubs and desultory racing at Yale College as early as 1833, but the first regular organization was in March, 1843. Harvard followed in September, 1844, and Yale and Harvard first met on the water at Lake Winepiseogee, New Hampshire, August 3, 1852; since 1878 they have met annually at New London, Connecticut. In 1865 Harvard, Yale, Trinity, and Brown formed the Union College Regatta Association, which lasted three years. The Racing Association of American Colleges, which at one time included sixteen colleges, died in 1876. In 1883 Bowdoin, Columbia, Cornell, Princeton, Rutgers, University of Pennsylvania, and Wesleyan formed the Intercollegiate Racing Association, which still flourishes and gives annual regattas.

The control of amateur racing in America belongs to the National Association of Amateur Oarsmen, founded in 1873, whose membership includes all the better class of amateur boat clubs. Its management is vested in an Executive Committee of nine members, three of whom are elected at each annual meeting of the association. The rulings of this committee are subject to review, approval, or reversal, at each annual meeting of the full association. This association gives an annual open amateur regatta, similar to the Royal Henley Regatta in being the chief aquatic event of the year, but unlike it in not being rowed always on the same course, but moving about from year to year—having since 1873, been rowed at Philadelphia, Newark, Troy, and Watkins (N. Y.), Detroit, Washington, and Boston. There are in the United States eleven regularlay organized amateur rowing associations, formed by the union of amateur rowing clubs and giving each year one or more regattas. These associations are the National Association of Amateur Oarsmen, the Northwestern Amateur Rowing Association, the Mississippi Valley Amateur Rowing Association, the Passaic River Amateur Rowing Association, the Intercollegiate Rowing Association, the Harlem Regatta Association, the Louisiana State Amateur Rowing Association, the Virginia State Rowing Association, the Schuylkill Navy, the Upper Hudson Navy, and the Kill von Kull Regatta Association. At English regattas it is usual to start three boats in a heat, sometimes four, five being the utmost limit, whereas at Saratoga, in the great regattas of 1874 and 1875, there were started abreast, in four separate races, eleven singles (twice), thirteen coxswainless fours, and thirteen coxswainless sixes.

The primary division of American racing craft is into (*a*) lapstreaks or clinkers, built of wood in narrow streaks with overlapping edges at each joint, and (*b*) smooth bottoms, made of wood or paper, and having a fair surface, without projecting joint or seam. Lapstreak boats are, however, now rarely used save in barge races. Then follows the subdivision into barges, which are open inrigged boats, gigs, which are open outrigged boats, and shells, which are covered outrigged boats. These three classes of boats are further subdivided, in accordance with the means of propulsion, into single, double, and quadruple sculling boats, and pair-, four-, six-, and eight-oared boats. In America the double-scull is more frequent than the pair, and the six-oar much more common than the eight-oar.

The sliding seat is now being gradually superseded by various styles of rolling seats, in which the actual seat travels backward and forward on frictionless wheels or balls. The best of these devices run more easily, are cleaner, and less liable to accident than the ordinary sliding seat. English oarsmen use the sliding seat as a means of making their old accustomed stroke longer and more powerful. American oarsmen hold that what is needed by an oarsman is not the addition of the long slide to the old-fashioned long swing, but the almost total substitution of slide for swing, the transfer of the labor from back to legs —in fact, a totally new style.

ROWLANDSON, Thomas (1756–1827), caricaturist, was born in Old Jewry, London, in July, 1756, the son of a tradesman or city merchant. It is recorded that "he could make sketches before he learned to write," and that he covered his lesson-books with caricatures of his masters and fellow-pupils. On leaving school he became a student in the Royal Academy. At the age of sixteen he resided and studied for a time in Paris, and he afterwards made frequent tours on the Continent, enriching his portfolios with numerous jottings of life and character. In 1775 he exhibited at the Royal Academy a drawing of Delilah visiting Samson in Prison, and in the following years he was represented by various portraits and landscapes. Possessed of much facility of execution and a ready command of the figure, he was spoken of as a promising student; and had he continued his early application he would have made his mark as a painter. But he was the victim of a disastrous piece of good fortune. By the death of his aunt, a French lady, he fell heir to the sum of £7000 [$34,020], and presently he plunged into the dissipations of the town. Gambling became a passion with him, and he has been known to sit at the gaming-table for thirty-six hours at a stretch. In time poverty overtook him; and the friendship and example of Gillray and Bunbury seem to have suggested that his early aptitude for caricature might furnish a ready means of filling an empty purse. His drawing of Vauxhall, shown in the Royal Academy exhibition of 1784, had been engraved by Pollard, and the print was a success. Rowlandson was largely employed by Rudolph Ackermann, the art publisher, who in 1809–1811 issued in his *Poetical Magazine* "The Schoolmaster's Tour"—a series of plates with illustrative verses by Dr. William Combe. They were the most popular of the artist's works. Again engraved by Rowlandson himself in 1812, and issued under the title of the Tour of Dr. Syntax in Search of the Picturesque, they had attained a fifth edition by 1813, and were followed in 1820 by Dr. Syntax in Search of Consolation, and in 1821 by the Third Tour of Dr. Syntax in Search of a Wife. The same collaboration of designer, author, and publisher appeared in the English Dance of Death, issued in 1814–16, one of the most admirable of Rowlandson's series, and in the Dance of Life, 1822. Rowlandson also illustrated Smollett, Goldsmith, and Sterne, and his designs will be found in *The Spirit of the Public Journals* (1825), *The English Spy* (1825), and *The Humorist* (1831). He died in London, after a prolonged illness, on the 22d April, 1827.

Rowlandson's designs were usually executed in outline with the reed-pen, and delicately washed with color. They were then etched by the artist on the copper, and afterwards aqua-tinted—usually by a professional engraver, the impressions being finally colored by hand. As a designer he was characterized by the utmost facility and ease of draughtsmanship. He poured forth his designs in ill-considered profusion, and the quality of his art suffered from this haste and over-production. He was a true if not a very refined humorist, dealing less frequently than his fierce contemporary Gillray with politics, but commonly touching, in a rather gentle spirit, the various aspects and incidents of social life. His most artistic work is to be found among the more careful drawings of his earlier period; but even among the gross forms and exaggerated caricature of his later time we find, here and there, in the graceful lines of a figure or the sweet features of some maiden's face, sufficient hints that this master of the humorous might have attained to the beautiful had he so willed.

See J. Grego, *Rowlandson the Caricaturist, a Selection from his Works*, etc. (2 vols., 1880).

ROWLEY, William, actor and dramatist, collaborated with several of the celebrated dramatists of the Elizabethan period—Dekker, Middleton, Heywood,

Fletcher, Webster, Massinger, and Ford. Nothing is known of his life except that he was an actor in various companies, and married in 1637. There was another Rowley, an actor and playwright in the same generation, Samuel, and probably a third, Ralph. Four plays by W. Rowley are extant,—*A Woman Never Vext* (printed 1632), *A Match at Midnight* (1633), *All's Lost by Lust* (1633), and *A Shoemaker a Gentleman* (1638). From these an opinion may be formed of his individual style. Effectiveness of situation and ingenuity of plot are more marked in them than any special literary faculty, from which we may conjecture why he was in such request as an associate in play-making. There are significant quotations from two of his plays in Lamb's *Specimens*. It is recorded by Langbaine that he "was beloved by those great men Shakespeare, Fletcher, and Jonson;" and the tradition of his personal amiability is supported by the fact of his partnerships with so many different writers.

ROWLEY REGIS, an urban sanitary district of Staffordshire, is situated on the Birmingham Canal, and on the Stourbridge branch of the Great Western Railway, 6 miles west of Birmingham. The original village surrounds the parish church, dating from the 13th century, but rebuilt in 1840 with the exception of the tower, which was also rebuilt in 1858. The village is situated in a rich coal and ironstone district, and round it numerous hamlets have grown up within recent years. Lately the parish has been erected into an urban sanitary district, governed by a local board of fifteen members. Besides collieries, iron works, and extensive quarries for "Rowley rag" (a basaltic intrusion), there are potteries, rivet, chain, and anchor works, breweries, and agricultural implement works, the district being one of the most important manufacturing centres of Staffordshire. The population of the urban sanitary district (area 3670 acres) in 1871 was 23,534 and in 1881 it was 27,385.

ROXANA, or ROXANE, daughter of the Bactrian Oxyartes and wife of Alexander the Great (see ALEXANDER, vol. i. p. 428, and MACEDONIAN EMPIRE, vol. xv. p. 142–3).

ROXBURGH, a border county of Scotland, occupying the greater part of the border line with England, is bounded E. and S.E. by Northumberland, S.E. by Cumberland, S.W. by Dumfriesshire, W. by Selkirkshire, N.W. by Midlothian, and N. by Berwickshire. It lies between 55° 6′ 30″ and 55° 42′ 30″ N. lat., and between 2° 10′ and 3° 7′ W. long. Its greatest length from north to south is 43 miles, and its greatest breadth about 30 miles. The area is 428,464 acres, or about 670 square miles.

Surface and Geology.—The greater part of Roxburgh is included in Teviotdale. The whole course of the Teviot, 40 miles in length, is included within the county. It rises in the ranges of greywacke hills which separate the county from Dumfriesshire and Selkirk, and runs northeastwards, following the deposition of the greywacke rocks to the Tweed at Kelso, and dividing the county into two unequal parts. On the north a high range of land runs parallel with its banks and slopes to its margin. Southwest between Dumfries and Cumberland the greywacke formation constitutes an almost continuous succession of eminences, through which the Liddel finds its way southwards. The highest summits of the greywacke ranges exceed 1800 feet. Although occasionally rocky and rugged, the hills are for the most part rounded in outline and clothed with grass to their summits. This Silurian formation occupies nearly the whole of the western half of the county, but along with the greywacke rocks is associated clay slate of a bluish color, glimmering with minute scales of mica and frequently traversed by veins of calcareous spar. The formation is succeeded to the eastward by an extensive deposit of Old Red Sandstone, forming an irregular quadrangular area towards the centre of the county, emitting two irregular projections from its southern extremity, and interrupted towards the north by an intrusion of trap rocks. Owing to the sandstone formation the transverse valleys formed by various affluents of the Teviot present features of great interest. The action of the water has scooped deep channels in the rock, and thus formed picturesque narrow defiles, of which the high sandstone scaurs are a prominent characteristic, their dark red color blending finely with the bright green woods and sparkling streams. The best example of this species of scenery is on the Jed near Jedburgh. From the left the Teviot receives the Borthwick and the Ale, both rising in Selkirkshire, and from the right the Allan, the Slitrig, the Rule, the Jed, the Oxnam, and the Kale, which rise in the high grounds towards the English border. As the Teviot approaches Hawick the county becomes more cultivated, although frequent irruptions of igneous rocks in the shape of isolated hills lend to it picturesqueness and variety. Towards the Tweed, where the lower division of the coal formation prevails, it expands into a fine champaign country, richly cultivated and finely wooded. The Tweed, which enters the county about two miles north of Selkirk, crosses its northern corner, eastwards by Abbotsford, Melrose, and Kelso to Coldstream. Its tributaries within the county are, besides the Teviot, the Gala, the Leader, and the Eden. One of the principal features of the Tweed district is the beautiful group of the Eildon Hills near Melrose, consisting of felspathic porphyry, the highest of the three peaks reaching 1385 feet. The extensive range of the Cheviots running along the Northumberland border is of similar formation. Within Roxburghshire they reach a height of over 2400 feet. The lochs are comparatively few, the principal being Yetholm or Primside Loch, and Hoselaw in Linton parish.

The principal minerals are calcareous spar and quartz. The spar is frequently of a red or rose character, indicating the presence of hematite. In the greywacke strata fossils are very rare, but in the old Red Sandstone fossil fishes of the genus *Pterichthys* and *Holoptychius* are very numerous, and a great variety of plant impressions have been found, especially fucoids, but also vegetables of a higher origin, including distinct petrifactions of *Calamites*.

Climate and Agriculture.—The mean annual temperature approximates to that of Scotland generally, but it is much warmer in the low and arable portions, where also the rainfall is much less than in the hilly regions. The soil varies much in different districts, being chiefly loam in the low and level tracts along the banks of the river, where it is also very fertile. In other parts a mixture of clay and gravel prevails, but there is also a considerable extent of mossy land. The hilly district is everywhere covered by a thick green pasturage admirably suited for sheep. Both in the pastoral and in the arable districts agriculture is in a very advanced condition. The chief attention is devoted to cattle and sheep rearing.

Of the total area of 428,464 acres, 184,196 were in crops in 1885, 48,506 being under corn crops, 28,385 green crops, 59,937 clover, 47,058 permanent pasture, and 310 fallow. Of the area under corn crops, 32,624 acres, or fully two-thirds, were occupied by oats, and 13,355 acres by barley. Turnips and swedes were the principal green crops, occupying 25,143 acres, while potatoes occupied only 2118. The total number of horses was 4420, of which 3697 were used solely for purposes of agriculture; of cattle 17,831, of which 5154 were cows and heifers in milk or in calf; of sheep 502,721; and of pigs 4783. The valued rental in 1674 was £314,633 Scots, or £26,219 sterling [$127,424.34], while that in 1883–84 was £420,403 [$2,043,158.58] including railways. According to the parliamentary return of lands and heritages, the total number of owners was 2455, of whom 1880 possessed less than one acre. The duke of Buccleuch possessed 104,461 acres, or nearly a fourth of the whole; the duke of Roxburghe, 50,459; the countess of Home, 25,380; marquis of Lothian, 19,740; and Sir William F. Elliot of Stobs, 16,475.

Manufactures.—Though essentially an agricultural county, Roxburghshire possesses woollen manufactures of some importance, including tweeds, blankets, shawls, and hosiery, the principal seats being Hawick, Jedburgh, and Kelso.

Railways.—The county is intersected by one of the lines of railway from Edinburgh to London (the "Waverley" route), which passes Melrose and Hawick. At Riccarton a branch passes southeastwards to Newcastle. The northern district is crossed by the border railway from St. Boswells to Kelso, Coldstream, and Berwick, a branch passing south from near Kelso to Jedburgh.

Population.—Between 1831 and 1881 the population increased from 43,663 to 53,442 (25,436 males, 28,006 females), but from 1861 to 1871 there was a decrease from 54,119 to 49,407. The town population numbered 24,273 in 1881, the village 6627, and the rural 22,542. Jedburgh (population 2432) is a royal burgh; it is also a police and parliamentary burgh, as is likewise Hawick (16,184); Kelso (4687) is a police burgh. The most important villages are Melrose (1550), Newcastleton (924), and Yetholm (746).

History and Antiquities.—Among the more important relics of the early inhabitants of the county are the so-called Druidical remains at Tinnishill between the parishes of Castleton and Canonbie, at Ninestanerigg near Hermitage Castle, and at Plenderleath between the Oxnam and the Kale. Of old forts there are two of great size on the summits of Caerby and Tinnishill in Liddesdale, and a number of smaller ones in different parts of the county. On the northwest of the Eildon Hills are two fossæ or ramparts forming a circuit of more than a mile. On Caldshiels Hill there was another British fort, and between them a ditch with rampart of earth defending the country from the east. The famous Catrail, "partition of the fence," the most important of the British remains in the kingdom, extended a distance of 45 miles from near Galashiels in Selkirkshire through Roxburgh to Peel Fell on the border. The Roman Watling Street touched on Roxburgh at Broomhartlaw, whence passing along the mountains now forming the boundary of the county for a mile and a half, until it entered Scotland at Blackhall, it turned northward by Bonjedward, Mount Teviot, Newton, Eildon, and Newstead to Channelkirk in the Lammermuirs. On its line there were important stations at Chewgreen in the Cheviots (*? Ad Fines*), Bonjedward (*Gadanica*), and Eildon Hill (*? Trimontium*). Another Roman road called the Maidenway, from Maiden Castle in Westmoreland, entered Roxburgh at Deadwater, and under the name of the Wheelcauseway traversed the northeast corner of Liddesdale into Teviotdale. From Watling Street a branch called the Devil's Causeway passed to the Tweed. After forming part of the kingdom of Northumberland for several centuries, Roxburgh was relinquished along with Lothian to the Scottish king about 1020 (see LOTHIAN, vol. xv. p. 12). It is supposed to have been formed into a shire in the reign of David I., its ancient county town of Roxburgh forming, along with Edinburgh, Berwick, and Stirling, the court of the four burghs of Scotland, whose laws were collected by that king. Roxburgh Castle, between the Tweed and Teviot near Kelso, was a royal residence of the Saxon kings of Northumbria and afterwards of the Scottish monarchs. It was frequently taken by the English, and James II. was killed there by the bursting of a cannon. After this it remained in ruins till it was repaired by Protector Somerset, shortly after which it was demolished. Hermitage, in Liddesdale, the scene of Leyden's ballad of *Lord Soulis*, was probably built by Nicholas de Soulis in the beginning of the 13th century. On the forfeiture of the Soulis family in 1320, it was granted by Robert the Bruce to Sir John Graham of Abercorn, and passed by the marriage of his heiress Mary to her husband William Douglas, knight of Liddesdale, who starved Sir Alexander Ramsay of Dalhousie to death in it in 1342 in revenge for Ramsey's appointment as sheriff of Roxburgh by David II. In 1492 Archibald Douglas, fifth earl of Angus, exchanged the Hermitage for Bothwell Castle, on the Clyde, with Patrick Hepburn, first earl of Bothwell; and it was there that his descendant, the fourth earl, was visited in 1566 by Mary queen of Scots. The principal of the other old castles are Branxholm on the Teviot, long the residence of the Buccleuchs and the scene of Sir Walter Scott's *Lay of the Last Minstrel;* Cessford, on a ridge inclining towards the Kale, formerly of great strength, besieged in 1520 by Surrey, to whom it surrendered; and Fernichirst, the mansion of the Kers, on the Jed, occupying the site of a baronial fortress erected in 1410, and the scene of many a fray. The district was for a long time the scene of continual border conflicts, the leaders in which were the Armstrongs and other chiefs occupying the fortresses or peels, chiefly in Liddesdale, as at Gilknockie, Castleton, Whitehaugh, Copshaw, Syde, Mangerton, Goranberry, Hartsgarth, and Newcastleton. Among many fine modern mansions mention may be made of Floors Castle, the seat of the duke of Roxburghe; Minto House, the seat of the earl of Minto; and Abbotsford, built by Sir Walter Scott. Few counties can boast of such important ecclesiastical remains as those of the abbeys of Melrose, Jedburgh, and Kelso. There are several ancient crosses in the county, the principal being those at Ancrum, Bowden, Maxton, and Melrose. Among numerous eminent men connected with Roxburgh mention may be made of Samuel Rutherford the theologian, James Thomson, author of *The Seasons*, John Leyden the poet, and Sir Gilbert Elliot of Minto.

See Jeffrey, *History of Roxburghshire*, 4 vols., 1857–64; Armstrong's *History of Liddesdale*, 1884. (T. F. H.)

ROXBURY, formerly a city of Norfolk county, Massachusetts, U. S., now incorporated in BOSTON (*q.v.*).

ROY, RÁMMOHUN (1772–1833). Rájá Rámmohun Roy (or Ráy), the founder of the Bráhma Samáj or Theistic Church of India, was born at Rádhánagar, Bengal, in May, 1772,[1] of an ancient and honorable Brahman family. His father gave him a good education; he learnt Persian at home, Arabic at Patna (where he studied Euclid, Aristotle, and the Koran), and Sanskrit at Benares. Although a devout idolator in boyhood, he early began to doubt and speculate, and at fifteen left home to study Buddhism in Tibet, where his criticisms on the Lama-worship gave much offence. After some years' travel he returned, but, his anti-idolatrous sentiments obliging him to leave home, he lived at Benares until his father's death in 1803. After this, he spent about ten years in the East India Company's service, latterly as dewán or head officer in the collection of revenues.

During this period he first began to assemble his friends together for evening discussions on the absurdities of idolatry, and he also issued his first work, *Tuhfat-al Muwahhiddin* ("A Gift to Monotheists"). This treatise was in Persian, with an Arabic preface, and was a bold protest against superstition and priestcraft. These proceedings brought on him much hostility, and even persecution, and in 1814 he retired to Calcutta for greater safety. Here he soon established a little Friendly Society (*Átmíya Sabhá*), which met weekly to read the Hindu Scriptures and to chant monotheistic hymns. In 1816 he translated the Vedánta into Bengali and Hindustani, following this by a series of translations from the Upanishads into Bengali, Hindustani, and English, with introductions and comments of his own. These works he published at his own expense and disseminated widely among his countrymen. His writings excited much opposition and gave rise to numerous controversies, in which his ability, tact, and learning rendered him fully a match for his antagonists. But the deadliest blow which he inflicted upon Hindu superstition was his effective agitation against the rite of suttee, the burning of living widows on the funeral piles of their deceased husbands. In 1811 he had been a horrified witness of this sacrifice in his elder brother's family, and had vowed never to rest until he had uprooted the custom. He exposed the hollow pretences of its advocates in elaborate pamphlets, both in Bengali and English, and pressed the matter in every possible way, till at last the tide of public feeling turned, and on December 4, 1829, Lord William Bentinck issued a regulation abolishing suttee throughout all the territory subject to Fort William. Rámmohun was an active politician and philanthropist. He built schoolhouses and established schools in which useful knowledge was gratuitously taught through the medium both of the English and the native languages. He wrote a suggestive Bengali grammar, of which he published one version in English (1826) and one in Bengali (1833). He wrote valuable pamphlets on Hindu law, and made strenuous exertions for the freedom of the native press; he also established (1822) and mainly conducted two native newspapers, the *Sambád Kaumudí* in Bengali, and (if rightly identified) the *Mirát-al-Akhbár* in Persian, and made them the means of diffusing

[1] [The inscription on his monument in Bristol, England, states that he was born in 1774. See Max Müller's *Biographical Essays* (N. Y., 1884), pp. 2, 14.—AM. ED.]

much useful political information. Becoming interested in Christianity, he learned Hebrew and Greek in order to read the Bible in the original languages; and in 1820 he issued a selection from the four Gospels entitled *The Precepts of Jesus, the Guide to Peace and Happiness.* This was attacked by the Baptist missionaries of Serampur, and a long controversy ensued, in which he published three remarkable *Appeals to the Christian Public in Defence of the "Precepts of Jesus."* He also wrote other theological tracts (sometimes under assumed names) in which he attacked both Hindu and Christian orthodoxy with a strong hand. But his personal relations with orthodox Christians were never unfriendly, and he rendered valuable assistance to Dr. Duff in the latter's educational schemes. He also warmly befriended a Unitarian Christian Mission which was started in Calcutta (1824) by Mr. William Adam, formerly a Baptist missionary, who, in attempting to convert Rámmohun to Trinitarianism, had himself been converted to the opposite view. This Unitarian Mission, though not a theological success, attracted considerable sympathy among the Hindu monotheists, whose Atmíya Sabhá had then become extinct. At last Rámmohun felt able to re-embody his cherished ideal, and on August 20, 1828, he opened the first "Bráhmya Association" (*Brahma Sabhá*) at a hired house. A suitable church building was then erected and placed in the hands of trustees, with a small endowment and a remarkable trust-deed by which the building was set apart "for the worship and adoration of the Eternal, Unsearchable, and Immutable Being who is the Author and Preserver of the universe." The new church was formerly opened on the 11th Mágh (January 23), 1830, from which day the Bráhma Samáj dates its existence. Having now succeeded in his chief projects, Rámmohun resolved to visit England, and the king of Delhi appointed him his envoy thither on special business, and gave him the title of rájá. He arrived in England on April 8, 1831, and was received with universal cordiality and respect. He watched with special anxiety the parliamentary discussions on the renewal of the East India Company's charter, and gave much valuable evidence before the Board of Control on the condition of India. This he republished with additional suggestions (*Exposition of the Practical Operation of the Judicial and Revenue Systems of India*), and also reissued his important *Essay on the Right of Hindus over Ancestral Property* (1832). He visited France, and wished to visit America, but died unexpectedly of brain fever at Bristol, September 27, 1833.

His Bengali and Sanskrit works were lately reissued in one volume, by Rájnáráin Bose and A. C. Vedántabágish (Calcutta, 1880), and his English works will shortly be published in two volumes by Eshanchandra Bose. Nagendranáth Chattopádhýa's Bengali memoir of him (1881) is the fullest yet published.

ROY, William (*c.* 1726–1790), a famous geodesist, was employed in some of the great national trigonometrical measurements which were made during last century. In 1746, at the age of twenty, when an assistant in the office of Colonel Watson, deputy quartermaster-general in North Britain, he began the survey of the mainland of Scotland, the results of which were embodied in what is known as the "duke of Cumberland's map." In 1756 he obtained a lieutenancy in the 51st regiment, and proceeded with it to Germany, where his talents as a military draughtsman brought him to notice, and procured him rapid promotion. He ultimately reached the rank of major-general. In 1784, while deputy quartermaster-general at the Horse Guards, his services were called into request for conducting the observations for determining the relative positions of the French and English royal observatories. His measurement of a base line for that purpose on Hounslow Heath in 1784, which was destined to be the germ of all subsequent surveys of the United Kingdom, gained him the gold medal of the Royal Society of London. Owing to unforeseen delays, the triangulation for connecting the meridians of the two observatories was not carried out until 1787. He had completed his undertaking and was finishing an account of it for the *Phil. Trans.* when he died in 1790.

Besides several papers in *Phil. Trans.*, Roy was author of the work entitled *Military Antiquities of the Romans in North Britain*, published in 1793.

ROYAL HOUSEHOLD. In all the mediæval monarchies of western Europe the general system of government sprang from, and centred in, the royal household. The sovereign's domestics were his officers of state, and the leading dignitaries of the palace were the principal administrators of the kingdom. The royal household itself had, in its turn, grown out of an earlier and more primitive institution. It took its rise in the *comitatus* described by Tacitus, the chosen band of *comites* or companions who, when the Roman historian wrote, constituted the personal following, in peace as well as in war, of the Teutonic *princeps* or chieftain. In England before the Conquest the *comitatus* had developed or degenerated into the thegnhood, and among the most eminent and powerful of the king's thegns, were his dishthegn, his bowerthegn, and his horsethegn or staller. In Normandy at the time of the Conquest a similar arrangement, imitated from the French court, had long been established, and the Norman dukes, like their overlords the kings of France, had their seneschal or steward, their chamberlain, and their constable. After the Conquest the ducal household of Normandy was reproduced in the royal household of England; and since, in obedience to the spirit of feudalism, the great offices of the first had been made hereditary, the great offices of the second were made hereditary also, and were thenceforth held by the grantees and their descendants as grand-serjeanties of the crown. The consequence was that they passed out of immediate relation to the practical conduct of affairs either in both state and court or in the one or the other of them. The steward and chamberlain of England were superseded in their political functions by the justiciar and treasurer of England, and in their domestic functions by the steward and chamberlain of the household. The marshal of England took the place of the constable of England in the royal palace, and was associated with him in the command of the royal armies. In due course, however, the marshalship as well as the constableship became hereditary, and, although the constable and marshal of England retained their military authority until a comparatively late period, the duties they had successively performed about the palace had been long before transferred to the master of the horse. Under these circumstances the holders of the original great offices of state and the household ceased to attend the court except on occasions of extraordinary ceremony, and their representatives either by inheritance or by special appointment have ever since continued to appear at coronations and some other public solemnities, such as the opening of the parliament or trials by the House of Lords.[1]

The materials available for a history of the royal household are somewhat scanty and obscure. The earliest record relating to it is of the reign of Henry II., and is contained in the *Black Book of the Exchequer.* It enumerates the various inmates of the king's palace and the daily allowances made to them at the period at which it was compiled. Hence it affords valuable evidence of the antiquity and relative

[1] The great officers of state and the household whom we have particularly mentioned do not of course exhaust the catalogue of them. We have named those only whose representatives are still dignitaries of the court and functionaries of the palace. If the reader consults Hallam (*Middle Ages*, vol. i. p. 181 *sq.*), Freeman (*Norman Conquest*, vol. i. p. 91 *sq.*, and vol. v. p. 426 *sq.*), and Stubbs (*Const. Hist.*, vol. i. p. 343 *sq.*), he will be able himself to fill in the details of the outline we have given above.

importance of the court offices to which it refers, notwithstanding that it is silent as to the functions and formal subordination of the persons who filled them.[1] In addition to this record we have a series of far later, but for the most part equally meagre, documents bearing more or less directly on the constitution of the royal household, and extending, with long intervals, from the reign of Edward III. to the reign of William and Mary.[2] Among them, however, are what are known as the *Black Book of the Household* and the *Statutes of Eltham*, compiled the first in the reign of Edward IV. and the second in the reign of Henry VIII., from which a good deal of detailed information may be gathered concerning the arrangements of the court in the 15th and 16th centuries. The *Statutes of Eltham* were meant for the practical guidance merely of those who were responsible for the good order and the sufficient supply of the sovereign's household at the time they were issued. But the *Black Book of the Household*, besides being a sort of treatise on princely magnificence generally, professes to be based on the regulations established for the governance of the court by Edward III., who, it affirms, was "the first setter of certeynties among his domesticall meyne, upon a grounded rule," and whose palace it describes as "the house of very policie and flowre of England;" and it may therefore possibly, and even probably, take us back to a period much more remote than that at which it was actually put together.[3] Various orders, returns, and accounts of the reigns of Elizabeth, James I., Charles I., Charles II., and William and Mary throw considerable light on the organization of particular sections of the royal household in times nearer to our own.[4] Moreover, there were several parliamentary inquiries into the expenses of the royal household in connection with the settlement or reform of the civil list during the reigns of George III., George IV., and William IV.[5] But they add little or nothing to our knowledge of the subject in what was then its historical as distinguished from its contemporary aspects. So much, indeed, is this the case that, on the accession of Queen Victoria, Chamberlayne's *Present State of England*, which contains a catalogue of the officials at the court of Queen Anne, was described by Lord Melbourne the prime minister as the "only authority" which the advisers of the crown could find for their assistance in determining the appropriate constitution and dimensions of the domestic establishment of a queen regnant.[6]

In its main outlines the existing organization of the royal household is essentially the same as it was under the Tudors or the Plantagenets. It is now, as it was then, divided into three principal departments, at the head of which are severally the lord steward, the lord chamberlain, and the master of the horse, and the respective provinces of which may be generally described as "below stairs," "above stairs," and "out of doors." But at present, the sovereign being a queen, the royal household is in some other respects rather differently arranged from what it would be if there were a king and a queen consort. When there is a king and a queen consort there is a separate establishment "above stairs" and "out of doors" for the queen consort. She has a lord chamberlain's department and a department of the master of the horse of her own, and all the ladies of the court from the mistress of the robes to the maids of honor are in her service. At the commencement of the reign of Queen Victoria the two establishments were combined, and on the whole considerably reduced. Hence the royal household, although it is of course much larger than that of a queen consort would be, is also appreciably smaller than that of a king and queen consort together has been since the reigning family acceded to the throne.[7]

I. *Department of the Lord Steward of the Household.*—The hall; the kitchen, ewry, and pantry; the wine, beer, and coal cellars; and the almonry are in the lord steward's department. The lord steward is the first dignitary of the court, and presides at the Board of Green Cloth, where all the accounts of the household are examined and passed.[8] He is always a member of the Government of the day, a peer, and a privy councillor. He receives his appointment from the sovereign in person, and bears a white staff as the emblem and warrant of his authority.[9] In his department the treasurer and comptroller of the household are the officers next in rank to him. They also sit at the Board of Green Cloth, carry white staves, and belong to the ministry. They are always peers or the sons of peers, and privy councillors. But the duties which in theory belong to the lord steward, treasurer, and comptroller of the household are in practice performed by the master of the household, who is a permanent officer and resides in the palace. It is he who really investigates the accounts and maintains discipline among the ordinary servants of the royal establishment. He is a white-staff officer and a member of the Board of Green Cloth but not of the ministry, and among other things he presides at the daily dinners of the suite in waiting on the sovereign.[10] In the lord steward's department are the secretary and three clerks of the Board of Green Cloth; the coroner and paymaster of the household; and the officers of the almonry, namely, the hereditary grand almoner,[11] the lord high almoner, the sub-almoner, the groom of the almonry, and the secretary to the lord high almoner.[12]

II. *Department of the Lord Chamberlain of the Household.*—The bedchamber, privy chamber, and presence chamber,

[1] The record in question is entitled *Constitutio Domus Regis de Procurationibus*, and is printed by Hearne (*Liber Niger Scaccarii*, vol. i. p. 341 *sq.*). It is analyzed by Stubbs (*Const. Hist.*, vol. i. note 2, p. 345).

[2] *A Collection of Ordinances and Regulations for the Government of the Royal Household, made in Divers Reigns from King Edward III. to King William and Queen Mary*, printed for the Society of Antiquaries, London, 1790. See also Pegge's *Curialia*, published partly before and partly after this volume; and Carlisle's *Gentlemen of the Privy Chamber*, published in 1829. Pegge and Carlisle, however, deal with small and insignificant portions of the royal establishment.

[3] *Liber Niger Domus Regis Edward IV.* and *Ordinances for the Household made at Eltham in the seventeenth year of King Henry VIII.*, A.D. 1526, are the titles of these two documents. The earlier documents printed in the same collection are *Household of King Edward III. in Peace and War from the eighteenth to the twenty-first year of his reign; Ordinances of the Household of King Henry IV. in the thirty-third year of his reign*, A.D. 1455, and *Articles ordained by King Henry VII. for the Regulation of his Household*, A.D. 1494.

[4] *The Book of the Household of Queen Elizabeth as it was ordained in the forty-third year of her Reign delivered to our Sovereign Lord King James, etc.*, is simply a list of officers' names and allowances. It seems to have been drawn up under the curious circumstances referred to in *Archæologia* (vol. xii. pp. 80–85). For the rest of these documents see *Ordinances and Regulations, etc.*, pp. 299, 340, 347, 352, 368, and 380.

[5] Burke's celebrated Act "for enabling His Majesty to discharge the debt contracted upon the civil list, and for preventing the same from being in arrear for the future, etc.," 22 Geo. III. c. 82, was passed in 1782. But it was foreshadowed in his great speech on "Economical Reform" delivered two years before. Since the beginning of the current century select committees of the House of Commons have reported on the civil list and royal household in 1803, 1804, 1815, and 1831.

[6] Torrens's *Memoirs of William, second Viscount Melbourne*, vol. ii. p. 303.

[7] Hansard, *Parl. Debates*, vol. xxxix. pp. 146 *sq.*, 1342 *sq.*

[8] In the *Statutes of Eltham* he is called "the lord great master," but in the *Household Book* of Queen Elizabeth "the lord steward," as before and since. In 31 Hen. VIII. c. 10, "for placing of the lords," he is described as "the grand master or lord steward of the king's most honorable household." The whole business of purveyance and prœmption was anciently managed by the Board of Green Cloth. See under heading "The counting house of the king's household, *Domus Compotus Hospitii Regis*," in Coke, *Institutes*, iv. cap. 19. It is designated "the court of the virge or green cloth" in 22 Geo. III. c. 82, § 5.

[9] In the old time the lord steward had three courts besides the board of green cloth under him, namely, the lord steward's court, the court of the Marshalsey, and the palace court (Coke, *Inst.*, iv. caps. 20 and 21; Reeves, *Hist. of the Law of England*, vol. ii. pp. 138 and 297; Stephen, *Commentaries on the Law of England*, vol. iv. p. 222). The lord steward or his deputies formerly administered the oaths to the members of the House of Commons, and frequent inconveniences were the consequence (see Hatsell, *Precedents of Proceedings in the House of Commons*, London, 1818, vol. ii. pp. 84–91). In certain cases now "the lords with white staves" are the proper persons to bear communications between the sovereign and the Houses of Parliament.

[10] In the case of the master of the household we see history repeating itself. He is not named in the *Black Book* of Edward IV. or in the *Statutes* of Henry VIII., and is entered as "master of the household and clerk of the green cloth" in the *Household Book* of Queen Elizabeth. But practically he has superseded the lord steward of the household, as the lord steward of the household at one time superseded the lord high steward of England.

[11] The marquess of Exeter.

[12] In the lord steward's department the offices of cofferer of the household, treasurer of the chamber, paymaster of pensions, and six clerks of the Board of Green Cloth were abolished by 22 Geo. III. c. 82.

the wardrobe, the housekeeper's room, and the guardroom, the metropolitan theatres, and the chapels royal are in the lord chamberlain's department. The lord chamberlain is the second dignitary of the court, and is always a member of the Government of the day, a peer, and a privy councillor. He carries a white staff, and wears a golden or jewelled key, typical of the key of the palace, which is supposed to be in his charge, as the ensigns of his office. He is responsible for the necessary arrangements connected with state ceremonies, such as coronations and royal marriages, christenings, and funerals. All invitations to court are sent out in his name by command of the sovereign, and at drawing-rooms and levees he stands next to the sovereign and announces the persons who are approaching the throne. It is also part of his duty to conduct the sovereign to and from his or her carriage.[1] The vice-chamberlain of the household is the lord chamberlain's assistant and deputy. He also is one of the ministry, a white-staff officer, and the bearer of a key; and he is always a peer or the son of a peer as well as a privy councillor. When there is a king the groom of the stole comes next to the vice-chamberlain in rank and authority. At present, however, the mistress of the robes in some measure occupies the position of the groom of the stole.[2] She is the only lady of the court who comes into office and goes out with the administration, and the duties she performs are merely occasional and formal. She is always a duchess, and attends the queen at all state ceremonies and entertainments, but is never in permanent residence at the palace.[3] On the contrary the ladies of the bedchamber share the function of personal attendance on the sovereign throughout the year. Of these there are eight, always peeresses, and each is in waiting for about a fortnight or three weeks at a time. But the women of the bedchamber, of whom there are also eight, appear only at court ceremonies and entertainments according to a roster annually issued under the authority of the lord chamberlain. They are usually the daughters of peers or the wives of the sons of peers, and in the old time, like the mistress of the robes and the ladies of the bedchamber, habitually assisted the queen at her daily toilette. But this has long ceased to be done by any of them. The maids of honor, whose situations are by no means sinecures, are likewise eight in number and have the same terms of waiting as the ladies of the bedchamber. They are commonly if not always the daughters or granddaughters of peers, and when they have no superior title and precedence by birth are called "honorable" and placed next after the daughters of barons. The queen as a special mark of her favor nominates "extra" ladies and women of the bedchamber and maids of honor. But their position is altogether honorary and involves no charge on the civil list. There are eight lords and eight grooms, who are properly described as "of the bedchamber" or "in waiting," according as the reigning sovereign is a king or a queen, and whose terms of attendance are of similar duration to those of the ladies of the bedchamber and the maids of honor. Occasionally "extra" lords and grooms in waiting are nominated by the queen, who, however, are unpaid and have no regular duties. The master, assistant master, and marshal of the ceremonies are the officers whose special function it is to enforce the observance of the *etiquette* of the court. The reception of foreign potentates and ambassadors is under their particular care, and they assist in the ordering of all entertainments and festivities at the palace.[4] The gentleman usher of the black rod—the black rod which he carries being the ensign of his office—is the principal usher of the court and kingdom. He is one of the original functionaries of the order of the Garter, and is in constant attendance on the House of Lords, from whom, either personally or by his deputy the yeoman usher of the black rod, it is part of his duty to carry messages and summonses to the House of Commons. The gentlemen ushers of the privy chamber and the gentlemen ushers daily waiters, of whom there are four each, and the gentlemen ushers quarterly waiters and the sergeants-at-arms, of whom there are eight each, are in waiting only at drawing-rooms and levees and state balls and concerts. But of the sovereign's sergeants-at-arms there are two others to whom special duties are assigned, the one attending the speaker in the House of Commons, and the other attending the lord chancellor in the House of Lords, carrying their maces and executing their orders.[5] The yeomen of the guard date from the reign of Henry VII., and the gentlemen-at-arms from the reign of Henry VIII. The captain of each corps is always a member of the ministry and a peer. Besides the captains, the former, now called the queen's bodyguard, consists of a lieutenant, ensign, clerk of the cheque and adjutant, four exons, and a hundred yeomen; and the latter, once called the gentlemen pensioners, consists of a lieutenant, standard-bearer, clerk of the cheque and adjutant, a sub-officer, and forty gentlemen. The comptroller and examiner of accounts, the licenser of plays, the dean and subdean of the chapel royal, the clerk of the closet, the groom of the robes, the pages of the backstairs, of the chamber, and of the presence, the poet laureate, the royal physicians and surgeons, chaplains, painters and sculptors, librarians and musicians, etc., are all under the superintendence of the lord chamberlain of the household.[6]

III. *Department of the Master of the Horse.*—The stables and coachhouses, the stud, mews, and kennels, are in the master of the horse's department. The master of the horse is the third dignitary of the court, and is always a member of the Government of the day, a peer, and a privy councillor. All matters connected with the horses and hounds of the sovereign are within his jurisdiction. The master of the buckhounds, who is also one of the ministry, ranks next to him, and it is his duty to attend the royal hunt and to head the procession of royal equipages on the racecourse at Ascot, where he presents himself on horseback in a green and gold uniform wearing the couples of a hound as the badge of his office. The hereditary grand falconer[7] is also subordinated to the master of the horse. But the practical management of the royal stables and stud in fact devolves on the chief or crown equerry, formerly called the gentleman of the horse, who is never in personal attendance on the sovereign, and whose appointment is permanent. The clerk marshal has the supervision of the accounts of the department before they are submitted to the Board of Green Cloth, and is in waiting on the sovereign on state occasions only. Exclusive of the crown equerry there are seven regular equerries, besides extra and honorary equerries, one of whom is always in attendance on the sovereign and rides at the side of the royal carriage. They are always officers of the army, and each of them is "on duty" for about the same time as the lords and grooms in waiting. There are also three pages of honor in the master of the horse's department, who must not be confounded with the pages of various kinds who are in the department of the lord chamberlain. They are youths aged from twelve to sixteen, selected by the sovereign in person, to attend on her at state ceremonies, when two of them arrayed in an antique costume assist the groom of the robes in carrying the royal train.

It remains to be said that to the three ancient departments of the royal household which we have already noticed two others have been added in comparatively recent times. The departments of the private secretary and the keeper of the privy purse to the sovereign, which are for the present combined, originated no longer ago than the earlier part of the current century. Very great doubts were at one time entertained as to whether such an office as that of private secretary to the sovereign could constitutionally exist, and the privy purse itself was unknown until after the passing of Burke's Act of 1782. As at present organized these branches of the royal household consist of the private secretary and keeper of the privy purse, two assistant private secretaries and keepers of the privy purse, and a secretary and two clerks of the privy purse. By the statute which settled the civil list at the beginning of the current reign (1 & 2 Vict. c. 2) the privy purse was fixed at £60,000 [$291,600] a year, and the salaries, allowances, and other expenses of the royal household are fixed at £303,760 [$1,476,273.60] a year. (F. DR.)

ROYAL SOCIETY, The, or, more fully, The Royal Society of London for Improving Natural Knowledge,

[1] The lord chamberlain of the household at one time discharged some important political functions, which are described by Sir Harris Nicholas (*Proceedings of the Privy Council*, vol. vi., Preface, p. xxiii.).

[2] In the reign of Queen Anne, Sarah duchess of Marlborough from 1704, and Elizabeth duchess of Somerset from 1710, held the combined offices of mistress of the robes and groom of the stole.

[3] Since the great "bedchamber question" of 1839 the settled practice has been for all the ladies of the court except the mistress of the robes to receive and continue in their appointments independently of the political connections of their husbands, fathers, and brothers (see Mr. Gladstone's *Gleanings of Past Years*, vol. i. p. 40; and Torrens's *Memoirs of Lord Melbourne*, vol. ii. p. 304).

[4] The office of master of the ceremonies was created by James I. The master of the ceremonies wears a medal attached to a gold chain round his neck, on one side being an emblem of peace with the motto "Beati pacifici," and on the other an emblem of war with the motto "Dieu et mon droit" (see *Finetti Philoxensis*, by Sir John Finett, master of the ceremonies to James I. and Charles I., 1656; and D'Israeli's *Curiosities of Literature*, 10th ed., p. 242 *sq.*).

[5] See May, *Parliamentary Practice*, pp. 236, 244.

[6] The offices of master of the great wardrobe and master of the jewel house in the lord chamberlain's department were abolished by 22 Geo. III. c. 82.

[7] The duke of St. Albans.

is an association of men interested in the advancement of mathematical and physical science. It is the oldest scientific society in Great Britain, and one of the oldest in Europe.

The Royal Society is usually considered to have been founded in the year 1660, but a nucleus had in fact been in existence for some years before that date. Wallis informs us that as early as the year 1645 weekly meetings were held of "divers worthy persons, inquisitive into natural philosophy, and other parts of human learning, and particularly of what hath been called the *New Philosophy* or *Experimental Philosophy*," and there can be little doubt that this gathering of philosophers is identical with the "Invisible College" of which Boyle speaks in sundry letters written in 1646 and 1647. These weekly meetings, according to Wallis, were first suggested by Theodore Haak, "a German of the Palatinate then resident in London," and they were held sometimes in Dr. Goddard's lodgings in Wood Street, sometimes at the Bull-Head Tavern in Cheapside, but more often at Gresham College.

On November 28, 1660, the first journal book of the society was opened with a "memorandum," from which the following is an extract: "Memorandum that Novemb. 28, 1660, These persons following, according to the usuall custom of most of them, mett together at Gresham Colledge to heare Mr. Wren's leecture, viz., The Lord Brouncker, Mr. Boyle, Mr. Bruce, Sir Robert Moray, Sir Paul Neile, Dr. Wilkins, Dr. Goddard, Dr. Petty, Mr. Ball, Mr. Rooke, Mr. Wren, Mr. Hill. And after the lecture was ended, they did, according to the usuall manner withdrawe for mutuall converse. Where amongst other matters that were discoursed of, something was offered about a designe of founding a Colledge for the promoting of Physico-Mathematicall Experimentall Learning." It was agreed at this meeting that the company should continue to assemble on Wednesdays at 3 o'clock; an admission fee of ten shillings [$2.43] with a subscription of one shilling a week was instituted; Dr. Wilkins was appointed chairman; and a list of forty-one persons judged likely and fit to join the design was drawn up. On the following Wednesday Sir Robert Moray brought word that the king (Charles II.) approved the design of the meetings; a form of obligation was framed, and was signed by all the persons enumerated in the memorandum of November 28, and by seventy-three others. On December 12 another meeting was held at which fifty-five was fixed as the number of the society,—persons of the degree of baron, fellows of the College of Physicians, and public professors of mathematics, physic, and natural philosophy of both universities being supernumeraries.

Gresham College was now appointed to be the regular meeting-place of the society. Sir Robert Moray was chosen president (March 6, 1661), and continued in that office until the incorporation of the society, when he was succeeded by Lord Brouncker. In October, 1661, the king offered to be entered one of the society, and next year the society was incorporated under the name of "The Royal Society," the charter of incorporation passing the great seal on the 15th July, 1662, to be modified, however, by a second charter in the following year. The council of the Royal Society met for the first time on May 13, 1663, when resolutions were passed that debate concerning those to be admitted should be secret, and that fellows should pay 1s. [24 cents] a week to defray expenses.

At this early stage of the society's history one main part of their labors was the "correspondence" which was actively maintained with Continental philosophers, and it was from this that the *Philosophical Transactions* (a publication now of world-wide celebrity) took its rise. At first the *Transactions* was entirely the work of the secretary, except that it was ordered (March 1, 1664–5) "that the tract be licensed by the Council of the Society, being first reviewed by some of the members of the same." The first number, consisting of sixteen quarto pages, appeared on Monday, 6th March, 1664–5. In 1750 four hundred and ninety-six numbers or forty-six volumes had been published by the secretaries. After this date the work was issued under the superintendence of a committee, and the division into numbers disappeared. At present (1885) one hundred and seventy-five volumes have been completed.

Another matter to which the society turned their attention was the formation of a museum, the nucleus being "the collection of rarities formerly belonging to Mr. Hubbard," which by a resolution of council passed February 21, 1666, was purchased for the sum of £100 [$486]. This museum, at one time the most famous in London, was presented to the trustees of the British Museum in 1781, upon the removal of the society to Somerset House.

After the Great Fire of London in September, 1666, the apartments of the Royal Society in Gresham College were required for the use of the city authorities, and the society were therefore invited by Henry Howard, of Norfolk, to meet in Arundel House. At the same time he presented them with the library purchased by his grandfather Thomas, earl of Arundel, and thus the foundation was laid of the magnificent collection of scientific works, probably not far short of 45,000 volumes, which the society at the present time possesses. Of the Arundel MSS. the bulk was sold to the trustees of the British Museum in 1830 for the sum of £3559 [$17,282.16], the proceeds being devoted to the purchase of scientific books. These MSS. are still kept in the museum as a separate collection.

Under date December 21, 1671, the journal-book records that "the lord bishop of Sarum proposed for candidate Mr. Isaac Newton, professor of the mathematicks at Cambridge." Newton was elected a fellow January 11, 1671–2, and in 1703 he was appointed president, a post which he held till his death in 1727. During his presidency the society moved to Crane Court, their first meeting in the new quarters being held November 8, 1710. In the same year they were appointed visitors and directors of the Royal Observatory at Greenwich, a function which they continued to perform until the accession of William IV., when by the new warrant then issued the president and six of the fellows of the Royal Astronomical Society were added to the list of visitors.

In 1780, under the presidency of Sir Joseph Banks, the Royal Society removed from Crane Court to the apartments assigned to them by the Government in the new Somerset House, where they remained until they removed to Burlington House in 1857. The policy of Sir Joseph Banks was to render the fellowship more difficult of attainment than it had been, and the measures which he took for this purpose, combined with other circumstances, led to the rise of a faction headed by Dr. Horsley. Throughout the years 1783 and 1784 feeling ran exceedingly high, but in the end the president was supported by the majority of the society. An account of the controversy will be found in a tract entitled *An Authentic Narrative of the Dissensions and Debates in the Royal Society.* In connection with this policy of Sir Joseph Banks may be mentioned a further step in the same direction taken in the year 1847, when the number of candidates recommended for election by the council was limited to fifteen, and the election was made annual. Concurrently, however, with this gradual narrowing of the Royal Society's boundaries was the successive establishment of other scientific bodies. The founding of the Linnean Society in 1788 under the auspices of several fellows of the Royal Society was the first instance of the establishment of a distinct scientific association under royal charter. The Geological Society followed in 1807, and the Royal Astronomical Society in 1820. The Chemical, the Royal Geographical, and the Entomological are the remaining chartered scientific societies existing in London at the present time.

The Royal Society continues, however, to hold the foremost place among the scientific bodies of England, not only from the number of eminent men included in its fellowship, but also from its close official connection with the Government.

The following will serve as some indication of the variety and importance of the scientific matters upon which they have been consulted by or have memorialized the Government during the last seventy years: 1816, standard measures of length; 1817, expedition in search of Northwest Passage; 1822, use of coal-tar in vessels of war; best manner of measuring tonnage of ships; 1823, corrosion of copper sheathing by sea-water; Babbage's calculating-machine; lightning-conductors for vessels of war; 1825, supervision of gas-works; 1826, Parry's North Polar expedition; 1832, tidal observations; 1835, instruments and tables for testing the strength of spirits; 1839, Antarctic expedition; magnetic observatories in the colonies; 1845, Franklin's Arctic expedition; 1849–55, Government grant for scientific research; 1862, the great Melbourne telescope; 1865, pendulum observations in India; 1866, reorganization of the meteorological department; 1868, deep sea research; 1872, "Challenger" expedition; 1874, Arctic expedition; 1875, eclipse expedition; 1876, Vivisection Bill; 1877, transit of Venus expedition; 1879, prevention of accidents in mines; 1881, pendulum observations; 1882, transit of Venus; cruise of the "Triton" in Faroe Channel; 1883, borings in delta of Nile; 1884, Bureau des Poids et Mesures; prime meridian conference, etc. One of the most important duties which the Royal Society performs on behalf of the Government is the administration of the annual grant of £4000 [$19,440] for the promotion of scientific research. This grant originated in a proposal by Lord John Russell in 1849 that at the close of the year the president and council should point out to the first lord of the treasury a limited number of persons to whom the grant of a reward or of a sum to defray the cost of experiments might be of essential service. This grant of £1000 [$4860] afterwards became annual, and was continued until 1876. In that year an additional sum of £4000 [$19,440] for similar purposes was granted, and the two funds of £1000 and £4000 were administered concurrently until 1881, in which year the two were combined in a single annual grant of £4000 under new regulations. One of the most useful of the society's undertakings of late years is the great catalogue of scientific papers,—an index, in eight quarto volumes, under authors' names, of all the memoirs of importance in the chief English and foreign scientific serials from the year 1800 to the year 1873. The work was prepared under the direction and at the expense of the Royal Society, and was printed by H. M. Stationery Office.

A statement of the trust funds administered by the Royal Society will be found in their published *Proceedings* under date November 30th of each year, and the origin and history of these funds will be found in Weld's *History of the Royal Society*, and in the late William Spottiswoode's "Anniversary Address for 1874" (*Proc. Roy. Soc.*, xxiii. p. 49). The income of the society is derived from the annual contributions and composition fees of the fellows, from rents, and from interest on various investments. The balance-sheet and an account of the estates and property are published in the *Proceedings* at each anniversary. Four medals (a Copley, two Royal, and a Davy) are awarded by the society every year, and the Rumford medal in alternate years. The first of these originated in a bequest by Sir Godfrey Copley (1709), and is awarded "to the living author of such philosophical research, either published or communicated to the society, as may appear to the council to be deserving of that honor;" the author may be an Englishman or a foreigner. The Rumford medal originated in a gift from Count Rumford in 1796 of £1000 [$4860] 3 per cent. consols, for the most important discoveries in heat or light made during the preceding two years. The Royal medals were instituted by George IV., and are awarded annually for the two most important contributions to science published in the British dominions not more than ten years nor less than one year from the date of the award. The Davy medal was founded by the will of Dr. John Davy, F. R.S., the brother of Sir Humphry Davy, and is given annually for the most important discovery in chemistry made in Europe or Anglo-America. An enumeration of the awards of each of the medals will be found at the end of the list of fellows which is published annually by the society.

Under the existing statutes of the Royal Society every candidate for election must be recommended by a certificate in writing signed by six or more fellows, of whom three at least must sign from personal knowledge. From the candidates so recommended the council annually select fifteen by ballot, and on the first Thursday in June the names so selected are submitted to the society in the form of a printed balloting-sheet with space left for erasure and substitution of names. Princes of the blood may, however, be proposed at any ordinary meeting and put to the vote on the same day, and any member of H. M. privy council may be balloted for on the third ordinary meeting from the day upon which his certificate is read. Foreign members, not exceeding fifty, may be selected by the council from among men of the greatest scientific eminence, and proposed to the society for election. Every member of the privileged class is liable to an admission fee of £10 [$48.60] and an annual payment of £4 [$19.44]; other fellows pay £3 [$14.58] per annum. The composition for annual payments is £60 [$291.60].

The anniversary meeting for the election of the council and officers is held on St. Andrew's Day. The council for the ensuing year, out of which are chosen the president, treasurer, principal secretaries, and foreign secretary, must consist of eleven members of the existing council and ten fellows who are not members of the existing council. These are nominated by the president and council previously to the anniversary meeting. The session of the society is from November to June; the ordinary meetings are held every Thursday during the session, at 4.30 P.M. The selection for publication from the papers read before the society is made by the "Committee of Papers," which consists of the members of the council for the time being aided by referees. The papers so selected are published either in the *Philosophical Transactions* (4to) or the *Proceedings of the Royal Society* (8vo), and one copy of each of these publications is presented gratis to every fellow of the society and to the chief scientific societies throughout the world.

The making and repealing of laws is vested in the council, and in every case the question must be put to the vote on two several days of their meeting.

The text of the charters of the Royal Society is given in the appendix to Weld's *History of the Royal Society*, and in the same work will be found lists of the presidents, treasurers, secretaries, and assistant-secretaries from the foundation to the year 1845. Appendix IV. to Thomson's *History of the Royal Society* (1812) gives a chronological list of all the fellows down to the year 1812 with dates of birth, election, admission, and death, and an alphabetical index to the same. Other histories are Bishop Sprat's (1667), which consists largely of a defence of the society against the attacks of *a priori* philosophers, and Dr. Birch's (1756), which treats mainly of the society's scientific work. (H. R.*)

ROYAN, a town of France, in the department of Charente Inférieure, is situated on the right bank of the Gironde, where it joins the ocean; a branch line of 5½ miles connects it with Saujon, on the Seudre Railway, which joins the Bordeaux-Nantes line at Pons. Royan, which in 1881 had a population of only 4573 (5445 as a commune), is one of the most frequented bathing resorts on the Atlantic seaboard, the visitors numbering about 80,000 annually. Royan owes this popularity to its charming neighborhood, pleasantly watered by brooks and shaded by fine trees down to the steep rocky shore. The coast is divided into a number of small bays or "conches," forming so many distinct beaches: to the east of the town is the "Grande Conche"; to the south the "Conche de Foncillon," separated from the first-named by a quay which forms a fine terraced esplanade; beyond the fort of Royan, which protects the entrance of the river, follow in succession the conches "du Chay" and "de Grand Robinson," and the most fashionable of all, that of Pontaillac. In the Avenue de Pontaillac stand a large new casino, a theatre, and a hydropathic establishment. Royan also has a race-course and a museum of natural history.

Royan, whose inhabitants were Protestants, had to sustain in 1622 an eight days' siege by the troops of Louis XIII. As late as the end of last century it was but a "bourg" of about one thousand inhabitants, noticeable only for its priory, where Brantôme wrote a portion of his *Chronicles*. The prosperity of the place dates from the Restoration, when steamboat communication was established with Bordeaux. The question of making Royan the seaport for Bordeaux has often been mooted, but as yet the harbor is still a merely tidal one and is dry at low water. The sardine, here known by the name of royan, is caught by the local fishermen.

ROYER-COLLARD, Pierre Paul (1763–1845), French statesman and philosopher, was born on the 21st June, 1763, at Sompuis near Vitry-le Français.

At an early age he became a member of the bar, and pleaded several times in the old parlement of Paris. On the breaking out of the Revolution he took the popular side, and was elected to a seat in the municipal council of Paris. He was secretary to this body from 1790 to 1792, but separated himself from the later excesses of the Revolution. During the Reign of Terror he lived in retirement at Sompuis, and after vainly endeavoring in 1797, as member of the Council of Five Hundred, to bring about the restoration of the monarchy, he retired altogether from public life till the fall of Napoleon in 1814. During the interval he devoted himself mainly to philosophical studies. Animated by a profound distrust of the negative sensationalism and materialism which had characterized the French philosophy of the 18th century, he found a master whom he could follow in Thomas Reid. The study of Reid's *Inquiry*, which he picked up on a book-stall, first gave a definite form and direction to his thinking. Royer-Collard may be said to have introduced Reid to France, and the works of the Scottish philosopher were translated not long afterwards by his pupil Jouffroy. In 1810 Royer-Collard became professor of philosophy, and taught with success in Paris, till the Restoration recalled him to political life. In 1815 he was elected to represent his native department of the Marne in the chamber of deputies; he was also made counsellor of state and appointed president of the commission of public instruction. A royalist of moderate views, he helped to restrain the extreme members of his own party, opposing alike the reactionary laws against the press and the proposal to give the clergy control of public instruction. In 1827 he was so popular as to be elected in seven departments, and shortly afterwards he became a member of the French Academy; in the following year he was made president of the chamber. In this capacity he had the unpleasant duty of presenting to Charles X. the address in which the majority of the chamber refused their further support to the Government (March, 1830). Royer-Collard retained his position as deputy under the new régime of Louis Philippe, but no longer took a prominent part in public affairs. In 1842 he withdrew completely from active life and spent most of his remaining time at his country seat of Châteauvieux near Sainte-Aignan. He died there on the 2d September, 1845.

As a philosopher, Royer-Collard is not distinguished either by originality or profundity; but he possesses a certain importance as having transplanted to France the philosophy of common sense. He has himself left no philosophical writings except some fragments which appear in Jouffroy's edition of Reid; but by his example and teaching he founded the school which has been variously named the Scoto-French, the eclectic, the spiritualistic, or the psychological. Maine de Biran, Cousin to some extent, and Jouffroy in a closer way, as well as Janet and others at the present day, are the chief representatives of the school. The name "Spiritualisme," which is perhaps the commonest designation, expresses the tenacity with which, in opposition to the dominant sensationalistic materialism of France, it upholds the doctrine of a spiritual Ego as a fact of consciousness. The title psychological, however, would be preferred by the philosophers themselves as describing their method, and the basis on which they claim to have erected their philosophy. Philosophy tends for them, as for Reid and Stewart, to become a classification of isolated facts of consciousness.

Several biographies of Royer-Collard have been published. Barante, *Vie politique de M. Royer-Collard, ses discours, et ses écrits*, 1861, is the fullest. Others are by Philippe and Lacombe. In addition may be mentioned *Mémoires sur Royer-Collard*, by his nephew Genty de Bussy.

ROYLE, John Forbes (1800–1858), a distinguished botanist and teacher of materia medica. His reputation is especially founded upon the results of personal investigations in the Himalaya Mountains and in other parts of Hindustan. He was born in Cawnpore in 1800. His medical education was obtained in London, and on its completion he entered the service of the East India Company, and was sent to India in 1822 in the grade of assistant surgeon. In this service he devoted himself to studying in the field the botany and geology of the regions within his reach, and made large collections among the Himalaya Mountains. He also made special investigations of the medical properties of the plants of Hindustan and of the history of their uses among the native races. The results of these investigations appeared in 1837 in the form of a valuable work *On the Antiquity of Hindoo Medicine*. For nearly ten years he held the post of superintendent of the East India Company's botanic garden in the Himalayas at Saharanpur. He returned to London on furlough in 1831, and in 1837 he was appointed to the professorship of materia medica in King's College, London, a position which he held till 1856. From 1838 onwards he conducted a special department of correspondence, relating to vegetable products, at the East India House, and at the time of his death he had just completed there the formation and arrangement of an extensive and valuable museum of technical products from the East Indies. In 1851 he superintended the Indian department of the Great Exhibition. He died at Acton near London on 2d January, 1858.

The work on which his reputation chiefly rests is the *Illustrations of the Botany and other branches of Natural History of the Himalaya Mountains, and of the Flora of Cashmere*, in 2 vols. 4to, begun in 1839. It contains much information on the natural products of India, especially on such as are useful in the arts or as drugs. In addition to this work, however, he wrote several others of repute, viz., *An Essay on the Productive Resources of India* (1840), *A Manual of Materia Medica* (1845), *An Essay on the Cultivation of Cotton* (1857), and on *The Cordage Plants and Vegetable Fibres of India* (1855). He also published a number of papers, between 1832 and 1855, upon subjects akin to those of his larger works, in scientific journals, for the most part published in India. Among these papers are included three on geological subjects. A list of the whole will be found in the *Royal Society's Catalogue of Scientific Papers*.

RSHEFF. See Rzheff.

RUBBER. See India-Rubber.

RUBENS, Peter Paul (1577–1640), the most eminent representative of Flemish art, and one of the greatest painters of any school, was born very probably at Siegen, in Westphalia, on the 29th of June, 1577. Till some thirty years ago Cologne might still claim the honor of having been the master's birthplace; the Rhenish city is mentioned by Rubens himself, in one of his letters, as closely connected with his childhood, and through his father's epitaph we learn that for more than nineteen years Cologne was the family's place of refuge amid the disturbances prevailing in the Low Countries. This, however, has been proved to be but part of the truth, and, if Rubens's parents certainly during several years did live at Cologne, they also resided elsewhere, and that for reasons so strong that both wife and husband might well desire to see them forever buried in secrecy.

Although of humble descent,—his father was a druggist,—John Rubens was a man of learning. He had studied law at home and abroad, and became councillor and alderman in his native town (1562). A Catholic by birth, it was not long before he became, like many of his countrymen, a zealous upholder of the Reformation, and we even find him spoken of by a contemporary as "le plus docte Calviniste qui fust pour lors au Bas Pays." After the plundering of the Antwerp churches in 1566, the magistrates were called upon for a justification. While openly they declared themselves devoted sons of the church, a list of the followers of the Reformed creed, headed by the name of Anthony Van Stralen, the burgomaster, got into the hands of the duke of Alva. This was a sentence of death for the magistrates, and John Rubens lost no time in quitting Spanish soil, ultimately settling at Cologne (October, 1568), with his wife and four children.

In his new residence he became legal adviser to Anne of Saxony, the second wife of the prince of

Orange, William the Silent. Before long it was discovered that their relations were not purely of a business kind. Thrown into the dungeons of Dillenburg, Rubens lingered there for many months, his wife, Maria Pypelincx, never relaxing her endeavors to get the undutiful husband restored to freedom. Two years elapsed before the prisoner was released, and then only to be confined to the small town of Siegen. Here he lived with his family, from 1573 to 1578, and here most probably Maria Pypelincx gave birth to Philip, afterwards town-clerk of Antwerp, and Peter Paul. A year after (May, 1578) the Antwerp lawyer got leave to return to Cologne, where he died on the 18th of March, 1587, after having, it is said, returned to Catholicism. As there are at Siegen no records going back to the 16th century, the facts relating to the birth of Peter Paul Rubens must, of course, remain conjectural, but his mother certainly was at Siegen a few days before his birth, for we find her there, petitioning in favor of John Rubens, on June 14, 1577.[1]

Rubens went to Antwerp with his mother when he was scarcely ten years of age, and made good progress in his classical studies, which he had begun with the Jesuits at Cologne. An excellent Latin scholar, he was also proficient in French, Italian, English, German, and Dutch. Part of his boyhood he spent as a page in the household of the countess of Lalaing, in Brussels; but, tradition adds, and we may well believe, the youth's disposition was such as to induce his mother to allow him to follow his proper vocation, choosing as his master Tobias Verhaecht, who was in some way connected with the family. Not the slightest trace of this first master's influence can be detected in Rubens's works. Not so with Adam Van Noort, to whom the young man was next apprenticed. Van Noort, whose aspect of energy is well known through Van Dyck's beautiful etching, was the highly esteemed master of numerous painters,—among them Van Balen, Sebastian Vrancx, and Jordaens, later his son-in-law. His pictures are almost exclusively to be found in Antwerp churches.

Rubens remained with Van Noort for the usual period of four years, thereafter studying under Otto Vœnius or Van Veen, a gentleman by birth, a most distinguished Latin scholar, and a painter of very high repute. He was a native of Leyden, and only recently settled in Antwerp, but the town gave him numerous commissions of importance. Though Rubens never adopted his style of painting, the tastes of master and pupil had much in common, and some pictures by Otto Vœnius can be pointed out as having inspired Rubens at a more advanced period. For example, the Magdalene anointing Christ's Feet, painted for the cathedral at Malaga, and now at the Hermitage in St. Petersburg, closely resembles in composition the very important work of Otto Vœnius in the church at Bergues near Dunkirk.

In 1598, Adam Van Noort acting as dean of the Antwerp guild of painters, Rubens was officially recognized as "master,"—that is, was allowed to work independently and receive pupils. We have no means of forming an idea of his style at this early period, two years before his journey to Italy, but even the somewhat later works found at Genoa, Mantua, and Rome differ considerably from what may be termed the Rubenesque.

From 1600 to the latter part of 1608 Rubens belonged to the household of Vincenzo Gonzaga, duke of Mantua. Few princes in Italy surpassed the Gonzagas in splendor. For them Mantegna, Giulio Romano, Titian, and Primaticcio had produced some of their most admired works, and their now deserted palaces still bear traces of the richest decoration. To the Mantuan collection the Pitti palace, the Louvre, and the royal galleries of England owe some of their noblest specimens of Italian art. How Rubens came to be engaged at Mantua has not been explained. The duke, it is known, spent some time at Venice in July, 1600, and is supposed there to have met his future painter, but it is also to be remembered that another Fleming, Francis Pourbus the younger, was at the time employed by him in taking the likeness of the prettiest women of the day; and Rubens, much against his will, was also, at first, it seems, intrusted with a similar task. The influence of the master's stay at Mantua was of extreme importance, and cannot be too constantly kept in view in the study of his later works.

Sent to Rome in 1601, to take copies from Raphael for his master, he was also commissioned to paint several pictures for the church of Santa Croce, by the archduke Albert of Austria, sovereign of the Spanish Netherlands, and once, when he was a cardinal, the titular of that see. A copy of Mercury and Psyche after Raphael is preserved in the museum at Pesth. The religious paintings—the Invention of the Cross, the Crowning with Thorns, and the Crucifixion—are to be found in the hospital at Grasse in Provence.

At the beginning of 1603 "The Fleming," as he was termed at Mantua, was sent to Spain with a variety of presents for Philip III. and his minister the duke of Lerma, and thus had opportunity to spend a whole year at Madrid and become acquainted with some of Titian's masterpieces. Two of his own works, known to belong to the same period, are in the Madrid Gallery, Heraclitus and Democritus. Of Rubens's abilities so far back as 1604 we get a more complete idea from an immense picture now in the Antwerp Gallery, the Baptism of Our Lord, originally painted for the Jesuits at Mantua. Here it may be seen to what degree Italian surroundings had influenced the painter of Vincenzo Gonzaga. Vigorous to the extreme in design, he reminds us of Michelangelo as much as any of the degenerate masters of the Roman school, while in decorative skill he seems to be descended from Titian and in coloring from Giulio Romano. Equally with this picture the Transfiguration, now in the museum at Nancy, and the portraits of Vincenzo and his consort, kneeling before the Trinity, in the library at Mantua, claim a large share of attention, apart from the interest awakened by the name of their author.

Two years later we meet a very large altarpiece of the Circumcision at St. Ambrogio at Genoa, the Virgin in a glory of Angels, and two groups of Saints, painted on the wall, at both sides of the high altar in the church of Santa Maria in Valicella, in Rome. Undoubtedly these works give an impression of grandeur and effectiveness, but, in the immediate vicinity of the finest productions of the Italian school, they rank higher as documentary evidence than in intrinsic value, and remind us of a saying of Baglione, who was acquainted with Rubens in Italy, "Apprese egli buon gusto, e diede in una maniera buona Italiana."

While employed at Rome in 1608, Rubens received most alarming news as to the state of his mother's health. The duke of Gonzaga was then absent from Italy, but the dutiful son, without awaiting his return, at once set out for the Netherlands, though with the full intention of shortly resuming his post at court, as we gather from a letter to Annibale Chieppio, the Mantuan minister. When he arrived in Antwerp, Maria Pypelincx was no more. However strong his wish might now be to return to Italy, his purpose was overruled by the express desire of his sovereigns, Albert and Isabella, to see him take up a permanent residence in the Belgian provinces. Scarcely a year before, the archduke had unsuccessfully attempted to free the painter from his engagement at Mantua, and he could not fail to take advantage of the opportunity now presented for the fulfilment of his wishes. On August 3, 1609, Rubens was named painter in ordinary to their Highnesses, with a salary of 500 livres

[1] [G. H. Calvert in his *Life of Rubens* (Boston, 1876) says that the Belgian botanist, B. C. Dumortier, by a "keen scrutiny of documents" established Antwerp as the painter's birthplace.—Am. Ed.].

[c. $95], and "the rights, honors, privileges, exemptions," etc., belonging to persons of the royal household, not to speak of the gift of a gold chain. Not least in importance for the painter was his complete exemption from all the regulations of the guild of St. Luke, entitling him to engage any scholars or fellow-workers without being obliged to have them enrolled, —a favor, it must be added, which has been the source of considerable trouble to the historians of Flemish art.

Although so recently returned to his native land, Rubens seems to have been, with one accord, accepted by his countrymen as the head of their school, and the municipality was foremost in giving him the means of proving his acquirements. The first in date among the numerous repetitions of the Adoration of the Magi is a picture in the Madrid Gallery, measuring 12 feet by 17, and containing no fewer than eight-and-twenty life-size figures, many in gorgeous attire, warriors in steel armor, horsemen, slaves, camels, etc. This picture, painted in Antwerp, at the town's expense in 1609, had scarcely remained three years in the town-hall when it went to Spain as a present to Don Rodrigo Calderon, count of Oliva. The painter has represented himself among the horsemen, bareheaded, and wearing his gold chain. Cumberland speaks of this picture as the standard work of its author, and certainly it was well calculated to bring Rubens to the front rank in his profession. From a letter written in May, 1611, we know that more than a hundred young men were desirous to become his pupils, and that many had, "for several years," been waiting with other masters, until he could admit them to his studio. It was thus from the beginning regarded as a great favor to be admitted a pupil of Rubens.

Apart from the success of his works, another powerful motive had helped to detain the master in Antwerp,—his marriage with Isabella Brant (October, 1609). Many pictures have made us familiar with the graceful young woman who was for seventeen years to share the master's destinies. We meet her at The Hague, St. Petersburg, Florence, at Grosvenor House, but more especially at Munich, where Rubens and his wife are depicted at full length on the same canvas. "His wife is very handsome," observes Sir Joshua Reynolds, "and has an agreeable countenance;" but the picture, he adds, "is rather hard in manner." This, it must be noted, is the case with all those pictures known to have immediately followed Rubens's return, when he was still dependent on the assistance of painters trained by others than himself. Even in the Raising of the Cross, now in the Antwerp cathedral, and painted for the church of St. Walburg in 1610, the dryness in outline is very striking.

According to the taste still at that time prevailing, the picture is tripartite, but the wings only serve to develop the central composition, and add to the general effect. In Witdoeck's beautiful engraving the partitions even disappear. Thus, from the first, we see Rubens quite determined upon having his own way, and it is recorded that, when he painted the Descent from the Cross, St. Christopher, the subject chosen by the Arquebusiers, was altered so as to bring the artistic expressions into better accordance with his views. Although the subject was frequently repeated by the great painter, this first Descent from the Cross has not ceased to be looked upon as his masterpiece. Begun in 1611, the celebrated work was placed in 1614, and certainly no more striking evidence could be given of the rapid growth of the author's abilities. Rubens received 2400 florins[1] for this picture.

Although it is chance that has brought the Raising of the Cross and the Descent from the Cross into their present close juxtaposition, it is not improbable that their uniformity in size may have been designed. In many respects, Italian influence remains conspicuous in the Descent. Rubens had seen Ricciarelli's fresco at the Trinita de' Monti, and was also acquainted with the grandiose picture of Baroccio in the cathedral of Perugia, and no one conversant with these works can mistake their influence. But in Rubens strength of personality could not be overpowered by reminiscence; and in type, as well as in coloring, the Descent from the Cross may be termed thoroughly Flemish and Rubenesque. As Waagen justly observes: "The boldness of the composition, the energy in the characters, the striking attitudes, and the effects of the grouping, together with the glowing vigorous coloring, belong to his later style, whereas a few of the heads, particularly that of the Virgin, display the careful execution of his earlier period. The interior of the wings, on which are painted the Visitation and the Presentation in the Temple, exhibit, on the other hand, a greater resemblance to the conjugal picture already alluded to, owing to a certain repose in action, a more elevated expression of delicacy and feeling in the characters, and a less glowing though still admirable coloring."

Legend, in some way, connects Van Dyck with the Descent from the Cross, and ascribes to the great portrait painter an arm and shoulder of Mary Magdalene, which had been damaged by a pupil's carelessness. Plain truth here, once more, seems to contradict romance. Van Dyck was a pupil of Van Balen's in 1609, and most probably remained with him several years before coming to Rubens.

If Sir Dudley Carleton could speak of Antwerp in 1616 as "Magna civitas, magna solitudo," there was no place nevertheless which could give a wider scope to artistic enterprise. Spain and the United Provinces were for a time at peace; almost all the churches had been stripped of their adornments; monastic orders were powerful and richly endowed, guilds and corporations eager to show the fervor of their Catholic faith, now that the "monster of heresy" seemed forever quelled. Here were opportunities without number for painters as well as sculptors and architects. Gothic churches began to be decorated according to the new fashion adopted in Italy. Altars magnified to monuments, sometimes reaching the full height of the vaulted roof, displayed, between their twisted columns, pictures of a size hitherto unknown. No master seemed better fitted to be associated with this kind of painting than Rubens, whose works we have already met with in churches newly erected at Rome, Genoa, and Mantua, by the Jesuits, in the gorgeous style which bears their name, and which Rubens commends in the preface to his *Palazzi di Genova* (Antwerp, 1622). The temple erected by the reverend fathers in Antwerp was almost entirely the painter's work, and if he did not, as we often find asserted, design the front, he certainly was the inspirer of the whole building, which, after all, was but a reminiscence of the churches in Genoa. And the temple of the Jesuits in Antwerp remained for a century the only example of its kind in Belgium. Hitherto no Fleming had undertaken to paint ceilings with foreshortened figures, and blend the religious with the decorative art after the style of those buildings which are met with in Italy, and owe their decorations to masters like Titian, Veronese, and Tintoretto. No less than forty ceilings were composed by Rubens and painted under his direction in the space of two years. All were destroyed by fire in 1718. Sketches in water-color were taken some time before the disaster by De Wit, and from these were made the etchings by Punt which alone enable us to form a judgment of the grandiose undertaking. In the Madrid Gallery we find a general view of the church in all its splendor. The present church of St. Charles, in Antwerp, is externally, with some alteration, the building here alluded to.

Rubens delighted in undertakings of the vastest kind. "The large size of a picture," he writes to W. Trumbull in 1621, "gives us painters more courage to represent our ideas with the utmost freedom and

[1] [This sum in Dutch coin would contain $996.—Am. Ed.].

semblance of reality. . . . . I confess myself to be, by a natural instinct, better fitted to execute works of the largest size." The correctness of this appreciation he was very soon called upon to demonstrate most strikingly by a series of twenty-four pictures, illustrating the life of Mary de' Medici, queen-mother of France. The gallery at the Luxembourg Palace, which these paintings once adorned, has long since disappeared, and the complete work is now exhibited in the Louvre. Drawings, it seems, had been asked from Quentin Varin, the French master who incited Poussin to become a painter, but Rubens was ultimately preferred. This preference may in some degree be ascribed to his former connection with the court at Mantua, Mary de' Medici and the duchess of Gonzaga being sisters. The story of Mary de' Medici may be regarded as a poem in painting, and no person conversant with the literature of the time can fail to recognize that strange mixture of the sacred and the mythological in which the most admired authors of the seventeenth century, beginning with Malherbe, delight. Absolutely speaking, Mrs. Jameson may be right in criticising Rubens's "coarse allegories, historical improprieties," etc.; but a man belongs to his time, and uses its language in order to make himself understood. From the cradle to the day of her reconciliation with Louis XIII. we follow Mary de' Medici after the manner in which it was customary in those days to consider personages of superior rank. The Fates for her have spun the silken and golden thread; Juno watches over her birth and intrusts her to the town of Florence; Minerva, the Graces, and Apollo take charge of her education; Love exhibits her image to the king, and Neptune conveys her across the seas; Justice, Health, and Plenty endow her son; Prudence and Generosity are at her sides during the regency; and, when she resigns the helm of the state to the prince, Justice, Strength, Religion, and Fidelity hold the oars. The sketches of all these paintings—now in the Munich Gallery—were painted in Antwerp, a numerous staff of distinguished collaborators being intrusted with the final execution. But the master himself spent much time in Paris, retouching the whole work, which was completed within less than four years. On May 13, 1625, Rubens writes from Paris to his friend Peiresc that both the queen and her son are highly satisfied with his paintings, and that Louis XIII. came on purpose to the Luxembourg, "where he never has set foot since the palace was begun sixteen or eighteen years ago." We also gather from this letter that the picture representing the Felicity of the Regency was painted to replace another, the Departure of the Queen, which had caused some offence. "If I had been let alone," he says, "the other subjects would have been better accepted by the court, and without scandal or murmur." "And I fear," he adds, "far greater difficulties will be found with the subjects of the next gallery." Richelieu gave himself some trouble to get this part of the work, intended to represent the life of Henry IV., bestowed upon Cavalier d'Arpina, but did not succeed in his endeavors. The queen's exile, however, prevented the undertaking from going beyond a few sketches, and two or three panels, one of which, the Triumph of Henry IV., now in the Palazzo Pitti, is one of the noblest works of Rubens or of any master. Most undoubtedly the painter here calls to his aid his vivid recollections of the Triumph of Cæsar by Mantegna, now at Hampton Court, but in his day adorning the palace at Mantua; of this he made a copy, inscribed No. 315 in the catalogue of his effects sold in 1640, and now in the National Gallery.

On the 11th of May, 1625, Rubens was present at the nuptials of Henrietta Maria at Notre Dame in Paris, when the scaffolding on which he stood gave way, and he tells us he was just able to catch an adjoining tribune.

No painter in Europe could now pretend to equal Rubens either in talent or in renown. Month after month productions of amazing size left the Antwerp studio; and to those unacquainted with the master's pictures magnificent engravings by Vorsterman, Pontius, and others had conveyed singularly striking interpretations. "Whatever work of his I may require," writes Moretus, the celebrated Antwerp printer, "I have to ask him six months before so that he may think of it at leisure, and do the work on Sundays or holidays; no week days of his could I pretend to get under a hundred florins."

Of the numerous creations of his pencil, none, perhaps, will more thoroughly disclose to us his comprehension of religious decorative art than the Assumption of the Virgin at the high altar of the Antwerp cathedral, finished in 1625. It is, of twenty repetitions of this subject, the only example still preserved at the place it was intended by the painter to occupy. In spirit we are here reminded of Titian's Assunta in the cathedral at Verona, but Rubens's proves perhaps a higher conception of the subject. The work is seen a considerable way off, and every outline is bathed in light, so that the Virgin is elevated to dazzling glory with a power of ascension, scarcely, if ever, attained by any master.

Able to rely so greatly on his power as a colorist, Rubens is not a mere decorator. He penetrates into the spirit of his subjects more deeply than, at first sight, seems consistent with his prodigious facility in execution. The Massacre of the Innocents, in the Munich Gallery, is a composition that can leave no person unmoved,—mothers defending their children with nails and teeth. If Mrs. Jameson terms this picture atrocious, it ought to be recollected how atrocious is the subject. When St. Francis attempts to shelter the universe from the Saviour's wrath (Brussels Gallery), Rubens, drawing his inspiration from a passage of St. Germain, "Ostendit mater filio pectus et ubera," recalls to our memory that most dramatic passage of the *Iliad* when Hecuba, from the walls of Troy, entreats her son Hector to spare his life. The subject is inconsistent with the spirit of Christianity, says Waagen, evidently forgetting that to Catholic eyes nothing could be more impressive than the Virgin's intervention at this supreme moment, when Christ, like another Jupiter, brandishes his thunderbolt against mankind. Rubens was a man of his time; his studies of Italian art in no way led him back to the Quattrocentisti nor the Raffaeleschi; their power was at an end. The influence of Michelangelo, Titian, Tintoretto, more especially Baroccio, Polydoro, and even Parmigiano, is no less visible with him than with those masters who, like Spranger, Chr. Schwartz, and Goltzius, stood high in public estimation immediately before his advent.

In the midst of the rarest activity as a painter, Rubens was now called upon to give proofs of a very different kind of ability. The truce concluded between Spain and the Netherlands in 1609 ended in 1621; archduke Albert died the same year. His widow sincerely wished to prolong the arrangement, still hoping to see the United Provinces return to the Spanish dominion, and in her eyes Rubens was the fittest person to bring about this conclusion. The painter's comings and goings, however, did not remain unheeded, for the French ambassador writes from Brussels in 1624,—"Rubens is here to take the likeness of the prince of Poland, by order of the infanta. I am persuaded he will succeed better in this than in his negotiations for the truce." But, if Rubens was to fail in his efforts to bring about an arrangement with the Netherlands, other events enabled him to render great service to the state.

Rubens and Buckingham met in Paris in 1625; a correspondence of some importance had been going on between the painter and the Brussels court, and before long it was proposed that he should endeavor to bring about a final arrangement between the crowns of

England and Spain. The infanta willingly consented, and King Philip, who much objected to the interference of an artist, gave way on hearing, through his aunt, that the negotiator on the English side, B. Gerbier—a Fleming by birth—was likewise a painter. Rubens and Gerbier very soon met in Holland. "Rubens is come hither to Holland, where he now is, and Gerbier in his company, walking from town to town, upon their pretence of pictures," writes Sir Dudley Carleton to Lord Conway in July, 1627, "which may serve him for a few days if he dispatch and be gone; but yf he entertayne tyme here long, he will infallibly be layd hold of, or sent with disgrace out of the country. . . . This I have made known to Rubens least he should meet with a skorne what may in some sort reflect upon others." Matters, however, went on very well, and Rubens volunteered to go to Spain and lay before the council the result of his negotiations (1628). Nine months were thus spent at Madrid; they rank among the most important in Rubens's career. He had brought with him eight pictures of various sizes and subjects as presents from the infanta, and he was also commissioned to take several portraits of the king and royal family. An equestrian picture of Philip IV., destroyed by fire in last century, became the subject of a poem by Lope de Vega, and the description enables us to identify the composition with that of a painting now in the Palazzo Pitti, ascribed to Velazquez.

Through a letter to Peiresc we hear of the familiar intercourse kept up between the painter and the king. Philip delighted to see Rubens at work in the studio prepared for him in the palace, where he not only left many original pictures, but copied for his own pleasure and profit the best of Titian's. No less than forty works were thus produced, and, says the author of the *Annals of the Artists of Spain*, "the unwearied activity of his well-stored mind is exemplified by the fact that amid his many occupations he was seeking in the libraries materials for an edition of Marcus Aurelius, on which his friend Gaspard Gevaerts was then engaged." An artistic event of some importance connected with the sojourn in Spain is the meeting of Rubens and Velazquez, to the delight, and we venture to add, advantage of both.

Great as was the king's admiration of Rubens as a painter, it seems to have been scarcely above the value attached to his political services. Far from looking upon Rubens as a man of inferior calling, unworthy to meddle with matters of state, he now commissioned the painter to go to London as bearer of his views to Charles I. Giving up his long cherished hope of revisiting Italy on his return from Spain, Rubens, honored with the title of secretary of the king's privy council in the Netherlands, started at once on his new mission. Although he stopped but four days in Antwerp, he arrived in London just as peace had been concluded with France. In this conjuncture of affairs, it can hardly be doubted that the eminent position of Rubens as a painter greatly contributed to his ultimate success as an envoy. Received by Charles with genuine pleasure, he very soon was able to ingratiate himself so far as to induce the king to pledge his royal word to take part in no undertakings against Spain so long as the negotiations remained unconcluded, and all the subsequent endeavors of France, Venice, and the States found him immovable in this resolution. Although the privy council in Madrid, as well they might, passed several votes of thanks to Rubens, the tardiness of the Spanish court in sending a regular ambassador involved the unfortunate painter in distressing anxieties, and the tone of his dispatches is very bitter. But he speaks with the greatest admiration of England and the English, regretting that he should only have come to know the country so late. His popularity must have been very great, for on September 23, 1629, the University of Cambridge conferred upon him the honorary degree of master of arts, and on February 21, 1630, he was knighted, the king presenting him with the sword used at the ceremony, which is still preserved by the descendants of the artist.

When the council at Madrid had to deliberate as to recognition of the title confered upon Rubens in England, they remembered that Titian had been made a knight by the emperor Charles V., and the matter was settled without difficulty; but, the painter's name having been mentioned as a possible envoy to the British court, Olivares objected that it was quite out of the question to make an ambassador of one who lived by the work of his hands.

Although, it seems, less actively employed as an artist in England than in Spain, Rubens, besides his sketches for the decoration of the Banqueting House at Whitehall, painted the admirable picture of the Blessings of Peace, now in the National Gallery. There is no reason to doubt, with Smith, that "His Majesty sat to him for his portrait, yet it is not a little remarkable that no notice occurs in any of the royal catalogues, or the writers of the period, of the existence of such a portrait." While in England, Rubens very narrowly escaped drowning while going to Greenwich in a boat. The fact is reported by Lord Dorchester in a letter to Sir Isaac Wake (Sainsbury, cxvi.). At the beginning of March the painter's mission came to a close.

Rubens was now fifty-three years of age; he had been four years a widower, and before the end of the year (December, 1630) he entered into a second marriage with the beautiful girl of sixteen named Helena Fourment, with whom his pictures have made the world so well acquainted. More than twenty portraits of her are described by Smith, and she also figures in perhaps twice as many of the master's creations. Whether Rubens was more powerfully led in the choice of his second wife by her personal beauty or by the strength of a certain resemblance to his feminine ideal is questionable. Anyhow, she was an admirable model, and none of her husband's works may be more justly termed masterpieces than those in which she is represented (Munich, St. Petersburg, Blenheim, Liechtenstein, the Louvre, etc.).

Although the long months of absence could not be termed blanks in Rubens's artistic career, his return was followed by an almost incredible activity. Inspired more than ever by the glorious works of Titian, he now produced some of his best creations. Brightness in coloring, breadth of touch and pictorial conception, are specially striking in those works we know to have been painted in the latter part of his lifetime. Could anything give a higher degree of Rubens's genius than, for example, the Feast of Venus, the portrait of Helena Fourment ready to enter the bath, or the St. Ildefonso? This last picture—now, as well as the two others just alluded to, in the Vienna Gallery—was painted for the church of the convent of St. Jacques, in Brussels. On the wings are represented the archdukes in royal attire, under the protection of their patron saints. The presence of these figures has led to some mistake regarding the date of the production, but it has been proved beyond doubt, through a document published by Mr. Castan (1884), that the St. Ildefonso belongs to the series of works executed after the journeys to Spain and England. Archduke Albert had been dead ten years. The picture was engraved by Witdoeck in 1638.

Isabella died in 1633, and we know that to the end Rubens remained in high favor with her, alike as an artist and as a political agent. The painter was even one of the gentlemen she deputed to meet Mary de' Medici at the frontier in 1631, after her escape from France.

Spain and the Netherlands went to war again, the king never ceasing to look upon the Dutch as rebels. The subject need not be dwelt upon; suffice it to say that much useless trouble and suspicion came upon the

great artist. As to the real nature of his communings with Frederick Henry of Orange, whom he is known to have interviewed, nothing as yet has been discovered.

Ferdinand of Austria, the cardinal infant of Spain, was called to the government of the Netherlands on the death of his aunt. He was the king's younger brother, and arrived at Antwerp in May, 1635. The streets had been decorated with triumphal arches and "spectacula," arranged by Rubens, and certainly never equalled by any other works of the kind.[1] Several of the paintings detached from the arches were offered as presents to the new governor-general, a scarcely known fact, which accounts for the presence of many of these works in public galleries (Vienna, Dresden, Brussels, etc.). Rubens was at the time laid up with the gout, but Prince Ferdinand was desirous of expressing his satisfaction, and called upon the painter, remaining a long time at his house. Rubens and Ferdinand had met at Madrid, and only a short time elapsed before the painter was confirmed in his official standing,—a matter of small importance, if we consider that the last years of his life were almost exclusively employed in working much more for the king than for his brother. About a hundred and twenty paintings of considerable size left Antwerp for Madrid in 1637, 1638, and 1639; they were intended to decorate the pavilion erected at the Pardo, and known under the name of Torre de la Parada. Another series had been begun, when Ferdinand wrote to Madrid that the painter was no more, and that Jordaens would finish the work. Rubens breathed his last on the 30th of May, 1640.

More fortunate than many artists, Rubens left the world in the midst of his glory. Not the remotest trace of approaching old age, not the slightest failing of mind or skill, can be detected even in his latest works, such as the Martyrdom of St. Peter at Cologne, the Martyrdom of St. Thomas at Prague, or the Judgment of Paris at Madrid, where his young wife appears for the last time. "She is the handsomest person in Antwerp," writes Ferdinand to his brother in announcing the completion of what he terms "the best painting Rubens has done."

If Rubens was something of a diplomatist, it cannot be denied that alike in body as in mind he is portrayed in his own works with the utmost straightforwardness. His productions are what they are, as if they could not have been otherwise, and the fact is that, in reply to any observations he may happen to receive, we constantly find him asserting the necessities of his subjects, thus confirming a remark made by Sir Joshua Reynolds that his subjects always seem to suit his style.

Rubens is so well known that it hardly seems necessary to dwell upon his outward appearance. From his own letters and those in which he is referred to, we become acquainted with a man of vast erudition, great good sense, dignity, and kindness, none more worthy of being called a gentleman; and Sir Dudley Carleton, we know, termed him not only the prince of painters but of gentlemen.

Those with whom he dealt in questions of learning proclaim his artistic excellence to be second only to his other qualifications, and even such critics as Winckelmann, who are least likely to sympathize with his style, do homage to his superior genius. "Rubens," he writes to Count Cobenzl, "is the glory of art, of his school, of his country, and of all coming centuries; the fertility of his imagination cannot be overrated; he is correct in his design, magnificent in his drapery; and he must be looked upon as the great model for chiaroscuro, although in this branch he may be termed fanciful, but he has not sacrificed to the goddesses of beauty (*Horæ*) and the Graces."

Rubens, indeed, although his type of feminine beauty is generally most pleasing, has little of the Italian grace and refinement, but then he was a Fleming throughout, notwithstanding his frequent recollections of those Italian masters whom he most admired, and who themselves have little, if anything, in common with Raphael. But it must be borne in mind how completely his predecessors were frozen into stiffness through Italianization, and how necessary it was to bring back the Flemish school to life and nature. Critics have spoken of Rubens's historical improprieties. Of course nobody could suppose that his classical learning did not go far enough to know that the heroines of the Old Testament or of Roman history were not dressed out as ladies of his time, but in this respect he only follows the example of Titian, Paul Veronese, and many others. In no other school do we find these animated hunts of lions, tigers, and even the hippopotamus and the crocodile, which may be reckoned among the finest specimens of art, and here again are life and nature displayed with the utmost power. "His horses are perfect in their kind," says Reynolds; his dogs of the strong Flemish breed, and his landscapes the most charming pictures of Brabantine scenery, in the midst of which lay his seat of Steen. As a portrait painter, although less refined than Van Dyck, he shows that eminent master the way, and his pure fancy subjects, as the Garden of Love (Madrid and Dresden) and the Village Feast (Louvre), have never been equalled. As Mrs. Jameson so justly remarks, "Rubens is the most popular because the most intelligible of painters."

For nearly one hundred years the Flemish school may be said to have been but a reflection of the Rubenesque principles. Although Jordaens and Erasmus Quellin lived till 1678, the school might be termed a body without soul.

Some etchings have been ascribed to Rubens, but except a head of Seneca, the only copy of which is in the Print Room at the British Museum, and a beautiful figure of St. Catherine, we can admit none of the other plates, said to proceed from Rubens, as authentic. Rubens nevertheless exercised an immense influence on the art of engraving. Under his direct guidance Soutman, Vorsterman, Pontius, Witdoeck, the two Bolswerts, Peter de Jode, N. Lauwers, and many others of less note left an immense number of beautiful plates, reproducing the most celebrated of his paintings. To give an idea of what his influence was capable of accomplishing, pictorially speaking, it might be sufficient to notice the transformation undergone by the Antwerp school of engraving under Rubens; even the modern school of engraving, in more than one respect, is a continuation of the style first practiced in Antwerp. His influence is scarcely less apparent in sculpture, and the celebrated Luke Fayd'herbe was his pupil.

Neither in name nor in fact did the Flemish school ever find a second Rubens. None of his four sons became a painter, nor did any of his three daughters marry an artist. According to Rubens's will, his drawings were to belong to that one of his sons who might become a painter, or in the event of one of his daughters marrying a celebrated artist they were to be her portion. The valuable collection was dispersed only in 1659, and of the pictures sold in 1640 thirty-two became the property of the king of Spain. The Madrid Gallery alone possesses a hundred of his works. Four years after her husband's death Helena Fourment married J. B. Van Brouckhoven de Bergheyck, knight of St. James, member of the privy council, etc. She died in 1673. In 1746 the male line of Rubens's descendants was completely extinct. In the female line more than a hundred families of name in Europe trace their descent from him.

The paintings of Rubens are found in all the principal galleries in Europe: Antwerp and Brussels, Madrid, Paris, Lille, Dresden, Berlin, Munich, Vienna, St. Petersburg, London, Florence, Milan, Turin exhibit several hundreds of his works. J. Smith's *Catalogue* gives descriptions of more than thirteen hundred compositions.

Literature.—A. van Hasselt, *Histoire de P. P. Rubens*, Brussels, 1840; E. Gachet, *Lettres inédites de P. P. Rubens*, Brussels, 1840; W. Noel Sainsbury, *Original unpublished Papers illustrative of the Life of Sir Peter Paul Rubens*, London, 1859; C. Ruelens, *Pierre Paul Rubens, Documents et Lettres*, Brussels, 1877; Armand Baschet, "Rubens en Italie et en Espagne," in the *Gazette des Beaux Arts*, vols. xxii. to xxiv., Paris, 1867–68; A. Michiels, *Rubens et l'École d'Anvers*, Paris, 1877; Cruzada Villaamil, *Rubens diplomatico español*, Madrid, 1874; Gachard, *Histoire politique et diplomatique de P. P. Rubens*, Brussels, 1877; P. Genard, *P. P. Rubens Aanteekeningen over den Grooten Meester*, Antwerp, 1877; Max Rooses, *Titres et Portraits gravés d'après P. P. Rubens, pour l'imprimerie plantinienne*, Antw., 1877; J. Smith, *Catalogue Raisonné of the Works of the most eminent Dutch and Flemish Painters*, part ii., London, 1830; Waagen, *Peter Paul Rubens* (translated from the German by R. Noel, edited by Mrs. Jameson, London, 1840); H. Hymans, *Histoire de la gravure dans l'École de Rubens*, Brussels, 1879; C. G. Voorhelm Schneevoogt, *Catalogue des Estampes gravées d'après Rubens*, Haarlem, 1873.

(H. H.)

[1] Many sketches of the arches are still preserved in the museums in Antwerp, St. Petersburg, Cambridge, Windsor, etc. All the compositions were etched under the direction of Rubens by his pupil J. Van Thulden and published under the title of *Pompa introitus honori serenissimi Principis Ferdinandi Austriaci S. R. E. card. a S. P. Q. Antwerp, decreta et ordinata.*

RUBIDIUM. See Potassium Metals.

RUBRUQUIS, the name which has most commonly been given to William of Rubruk, a Franciscan friar and the author of a remarkable narrative of Asiatic travel in the 13th century. Nothing is known

of him save what can be gathered from his own narrative, with the exception of a word from the pen of Roger Bacon, his contemporary and brother Franciscan, indicating personal acquaintance. The name of Rubruquis has adhered to him, owing to this form ("Willielmus de Rubruquis") being found in the imperfect copy of the Latin original printed by Hakluyt in his collection, and followed in his English translation, as well as in the completer issue of the English by Purchas. Writers, again, of the 16th and 17th centuries have called the traveller Risbroucke and Rysbrokius, for which there is no authority,—an error founded on the too hasty identification of his name of origin with Ruysbroeck in Brabant (a few miles south of Brussels). This error was probably promoted by the fame of John of Ruysbroeck or Rysbroeck (1294–1381), a Belgian mystic theologian, whose treatises have been reprinted as late as 1848 (see vol. xvii. p. 141). Our traveller is styled "Guillaume de Rysbroeck" and "Ruysbroek" in the *Biographie Universelle* and in the *Nouv. Biog. Générale*. It is only within the last twenty years that attention has been called to the fact that Rubrouck is the name of a village and commune in what was formerly called French Flanders, belonging to the canton of Cassel in the department du Nord, and lying some 8½ miles northeast of St. Omer. In the library of the latter city many mediæval documents exist referring expressly to Rubrouck, and to persons in the 12th and 13th centuries styled as "de Rubrouck."[1] It may be fairly assumed that Friar William came from this place; indeed, if attention had been paid to the title of the MS. belonging to Lord Lumley, which was published by Hakluyt (*Itinerarium fratris Willielmi de Rubruquis de Ordine fratrum Minorum*, Galli, *Anno Gratiæ* 1253, *ad partes Orientales*), there need have been no question as to the traveller's quasi-French nationality;[2] but this (erroneously) has always been treated as if it were an arbitrary gloss of Hakluyt's own.

Friar William went to Tartary under orders from Louis IX. (St. Louis). That king, at an earlier date, viz., December, 1248, when in Cyprus, had been visited by certain persons representing themselves to be envoys from a great Tartar chief Elchigaday (Ilchikadai) who commanded the Mongol hosts in Armenia and Persia. The king then despatched a return mission consisting of Friar Andrew of Lonjumel and other ecclesiastics, who carried presents and letters for both Ilchikadai and the Great Khan. They reached the court of the latter in the winter of 1249–50, when there was in fact no actual khan on the throne; but in any case they returned along with Tartar envoys, bearing a letter to Louis, which was couched in terms so arrogant and offensive that the king repented sorely having sent such a mission (*le rois se repenti fort quant il y envoia*, Joinville, § 492). These returned envoys reached the king when he was at Cæsarea, therefore between March, 1251, and May, 1252. It was, however, not very long after that the zealous king, hearing that a great Tartar prince called Sartak was a baptized Christian, felt strongly moved to open communication with him, and for this purpose deputed Friar William of Rubruk with companions. But it is evident that the former rebuff had made the king chary as to giving these emissaries the character of his royal envoys, and Friar William on every occasion, beginning with a sermon delivered in St. Sophia's (on Palm Sunday, *i. e.*, April 13, 1253) formally disclaimed that character, alleging that, though he was the bearer of the king's letters and presents, he went simply in fulfilment of his duty as a Franciscan and preacher of the gospel.

Various histories of St. Louis, and other documents which have come down to us, give particulars of the despatch of the mission of Friar Andrew from Cyprus, but none mention that of Friar William; and the first dates given by the latter are those of his sermon at Constantinople, and of his embarkation from Sinope (May 7, 1253). He must therefore have received his commission at Acre, where the king was residing from May, 1252, to June, 29, 1253; but he had travelled by way of Constantinople, as has just been indicated, and there received letters to some of the Tartar chiefs from the emperor, who was at this time Baldwin de Courtenay, the last of the Latin dynasty.

The narrative of the journey is everywhere full of life and interest, but we cannot follow its details. The vast conquests of Jenghiz Khan were still in nominal dependence on his successors, at this time represented by Mangu Khan, reigning on the Mongolian steppes, but practically those conquests were splitting up into several great monarchies. Of these the Ulûs of Jûjî, the eldest son of Jenghiz, formed the most westerly, and its ruler was Bâtû Khan, established on the Volga. Sartak is known in the history of the Mongols as Bâtû's eldest son, and was appointed his successor, though he died immediately after his father (1255). The story of Sartak's profession of Christianity may have had some kind of foundation; it was concurrently believed among the Asiatic Christians, and it is alleged by Armenian writers that he had been brought up and baptized among the Russians.

Rubruk and his party landed at Soldaia, or Sûdâk, on the Crimean coast, a port which was then the chief seat of the communication between the Mediterranean states and what is now southern Russia. Equipped with horses and carts for the steppe, they travelled successively to the courts of Sartak and of Bâtû, respectively on the hither and further banks of the Volga, bandied from one to the other, and then referred to the Great Khan himself, an order involving the enormous journey to Mongolia. The actual travelling of the party from the Crimea to the khan's court near Karakorum cannot have been, on a rough calculation, less than 5000 miles, and the return journey to Ayas in Cilicia would be longer by 500 to 700 miles. The chief dates to be gathered from the narrative are as follows: embark on the Euxine, May 7, 1253; reach Soldaia, 21; set out thence, June 1; reach camp of Sartak, July 31; begin journey from camp of Bâtû eastward across steppe, September 16; turn southeast, November 1; reach Talas river, 8; leave Cailac[3] (south of Lake Balkash), 30; reach camp of Great Khan, December 27; leave camp of Great Khan on or about July 10, 1254; reach camp of Bâtû again, September 16; leave Sartak's camp, November 1; at the Iron Gate (Derbend), 13; Christmas spent at Nakhshivân (under Ararat); reach Antioch (from Ayas, *via* Cyprus), June 29, 1255; reach Tripoli, August 15.

The camp of Batu was reached near the northernmost point of his summer marches, therefore about Ukek near Saratoff (see *Marco Polo*, Prol., chap. iii. note 4). Before the camp was left they had marched with it five weeks down the Volga. The point of departure would lie on that river somewhere between 48° and 50° N. lat. The route taken lay eastward by a line running north of the Caspian and Aral basins; then from about 70° E. long. south (with some easting) to the basin of the Talas river; thence across the passes of the Kirghiz Ala-tau and south of the Balkash Lake to the Ala-kul and the Baratula Lake (Ebi-nûr). From this the travellers struck north across the Barluk, or the Orkochuk Mountains, and thence, passing south of the modern Kobdo, to the valley of the Jabkan river, whence they emerged on the plain of Mongolia, coming upon the Great Khan's camp at a spot ten days' journey from Karakorum and bearing in the main south from that place, with the Khangai Mountains between.

This route is of course not thus defined in the narrative, but is a laborious deduction from the facts stated therein. The key to the whole is the description given of that central portion intervening between the basin of the Talas and the Lake Ala-kul, which enables the topography of that region, including the passage of the Ili, the plain south of the Balkash, and the Ala-kul itself, to be identified past question.[4]

[1] A detailed notice of such documents was published by M. Edm. Coussemaker of Lille. See remarks by M. D'Avezac in *Bull. de la Soc. de Géog.*, 2d vol. for 1868, pp. 569–570.

[2] The country of Flanders was at this time a fief of the French crown (see Natalis de Wailly, *Notes on Joinville*, p. 576). William's mother-tongue may probably have been Flemish. But this cannot be proved by his representation to Mangu Khan (p. 361) that certain *Teutonici* who had been carried away as slaves by a Tartar chief were *nostrae linguae*, as Dr. Franz Schmidt inclines to think.

[3] Cailac, where Rubruk halted twelve days, is undoubtedly the Kayalik of the historians of the Mongols, the position of which is somewhat indefinite. The narrative of Rubruk shows that it must have been near the modern Kopal.

[4] See details in *Cathay and the Way Thither*, pp. ccxi.–ccxiv., and Schuyler's *Turkistan*, i. 402–405. Mr. Schuyler points out the true

The return journey being made in summer, after retraversing the Jabkan valley,[1] lay much farther to the north, and passed north of the Balkash, with a tolerably straight course probably, to the mouths of the Volga. Thence the party travelled south by Derbend, and so by Shamakhi to the Araxes, Nakhshivan, Erzingan, Sivas, and Iconium, to the coast of Cilicia, and eventually to the port of Ayas, where they embarked for Cyprus and Syria. St. Louis had returned to France a year before.

We have alluded to Roger Bacon's mention of Friar William of Rubruk. Indeed, in the geographical section of the *Opus Majus* (*c.* 1262)[2] he cites the traveller repeatedly and copiously, describing him as "frater Wilhelmus quem dominus rex Franciae misit ad Tartaros, Anno Domini 1253 . . . . qui perlustravit regiones orientis et aquilonis et loca in medio his annexa, et scripsit haec praedicta illustri regi; quem librum diligenter vidi et cum ejus auctore contuli" (*Opus Majus*, ed. Jebb, 1733, pp. 190–191). Add to this William's own incidental particular as to his being (like his precursor, Friar John of Pian Carpine, see vol. v. p. 116) a very heavy man (*ponderosus valde*), and we know no more of his personality except the abundant indications of character afforded by the story itself. These paint for us an honest, pious, stout-hearted, acute, and most intelligent observer, keen in the acquisition of knowledge, the author in fact of one of the best narratives of travel in existence. His language indeed is Latin of the most un-Ciceronian quality,—dog-Latin we fear it must be called; but, call it what we may, it is in his hands a pithy and transparent medium of expression. In spite of all the difficulties of communication, and of the badness of his *turgemannus* or dragoman,[3] he gathered a mass of particulars, wonderfully true or near the truth, not only as to Asiatic nature, geography, ethnography, and manners, but as to religion and language. Of his geography a good example occurs in his account of the Caspian (eagerly caught up by Roger Bacon), which is perfectly accurate, except that he places the hill country occupied by the Mulâhids, or Assassius, on the eastern instead of the southern shore. He explicitly corrects the allegation of Isidore that it is a gulf of the ocean: "non est verum quod dicit Ysidorus . . . . nusquam enim tangit oceanum, sed undique circumdatur terra" (265).[4] Of his interest and acumen in matters of language we may cite examples. The language of the Pascatir (or Bashkirds) and of the Hungarians is the same, as he had learned from Dominicans who had been among them (274).[5] The language of the Ruthenians, Poles, Bohemians, and Slavonians is one, and is the same with that of the Wandals, or Wends (275). In the town of Equius (immediately beyond the Ili, perhaps Aspara)[6] the people were Mohammedans speaking Persian, though so far remote from Persia (281). The Yugurs (or Uigurs) of the country about Cailac (see note above) had formed a language and character of their own, and in that language and character the Nestorians of that tract used to perform their office and write their books (281–2). The Yugurs are those among whom are found the fountain and root of the Turkish and Comanian tongue (289). Their character has been adopted by the Moghals. In using it they begin writing from the top and write downwards, whilst line follows line from left to right (286). The Nestorians say their service, and have their holy books, in Syriac, but know nothing of the language, just as some of our monks sing the mass without knowing Latin (293). The Tibet people write as we do, and their letters have a strong resemblance to ours. The Tangut people write from right to left like the Arabs, and their lines advance upwards (329). The current money of Cathay is of cotton paper, a palm in length and breadth, and on this they print lines like those of Mangu Khan's seal: "*imprimunt lineas* sicut est sigillum Mangu"—a remarkable expression. They write with a painter's pencil and combine in one character several letters, forming one expression: "faciunt in una figura plures literas comprehendentes unam dictionem,"—a still more remarkable utterance, showing an approximate apprehension of the nature of Chinese writing (329).

Yet this sagacious and honest observer is denounced as an ignorant and untruthful blunderer by Isaac Jacob Schmidt (a man no doubt of useful learning, of a kind rare in his day, but narrow and wrong-headed, and in natural acumen and candor far inferior to the 13th-century friar whom he maligns), simply because the evidence of the latter as to the Turkish dialect of the Uigurs traversed a pet heresy, long since exploded, which Schmidt entertained, viz., that the Uigurs were by race and language Tibetan.[7]

The narrative of Rubruk, after Roger Bacon's copious use of it, seems to have dropped out of sight. It has no place in the famous collections of the 14th century, nor in the earlier *Speculum Historiale* of Vincent of Beauvais, which gives so many others of the Tartarian ecclesiastical itineraries. It first appeared imperfectly in Hakluyt (1600), as we have mentioned. But it was not till 1839 that any proper edition of the text was published. In that year the *Recueil de Voyages* of the Paris Geographical Society, vol. iv., contained a thorough edition of the Latin text, and a collation of the few existing MSS., put forth by M. D'Avezac, with the assistance of two young scholars, since of high distinction, viz., Francisque-Michel and Thomas Wright. But there is no commentary, such as M. D'Avezac attached, in his own incomparable fashion, to the edition of Friar John of Pian Carpine in the same volume; nor has there ever been any properly annotated edition of a traveller so worthy of honor. Richthofen in his *China*, i. 602–604, has briefly but justly noticed the narrative of Rubruk. A French version with some notes, issued at Paris in 1877, in the *Bibliothèque Orientale Elzévirienne*, if named at all, can only be mentioned as beneath contempt. The task is one which the present writer has long contemplated, but now with but slender hope of accomplishment. (Since this was in type the writer has received from Dr. Franz Max Schmidt an admirable monograph by him, *Ueber Rubruk's Reise* (Berlin, p. 93), extracted from vol. xx. of the *Ztschr. Geog. Soc. Berl.*, and has greatly profited by it in the revision of the article in proof.) (H. Y.)

RUBY. This name is applied by lapidaries and jewellers to two distinct minerals, which may be distinguished as the true or Oriental ruby and the spinel ruby. The former is a red variety of corundum or native alumina, of great rarity and value, while the latter is an aluminate of magnesium, inferior to the true ruby in hardness and much less esteemed as a gem stone. With ancient writers the confusion was even greater, for they appear to have classed together under a common name, such as the *carbunculus* of Pliny or the *ἄνθραξ* of Greek writers, not only our two kinds of ruby but also garnets and other inferior stones of a brilliant fiery color. By modern mineralogists it has come to be understood that when the word ruby is used without any qualifying prefix the true or Oriental stone is invariably indicated.

The Oriental ruby, like all other varieties of corundum, crystallizes in the rhombohedral system; but, as it usually occurs as small pebbles or rounded fragments, the crystalline form can rarely be traced. Its color varies from deep cochineal to pale rose red, in some cases inclining to purple, the most valued tint being that known to experts as pigeon's blood color. On exposure to a high temperature the ruby becomes green, but regains its original color on cooling—a behavior which is consistent with the supposition that the stone owes its color to the presence of oxide of chromium, and indeed in artificial rubies the required tint is always obtained by the use of some compound of chromium. When a ruby of the most esteemed color is properly viewed through a dichroiscope, the color is resolved into a carmine and an aurora red, or red inclining to orange. By this test the true ruby may be distinguished from spinel and garnet, since these minerals crystallize in the cubic system and therefore are not dichroic. Another mode of distinction is suggested by the high density of corundum:

identification of Rubruk's river with the Ili instead of the Chu, which is a much smaller stream; and other amendments have been derived from Dr. F. M. Schmidt (see below).

[1] So the present writer interprets what Rubruk says: "Our going was in winter, our return in summer, and that by a way lying very much farther north, only that for a space of fifteen days' journey in going and coming we followed a certain river between mountains, and on these there was no grass to be found except close to the river." The position of the Chagan Takoi or upper Jabkan seems to suit these facts best; but Mr. Schuyler refers them to the upper Irtish, and Dr. F. Schmidt to the Uliungur.

[2] [Date of *Opus Majus* is *c.* 1266, v. vol. iii., p. 189.—Am. Ed.]

[3] "Ego enim percepi postea, quando incepi aliquantulum intelligere idioma, quod quando dicebam unum ipse totum aliud dicebat, secundum quod ei occurrebat. Tum, videns periculum loquendi per ipsum, elegi magis tacere" (248–249).

[4] The page references in the text are to D'Avezac's edition of the Latin (see below).

[5] The Bashkirds now speak a Turkish dialect; but they are of Finnish race, and it is quite possible that they then spoke a language akin to Magyar. There is no doubt that the Mussulman historian of that age identified the Hungarians and the Bashkirds (*e.g.*), see extracts from Juvainî and Rashîduddîn in App. to D'Ohsson's *Hist. des Mongols*, ii. 620–623). The Bashkirds are also constantly coupled with the *Majâr* by Abulghâzî. See Fr. tr. by Desmaisons, pp. 19, 140, 180, 189.

[6] *Asp* = *Equus*. Aspara is often mentioned by the historians of Timur and his successors; its exact place is uncertain, but it lay somewhere on the Ili frontier. Dr. F. Schmidt thinks this identification impossible; but one of his reasons—viz., that Equius was only one day from Cailac—appears to be a misapprehension of the text.

[7] See *Forschungen im Gebiete . . . . der Völker Mittel-Asiens*, St. Petersburg, 1824, pp. 90–93.

the specific gravity of the true ruby reaches or even rises slightly above 4, and thus greatly exceeds that of either spinel or garnet. But perhaps the simplest test is afforded by its great hardness (H = 9): the sharp edge of a corundum crystal will readily scratch either a spinel or a garnet, but has no effect on a ruby. The true ruby has a very high index of refraction ($\mu = 1.78$), and to this character is due the remarkable lustre of the polished stone. Mr. Crookes has shown that the ruby is brilliantly phosphorescent when subjected to radiant discharge in a properly exhausted vessel, and curiously enough the red light emitted is equally vivid whatever be the color of the corundum under experiment. The microscopic structure of the ruby has been studied by Mr. Sorby, who finds that the stone contains fluid cavities and numerous crystallized enclosures of other minerals (*Proc. Roy. Soc.*, xvii., 1869, p. 291).

The Oriental ruby is a mineral of very limited distribution, its principal localities being confined to the kingdom of Burmah. The most important ruby mines are situated at Kyat Pyen, about 70 miles to the northeast of Mandalay; there are also mines at Mookop, a little farther north, and others in the Sagyiu Hills, within 16 miles of Mandalay. In all these localities the rubies occur in association with sapphires and other precious stones, forming a gem-bearing gravel which is dug up and washed in very primitive fashion. By far the larger number of the rubies are of small size, and the larger stones are generally flawed. All rubies exceeding a certain weight were the property of the king of Burmah. The mines were jealously watched, and it was difficult for Europeans to obtain access to them; but some of the Ava workings were visited and described many years ago by Père Giuseppe d'Amato, and more recently those near Mandalay have been described by Mr. Bredmeyer, who was officially connected with them (Ball). It is stated in the older works on mineralogy that rubies occur in the Capelan Mountains near Syrian, in Pegu. In peninsular India there are but few localities that yield rubies, but they have been reported from the corundum mines of the Salem district in Madras and from Mysore. In Ceylon they occur with sapphires, but are rarer than those gems, and the Ceylon rubies are not usually of good color. Rubies have been brought from Gandamak, in Afghanistan, but most of the stones reputed to be Afghan rubies are merely spinels.

In 1871 some remarkable deposits of corundum were discovered by Col. C. W. Jenks in Macon county, North Carolina. Rubies, sapphires, and large pebbles of coarse corundum were found in the bed of a river near a large mass of serpentine which afterwards became known as Corundum Hill, and these pebbles were eventually traced to certain veins in the serpentine. The corundum occurred crystallized *in situ*, but was rarely of such a color as would entitle it to be called ruby. Mr. G. F. Kunz, who has lately written an article on American precious stones, states that rubies and sapphires have also been found at Vernon, New Jersey; near Helena, Montana; at Santa Fé, New Mexico; in southern Colorado; and in Arizona.

Australia has occasionally yielded true rubies, but mostly of small size and inferior quality. In Victoria they have been found in the drifts of the Beechworth gold fields and at the Berwick tin mine, Wallace's Creek; while in New South Wales they occur at Mudgee, in the Cudgegong and some of its tributaries, and at Tumberumba, county Wynyard. A magenta-colored turbid ruby from Victoria is known under the name of "barklyite."

The "star ruby" is a rather cloudy variety from Ceylon, exhibiting when cut *en cabochon* a luminous star of six rays reflected from the convex surface of the stone.

The largest ruby known in Europe is said to be one of the size of a small hen's egg, which was presented by Gustavus III. of Sweden to the empress of Russia on the occasion of his visit to St. Petersburg. Rubies of larger size have been described by Tavernier and other Oriental travellers, but it is probable than in many cases spinels have been mistaken for true rubies. There seems no doubt that the great historic ruby set in the Maltese cross in front of the imperial state crown of England is a spinel. This stone was given to Edward the Black Prince by Pedro the Cruel, king of Castile, on the victory of Najera in 1367, and it was afterwards worn by Henry V. at the battle of Agincourt, when it narrowly escaped destruction.

The spinel ruby has been described in the article MINERALOGY (vol. xvi. p. 402, sp. 93). The spinels used for jewelry are mostly obtained in Burmah, where they occur as octahedral crystals or as water-worn pebbles in association with the true ruby, for which they are often mistaken. They are also found in the gem-bearing gravels of Ceylon, Victoria, and New South Wales. The delicate rose-pink variety known as balas ruby was worked for centuries in Badakshan, but the operations appear to have been suspended of late years. The mines are situated on the river Shighnan, a tributary of the Oxus. It is commonly said that the name "balas" or "balash" is a corruption of Badakhshan, while others derive it from Balkh.

The Oriental ruby has always been esteemed of far higher value than any other precious stone. A ruby of perfect color, weighing five carats, is worth at the present day ten times as much as a diamond of equal weight (Streeter). As the weight of the stone increases, its value rapidly rises, so that the rubies of exceptional size command enormous prices. There is consequently much temptation to replace the true stone by spinel or garnet or even paste. By means of oxide of chromium an excellent imitation of the color of the ruby is obtained; and, though the ordinary "strass," or fine lead-glass, is very soft, and therefore soon loses its lustre, it is yet possible to produce a paste consisting of silicate of alumina which is almost as hard as rock crystal.

It is an interesting fact that the chemist has frequently succeeded in causing alumina to assume artificially many of the physical characteristics of the native ruby. As far back as 1837 M. Gaudin reproduced the ruby on a small scale by exposing ammonia-alum to the heat of the oxyhydrogen blowpipe, whereby he obtained fused alumina which was readily colored by the addition of oxide of chromium. A different method was followed by Ebelmen. He dissolved alumina in boric acid at a high temperature, and on the cooling of the mass obtained the alumina in a crystallized form; while if chromate of ammonium was present the crystals became veritable ruby. MM. Sainte-Claire Devill and Caron heated a mixture of fluoride of aluminium, fluoride of chromium, and boric acid, and thus obtained a fluoride of boron, which, being volatile, readily escaped, and left a solid residue of alumina colored by the chrome. These, however, were only laboratory experiments, and it was reserved for MM. Frémy and Feil, in 1878, to reproduce the ruby and sapphire on a scale suggestive of some commercial importance. By heating a mixture of artificial alumina and red lead in a fireclay crucible, they obtained a vitreous silicate of lead (the silica being derived from the crucible) and crystallized alumina, while the addition of bichromate of potassium caused this alumina to assume the coveted tint of the ruby.

For a general description of the ruby see E. Jannettaz, *Diamant et Pierres Précieuses* (1881); Kluge, *Handbuch der Edelsteinkunde* (1860); Schranf, *Edelsteinkunde* (1869); Church, *Precious Stones* (1883); Streeter, *Precious Stones and Gems* (4th ed., 1884). For Indian localities see Ball's *Economic Geology*, being vol. iii. of the *Manual of the Geology of India* (1881); for Australian localities, Liversidge's *Minerals of New South Wales* (2d ed., 1882); for United States rubies, *Quart. Jour. Geol. Soc. Lond.*, vol. xxx. 1874, p. 303, and *American Jour. Science*, ser. iii. vol. iv., 1872, pp. 109, 175, and Kunz's article in *Mineral Resources of the United States*, by A. Williams, jun. (1883). For the history of the stone consult King's *Natural Hist. of Precious Stones* (1865), and for artificial rubies, *Comptes Rendus*, vol. lxxxv. 1877, p. 1029. (F. W. R.)

RÜCKERT, FRIEDRICH (1788–1866), an eminent German poet, was born at Schweinfurt on the 16th May, 1788. He was educated at the gymnasium of his native place and at the universities of Würzburg and Heidelberg, where he studied law and philology. Having taken his degree, he went to the university of Jena as a "privat-docent"; but this position he soon abandoned. For some time he worked in connection with the *Morgenblatt* at Stuttgart. Nearly the whole of the year 1818 he spent in Rome, where he devoted himself to study, especially to the study of the popular poetry of Italy; and afterwards he lived for several years at Coburg. He was appointed a professor of Oriental languages at the university of Erlangen in 1826, and in 1841 he was called to a similar position in Berlin, where he was also made a privy councillor. In 1849 he resigned his professorship in Berlin, and went to live on his estate near Coburg. He died on the 31st January, 1866. When Rückert began his literary career, Germany was engaged in her life-and-death struggle with Napoleon; and in his first volume, *Deutsche Gedichte*, published in 1814 under the name of Freimund Raimar, he gave vigorous expression to the prevailing sentiment of his countrymen. In 1816 appeared *Napoleon, eine politische Komödie in drei Stücken*, and in 1817 the *Kranz der Zeit*. He issued

a collection of poems, *Oestliche Rosen*, in 1822; and in 1834–38 his *Gesammelte Gedichte* were published in six volumes, a selection from which has passed through many editions. Rückert, who was master of thirty languages, made his mark chiefly as a translator of Oriental poetry, and as a writer of poems conceived in the spirit of Oriental masters. Much attention was attracted by *Die Verwandlungen des Abu Seid*, a translation of Hariri's *Makamen* (1826), *Nala und Damajanti*, an Indian tale (1828), *Amrilkais, der Dichter und König* (1847), and *Hamasa, oder die ältesten arabischen Volkslieder* (1846). Among his original poems dealing with Oriental subjects are *Morgenländische Sagen und Geschichten* (1837), *Erbauliches und Beschauliches aus dem Morgenland* (1836–38), *Rostem und Suhrab, eine Heldengeschichte* (1838), and *Brahmanische Erzählungen* (1839). The most elaborate of his works is *Die Weisheit des Brahmanen*, published in six volumes in 1836–39. In 1843–45 he issued several dramas, all of which are greatly inferior to the work to which he owes his distinctive place in German literature. At the time of the Danish war in 1864 he wrote *Ein Dutzend Kampf-Lieder für Schleswig-Holstein*, which, although published anonymously, produced a considerable impression. After his death many poetical translations and original poems were found among his papers, and several collections of them were published. Rückert lacked the simple and natural feeling which is characteristic of all the greatest lyric poets of Germany. But he had a certain splendor of imagination which made Oriental poetry congenial to him, and he has seldom been surpassed in his power of giving rhythmic expression to ideas on the conduct of life. As a master of poetical style he ranks with German writers of the highest class. There are hardly any lyrical forms which are not represented among his works, and in all of them, the simplest and the most complex, he wrote with equal ease and grace.

A complete edition of Rückert's poetical works appeared in Frankfort in 1867–69. See Fortlage, *Rückert und seine Werke* (1867); Beyer, *Friedrich Rückert, ein biographisches Denkmal* (1868); *Neue Mittheilungen über Rückert* (1873); and *Nachgelassene Gedichte Rückerts und neue Beiträge zu dessen Leben und Schriften* (1877); Boxberger, *Rückert-Studien* (1878).

RŪDAGĪ (d. 954). Hakím Mohammed Faríd-eddín 'Abdalláh, the first great genius of modern Persia, was born in Rúdag, a village in Transoxiana, about 870–900,—totally blind, as most of his biographers assert, although the fine distinction of colors and the minute description of the various tints and shades of flowers in his poems flatly contradict the customary legend of the "blind minstrel." In his eighth year he knew the whole Korán by heart and had begun to write verses. He had besides a wonderful voice which enraptured all hearers, and he played in a masterly way on the lute. The fame of these accomplishments at last reached the ear of the Sámánid Nasr II. bin Ahmad, the ruler of Khorásán and Transoxiana (913–942), who drew the poet to his court and distinguished him by his personal favor. Rúdagí became his daily companion, rose to the highest honors, and grew rich in worldly wealth. He received so many costly presents that he could allow himself the extravagance of keeping two hundred pages, and that four hundred camels were necessary to carry all his property. In spite of various predecessors he well deserves the title of "father of Persian literature," since he was the first who impressed upon every form of epic, lyric, and didactic poetry its peculiar stamp and its individual character. He is also said to have been the founder of the "díwán," that is, the typical form of the complete collection of a poet's lyrical compositions in a more or less alphabetical order which prevails to the present day among all Mohammedan writers. His poems filled, according to all statements, one hundred volumes and consisted of one million three hundred thousand verses; but of this there remain only fifty-two kasídas, ghazals, and rubá'ís; of his epic masterpieces we have nothing beyond a few stray lines found here and there as illustrations of ancient Persian words and phrases in native dictionaries. But the most serious loss is that of his translation of Ibn Mukaffa's Arabic version of the old Indian fable book *Kalílah and Dimnah*, which he put into Persian verse at the request of his royal patron, and for which he received the handsome reward of 40,000 dirhems. In his kasídas, which are all devoted to the praise of his sovereign and friend, Rúdagí has left us unequalled models of a refined and delicate taste, very different from the often bombastic compositions of later Persian encomiasts, and these alone would entitle him to a foremost rank among the poets of his country; but his renown is considerably enhanced by his odes and epigrams. Those of a didactic tendency express in well-measured lines a sort of Epicurean philosophy—in the loftiest sense of the word—on human life and human happiness; more charming still are the purely lyrical pieces, sweet and fascinating songs, which glorify the two everlasting delights of glowing hearts and cheerful minds—love and wine. Rúdagí survived his royal friend, and died long after the splendid days of Nasr's patronage, the time of wealth and luxury, had passed away—poor and forgotten by the world, as one of his poems, a beautiful elegy, seems to indicate—in 954.

A complete edition of all the extant poems of Rúdagí, in Persian text and metrical German translation, together with a biographical account, based on forty-six Persian MSS., is found in Dr. Ethé's "Rúdagí der Sámánidendichter" (*Göttinger Nachrichten*, 1873, pp. 663–742).

RUDD, or Red-Eye (*Leuciscus erythrophthalmus*), a fish of the family of Carps, generally spread over Europe, north and south of the Alps, also found in Asia Minor, and extremely common in suitable localities, viz., still and deep waters with muddy bottom. When adult, it is readily recognized by its deep, short body, golden-coppery tint of the whole surface, red eyes, and scarlet lower fins; the young are often confounded with those of the roach, but the pharyngeal teeth of the rudd stand in a double row, and not in a single one, as in the roach; also the first dorsal rays are inserted distinctly behind the vertical line from the root of the ventral fin. The anal rays are from thirteen to fifteen in number, and the scales in the lateral line from thirty-nine to forty-two. The rudd is a fine fish, but little esteemed for food, and very rarely exceeds a length of 12 inches or a weight of 2 lb. It feeds on small freshwater animals and soft vegetable matter, and spawns in April or May. It readily crosses with the white bream, more rarely with the roach and bleak.

RUDDIMAN, Thomas (1674–1758), an eminent Scottish scholar, was born in October, 1674, at Raggal, in the parish of Boyndie, Banffshire, where his father was a farmer. He studied Latin eagerly at the school of his native parish, and when sixteen started off to walk to Aberdeen, there to compete for a college bursary. On the way he was attacked by gypsies, robbed of a guinea, which was all he had, and otherwise very cruelly treated; but he persevered in his journey, reached Aberdeen, and competed for and won the bursary. He then entered the university, and four years afterwards—on the 21st June, 1694—received the degree of M.A. For some time he acted as schoolmaster at Laurencekirk in Kincardine. There he chanced to make the acquaintance of Dr. Pitcairne, of Edinburgh, who persuaded him to remove to the Scottish capital, where he obtained the post of assistant in the Advocates' Library. As his salary was only £8, 6s. 8d. [$40.51] per annum, he was forced to undertake additional employment. He engaged in miscellaneous literary work, took pupils, and for some time acted as an auctioneer. His chief writings at this perid were editions of Wilson's *De Animi Tranquillitate Dialogus* (1707), and the *Cantici Solomonis Paraphrasis Poetica*

(1709) of Arthur Johnstone (*ob.* 1641), editor of the *Delicæ Poetarum Scotorum*.

In 1714 he published *Rudiments of the Latin Tongue*, which is even yet his best known work. This was intended to be an easy introduction to Latin grammar, and was so successful that it at once superseded all others. Under various forms it has been in use, down to our own day, in the schools of Scotland. In 1715 he edited, with notes and annotations, the works of George Buchanan in two volumes folio. As Ruddiman was a Jacobite, the liberal views of Buchanan seemed to him to call for frequent censure. That censure is often rather implied than openly expressed; but it excited much opposition. A society of scholars was formed in Edinburgh to "vindicate that incomparably learned and pious author from the calumnies of Mr. Thomas Ruddiman" by publishing a correct edition of his works. This they never did, but a number of obscure writers from this time attacked Ruddiman with great vehemence. He replied; and it was not till the year before his death that he said his "last word" in the controversy.

His worldly affairs, meanwhile, grew more and more prosperous. He founded (1715) a successful printing business, and after some time was appointed printer to the university. He acquired the *Caledonian Mercury* in 1729, and in 1730 was appointed keeper of the Advocates' Library, which post, owing to failing health, he resigned in 1752. He died at Edinburgh, 19th January, 1758, and was interred in Greyfriars churchyard, where in 1806 a tablet was erected to his memory.

Besides the works mentioned, the following writings of Ruddiman deserve notice: an edition of Gavin Douglas's *Æneid* of Virgil (1710); the editing and completion of Anderson's *Selectus Diplomatum et Numismatum Scotiæ Thesaurus* (1739); *Catalogue of the Advocates' Library* (1733–42); an edition of Livy, famed for its "immaculate purity," in 4 vols. (1751). Ruddiman was for many years the representative scholar of Scotland. Writing in 1766, Dr. Johnson, after reproving Boswell for some bad Latin, significantly adds—"Ruddiman is dead." When Boswell proposed to write Ruddiman's life, "I should take pleasure in helping you to do honor to him," said Johnson.

See Chalmer's *Life of Ruddiman*, (1794); *Scots Magazine*, January 7, 1757; Boswell's *Life of Johnson*.

RUDE, François (1784–1855), a French sculptor of great natural talent and force of character, but of an ignorance as to all that did not immediately concern his art which can best be described as out of date. He was born at Dijon, 4th January, 1784, and came therefore in his youth under the influence of the democratic and Napoleonic ideals in their full force. Till the age of sixteen he worked at his father's trade as a stovemaker, amusing himself with modelling in his free hours only; but in 1807 he went up to Paris from the Dijon school of art, and became a pupil of Cartellier, obtaining the Great Prize in 1812. After the second restoration of the Bourbons he retired to Brussels, where he got some work under the architect Van der Straeten, who employed him to execute nine bas reliefs in the palace of Tervueren, which he was then engaged in building. At Brussels Rude married Sophie Frémiet, the daughter of a Bonapartist compatriot, to whom he had many obligations, but, obtaining with difficulty work so ill-paid that it but just enabled him to live, he gladly availed himself of the opportunity of return to Paris, where in 1828 a statue of the Virgin for St. Gervais and a Mercury Fastening his Sandals obtained much attention. His great success dates, however, from 1833, when he received the cross of the Legion of Honor for his statue of a Neapolitan Fisher Boy playing with a Tortoise, which also procured for him the important commission for all the ornament and one bas relief of the Arc de l'Étoile. This relief, a work full of energy and fire, immortalizes the name of Rude. Amongst other productions, we may mention the statue of Monge, 1848, Jeanne d'Arc (in garden of Luxembourg), 1852, a Calvary in bronze for the high altar of St. Vincent de Paul, 1855, as well as Hebe and the Eagle of Jupiter, Love Triumphant, and Christ on the Cross, all of which appeared at the Salon of 1857 after his death. He had worked all his life long with the most extraordinary energy and given himself no rest in spite of the signs of failing health, and at last, on the 3d November, 1855, he died suddenly with scarcely time to cry out. One of his noblest works, and easily accessible, is the tomb of Cavaignac, on which he placed beside his own the name of his favorite pupil Christophe. Although executed in 1840, this was not erected at Montmartre till the year after Rude's own death. His Louis XIII. (*enfant*), a life-size statue, cast in silver, is to be seen at the Duc de Luynes's chateau at Dampierre. Cato of Utica stands in the gardens of the Tuileries, and his Baptism of Christ decorates a chapel of the Madeleine.

RUDE STONE MONUMENTS. The raising of commemorative monuments of such an enduring material as stone is a practice that may be traced in all countries to the remotest times. The highly sculptured statues, obelisks, and other monumental erections of modern civilization are but the lineal representatives of the unhewn monoliths, dolmens, cromlechs, etc., of prehistoric times. Judging from the large number of the latter that have still survived the destructive agencies (notably those of man himself) to which they have been exposed during so many ages, it would seem that the ideas which led to their erection had as great a hold on humanity in its earlier stages of development as at the present time. In giving some idea of these rude monuments in Britain and elsewhere, it will be convenient to classify them as follows (see vol. ii. pp. 335–6, Figs. 1–4). (1) Isolated pillars or monoliths of unhewn stones raised on end are called *Menhirs* (*maen*, a stone, and *hir*, long). (2) When these monoliths are arranged in lines they become *Alignments*. (3) But if their linear arrangement is such as to form an enclosure (*enceinte*), whether circular, oval, or irregular, the group is designated by the name of *Cromlech* (see Cromlech). (4) Instead of the monoliths remaining separate, they are sometimes placed together and covered over by one or more capstones so as to form a rude chamber; in this case the monument is called a *Dolmen* (*daul*, a table, and *maen*, a stone). This megalithic chamber is sometimes partially or wholly imbedded in a mound of earth or stones so as to form a tumulus or cairn. As, however, there are many tumuli and cairns which do not contain megalithic chambers, we have only partially to deal with them under the category of rude stone monuments.

Menhirs.—Rude monoliths fixed on end (see vol. ii. p. 335, Fig. 1) have been used in all ages for a variety of purposes, commemorative and religious. Stone pillars were also used ceremonially on the accession of kings and chiefs. In Scotland, when stones were thus used, they were called Tanist Stones, the most celebrated of which was the Lia Fail, formerly at Scone (now at Westminster Abbey), on which the kings of Scotland used to be crowned. We read also of Hare or Hoer Stones, Cambus or Camus Stones, Cat (*cath*, battle) Stones, "Witch Stanes," "Druid Stanes," etc. The Hawk's Stane, or *Saxum Falconis*, at St. Madoes, Perthshire, was erected in memory of the defeat of the Danes at Luncarty, and a monolith now standing on the field of Flodden is said to mark the place where King James fell. When menhirs were grouped together their number was often significant, *e.g.*, twelve (Josh. iv. 5) or seven (Herod., iii. 8). Some standing stones are found to have been artificially perforated, and these superstition has invested with some curious functions. As examples of this class may be mentioned the famous Stone of Odin, near the circle of Stennis, the Clach-Charra, or Stone of Vengeance, at Onich near Balachulish in Argyllshire, and Men-en-tol in Cornwall. Two rude monoliths in Scotland bear inscriptions,—the famous Newton Stone in the district of Garioch, and the Cat Stane near Edinburgh. Many others have cup-marks and spirals or concentric circles. In Ireland, Wales, and the north of Scotland, they are occasionally found with ogam inscriptions, and in the northeast of Scotland (Pict-

land) with symbolical figures, which were subsequently continued on the beautifully sculptured stones of early Christian date which are peculiar to that locality.

Menhirs are found in all megalithic countries. In the British Isles they are very abundant, more especially in the less cultivated districts. In France over 1600 isolated examples have been recorded, of which about the half, and by far the most remarkable, are within the five departments which constitute Brittany. In the rest of France they are generally small, and not to be compared in grandeur to those of Brittany. At Locmariaquer (Morbihan) is the largest menhir in the world. It is in the form of a rude but smooth-sided obelisk, and lies on the ground broken into four portions, the aggregate length of which amounts to 20.50 metres (about 67 feet). It was made of granite, foreign to the neighborhood, and its weight, according to the most recent calculations, amounted to 347,531 kilogrammes or 342 tons (*L'Homme*, 1885, p. 193). The next largest menhir is at Plésidy (Côtes-du-Nord), measuring about 37 feet in height. Then follows a list of sixty-seven gradually diminishing to 16 feet in height, of which the first ten (all above 26 feet) are in Brittany. As regards form, these menhirs vary greatly. Some are cylindrical, as the well-known "pierre du champ Dolent" at Dol (height 30 feet), and that of Cadiou in Finistère (28 feet); while that of Penmarch (26 feet) takes the shape of a partially expanded fan. On the introduction of Christianity into France its adherents appear to have made use of these menhirs at an early period; many of them at present support a cross, and some a Madonna. The scattered positions of some monoliths and the no less singular grouping of others show that, although they were sometimes used as landmarks, this was only a secondary function. It is not uncommon to find a monolith overtopping a tumulus, thus simulating the Banta (grave or battle) Stones of Scandinavia. In England, monoliths are often associated with the stone circles, as the King's Stone at Stanton Drew, Long Meg at Little Salkeld, the Ring Stone at Avebury, etc. One of the finest British monoliths stands in the churchyard of Rudston, Yorkshire. Examples of a large size are met with in Algeria, Morocco, India, Central Asia, etc.

Alignments.—The most celebrated monuments of this class are in the vicinity of Carnac in Brittany. They are situated in groups at Ménec, Kermario, Kerlescant, Erdeven, and St. Barbe—all within a few miles of each other, and in the centre of a district containing the most remarkable megalithic remains in the world. The first three groups are supposed by some archæologists to be merely portions of one original and continuous series of alignments, which extend nearly 2 miles in length in a uniform direction from southwest to northeast. Commencing at the village of Ménec, the menhirs are arranged in eleven rows. At first they stand from 10 to 13 feet above the ground, but, as we advance, they become gradually smaller till they attain only 3 or 4 feet, when they cease altogether. After a vacant space of about 350 yards we come to the Kermario group, which contains only ten lines, but they are nearly of the same magnitude as at the beginning of the former group. After a still greater interval the menhirs again appear, but this time in thirteen rows, at the village of Kerlescaut. In 1881 M. Felix Gaillard, Plouharnal, made a plan of the alignments at Erdeven, which shows that, out of a total of 1120 menhirs which originally constituted the group, 290 are still standing, 740 fallen, and 90 removed. The menhirs here may be traced for nearly a mile, but their linear arrangement is not so distinct, nor are the stones so large as those at Carnac. About fifty aligments are known in France. At Penmarch there is one containing over two hundred menhirs arranged in four rows. Others, however, are formed of only a single row of stones, as at Kerdonadec, Leuré, and Camaret. The first is 480 m. [*c.* 525 yards] in length, and terminates at its southern extremity in a kind of croix gammée. At Leuré three short lines meet at right angles. The third is situated on the rising ground between the town of Camaret and the point of Toulingnet. It consists of a base line, some 600 yards long, with forty-one stones (others have apparently been removed), and two perpendicular lines as short offsets. Close to it are a dolmen and a prostrate menhir. These monoliths are all of coarse quartz and of small size, only one, at Leuré, reaching a height of 9 feet. Alignments are also found in other countries. In the Pyrenees they are generally in single file,—mostly straight, but sometimes reptiliform. One at Peyrelade (Billière) runs in a straight line from north to south for nearly 300 yards, and contains ninety-three stones, some of which are of great size. At St. Columb in Cornwall, there is one called the Nine Maidens, which is formed of eight quartz stones, extending in a perfectly straight line for 262 feet. In Britain they are more frequently arranged in double file, or in avenues, leading to or from other megalithic monuments, such as still exist, or formerly existed, at the circles of Avebury, Stonehenge, Shap, Callernish, etc. The only example in England comparable to the great alignments of Carnac is in the Vale of the White Horse in Berkshire. Here the stones, numbering about eight hundred, are grouped in three divisions, and extend over an irregular parallelogram which measures from 500 to 600 yards in length and from 250 to 300 yards in breadth. Sir Henry Dryden describes groups of a similar character in Caithness, as at Garry-Whin, Camster, Yarbouse, and the "many stones" at Clyth. Alignments in single and multiple rows have also been observed in Shetland, India, Algeria, etc.

Cromlechs.—Enclosures (*enceintes*) formed of rude monoliths, placed at intervals of a few yards, have generally a circular or oval shape. Rectangular forms are, however, not unknown, examples of which may be seen at Crucuno (Morbihan), near the celebrated dolmen of that name, and at Saint Just (Ille-et-Vilaine). The former measures 37 by 27 yards, and is now composed of twenty-two menhirs, all of which are standing (some fallen ones having been recently restored by the Government). About a dozen menhirs would appear to be wanting. A donkey-shoe-shaped enclosure has been described by Sir Henry Dryden, in the parish of Latheron, Caithness. It is 226 feet long and 110 feet wide in the middle, and the two extremities are 85 feet apart. Stone circles are frequently arranged concentrically, as may be seen in the circle at Kenmore, near Aberfeldy, Perthshire, as well as in many other Scotch, Irish, and Scandinavian examples. More rarely one large circle surrounds secondary groups, without having a common centre, as was the case at Avebury, where the outer circle, 1200 feet in diameter, included two others, each of which contained an inner concentric circle. At Boscawen, in Cornwall, there is a group of circles confusedly attached, and, as it were, partially overlapping each other. Circles may also be connected by an alignment or avenue, as at Stanton Drew, Dartmoor, etc. Cromlechs are often associated with other megalithic monuments; thus at the head of the great Carnac alignments are the remains of a large circle which can be readily traced, notwithstanding that some houses are constructed within its area. In the British Isles and the north of Europe cromlechs frequently surround the dolmens, tumuli, or cairns. A few examples of a dolmen surrounded by one or more concentric circles have also been recorded by M. Cartailhac, in the department of Aveyron in France. Outside the cromlech there is also frequently to be found a circular ditch or vallum, as at Avebury, Stonehenge, Arbor Low, Brogar, etc. The most remarkable megalithic monument of this class now extant is Stonehenge, which differs, however, from its congeners in having the stones of its second inner circle partially hewn and attached by large transverse lintels. The largest cromlech in France stands on the Ile-aux-Moines (Morbihan), in the village of Kergonan. About half of it is destroyed by the encroachment of the houses. The remaining semi-circumference (slightly elliptical) contains thirty-six menhirs from 6 to 10 feet high, and its diameter is about 100 metres (328 feet). Only a few of the British cromlechs exceed these dimensions, among which may be mentioned Avebury (1260 by 1170 feet), Stonehenge (outer circle 300 feet, inner 106 feet), Stanton Drew (360 feet), Brogar (345 feet), Long Meg and her Daughters (330 feet). One near Dumfries, called the Twelve Apostles, also closely approaches the 100-metre size; but, generally speaking, the Scotch and Irish examples are of smaller proportions, rarely exceeding 100 feet in diameter. That most of the smaller circles have been used as sepulchres has been repeatedly proved by actual excavations, which showed that interments had taken place within their area. It is difficult, however, to believe that this could have been the main object of the larger ones. At Mayborough, near Penrith, there is a circle entirely composed of an immense aggregation of small stones in the form of a gigantic ring enclosing a flat area, about 300 feet in diameter. Near the centre there is a fine monolith, one of several known to have formerly stood there. Of the same type is the Giant's Ring near Belfast, only the ring in this instance is made of earth, and it is considerably larger in diameter (580 feet); the central object is a fine dolmen. It is more probable that such enclosures were used, like many of our modern churches, for the double purpose of burying the dead and addressing the living.

Dolmens.—In its simplest form a dolmen consists of three, four, or five stone supports, covered over with one selected megalith called a capstone or table. A well-known example of this kind in England is Kit's Coity House, between Rochester and Maidstone, which is formed of three large supports, with a capstone measuring 11 by

8 feet. From this simple form there is an endless variety of upward gradations till we reach the so-called Giant Graves and Grottes anx Fées, which are constrncted of nnmerons snpports and several capstones. A dolmen (*allée couverte*) situated in a plantation at the outskirts of the town of Saumnr is composed of fonr flat snpports on each side, with one at the end, and fonr capstones. The largest capstone measnres 7.5 metres [8 yards, 7 inches] in length, 7 [7 yards, 2 feet] in breadth, and 1 [1 yard, 3 inches] in thickness. The chamber is 18 metres [19 yards, 1 foot] long, 6.5 [7 yards, 4 inches] broad, and 3 [3 yards, 10 inches] high. Another near Essé, called "la Roche aux Fées," is equally long, and is constructed of thirty snpports, with eight capstones, including the vestibnle. Dolmens of this kind are extremely rare in the British Isles, the only one approaching them being Calliagh Birra's House in Ireland. These (generally known as allées convertes) and many other examples of the simple dolmen show no evidence of having been covered over with a mound. When there was a monnd it neeessitated, in the larger ones, an entrance passage, which was constrneted, like the chamber, of a series of side stones or snpports and capstones. Some archæologists maintain that all dolmens were formerly covered with a cairn or tnmulus,—a theory which undoubtedly derives some favor from the condition of many examples still extant, especially in France, where all stages of degradation are seen, from a partial to a complete state of denudation. The allées couvertes of France, Germany, and the Channel Islands had their entrance at the end; but, on the other hand, the Hunnebedden of Holland had both ends closed and the entrance was on the side facing the snn. The covered dolmens are extremely variable in shape,—circular, oval, qnadrangnlar, or irregular. The entrance gallery may be attached to the end, as in the Grotte de Gavr'inis, or to the side, as in the Giant's Grave (Jettestuer) at Oem near Röskilde. In other instances there is no distinct chamber, bnt a long passage gradnally widening from the entrance; and this may be bent at an angle, as in the dolmen dn Rocher (Morbihan). Again there may be several chambers communicating with one entrance, or two or three separate chambers having separate entrances, and all imbedded in the same tnmnlns. An excellent example of this kind is the partially destroyed tumulus of Rondosee, near Plonharnal railway station, which contains three separate dolmens. That such variations are not due to altered customs, in conseqnence of wideness of geographical range, is shown by M. de Mortillet, who gives plans of no less than sixteen differently shaped dolmens (*Musée préhistorique*, pl. 58), all within a confined district in Morbihan.

No dolmens exist in eastern Enrope beyond Saxony. They reappear, however, in the Crimea and Circassia, whence they have been traced through Central Asia to India, where they are widely distributed. Similar megalithic strnctures have also been recognized and described by travellers in Palestine, Arabia, Persia, Australia, the Penrhyn Islands, Madagascar, Peru, etc. The irregular manner in which dolmens are distribnted along the western parts of Enrope has led to the theory that all these megalithic structures were erected by a special people, but as to the when, whence, and whither of this singnlar race there is no knowledge whatever. Though the European dolmens have a strong family likeness, however widely apart, they present some characteristic differences in the various countries in which they are found. In Scandinavia they are confined to the Danish lands and a few provinces in the south of Sweden. Here the exposed dolmens are often on artificial mounds, and snrrounded by cromleehs which are either circular (*rnnddysser*) or oval (*langdysser*). In Sweden the *sepnlture à galerie* is very rarely entirely covered up as in the giant graves of Denmark.

Hanover, Oldenbnrg, and Mecklenburg are very rich in the remains of these monuments. At Riestedt, near Uelzen in Hanover, there is, on the summit of a tnmnlus, a very singular dolmen of oblong form, which measures abont 40 feet long and over 6 feet in breadth. Another at Naschendorf, near Wismar, consists of a monnd surronnded by a large circle of stones and a covered chamber on its summit. Remains of a megalithic structnre at Rudenbeck, in Mecklenburg, though now imperfect, show that originally it was constrneted like an allée converte. It had four supports on each side, two at one end (the other end forming the entrance), and two large capstones. The length had been about 20 feet, breadth 7½ feet, and height from the floor to the nnder-surface of roof about 3 feet. According to Bonstetten, no less than two hundred of these monuments are found distributed over the three provinces of Lüneburg, Osnabrück, and Stade; and the most gigantic examples in Germany are in the duchy of Oldenburg.

In Holland, with one or two exceptions, they are confined to the province of Drenthe, where between fifty and sixty still exist. Here they get the name of Hunnebedden (Huns' beds). The Borger Hunnebed, the largest of this gronp, is 70 feet long and 14 feet wide. In its original condition it contains forty-five stones, ten of which were capstones. They are all now dennded, but some show evidence of having been snrronnded with a monnd containing an entrance passage. Only one dolmen has been recorded in Belginm; bnt in France their nnmber amonnts to 3410. They are irregnlarly distribnted over seventy-eight departments, six hnndred and eighteen being in Brittany. In the centre of the country they are also numerons, no less than four hnndred and thirty-five being recorded in Aveyron, but they are of mnch smaller proportions than in the former locality. From the Pyrenees the dolmens are sparsely traced along the north coast of Spain and through Portugal to Andalusia, where they occnr in considerable nnmbers. Crossing into Africa they are found in large groups in Morocco, Algeria, and Tunis. General Faidherbe writes of having examined five or six thonsand at the cemeteries of Bon Merzoug, Wady Berda, Tebessa, Gastal, etc.[1] In the Channel Islands every species of megalithic monument is met with. At Mont Cochon, near St. Helier, there was lately discovered in a mound of blown sand an allée converte, and close to it a stone circle snrronnding a dolmen.[2] In the British Isles they are met with in many localities, particularly in the west of England, Anglesey, the Isle of Man, Ireland, and Scotland. In the conntry last named, however, they are not the most striking features among its rude stone monuments—the stone circles and cisted cairns having largely superseded them.

In the absence of historical knowledge all these megalithic strnctnres were formerly regarded as of Celtic origin. By some they were snpposed to have been constructed by the Druids, the so-called priests of the Celts; and hence they were often described, especially since the time of Anbrey and Stukely, nnder the name of Celtic or Druidical monuments. But this theory is disproved by the fact that the ethnographical range of the Celtic races does not correspond with the geographical distribntion of these rude stone monuments. Thus, for example, in Europe, not to speak of their localization in non-Celtic countries, the megaliths occnpy an elongated stretch of territory on its western seaboard extending from Pomerania to North Africa. This area crosses at right angles the lands supposed to have been occnpied by the Celtic or Aryan races on their westward waves of migration. There can be no doubt from investigation of the contents of dolmens that their primary object was sepulchral, and that the megalithic chambers, with entrance passages, were used as family vaults. Against the theory that any of them were ever used as altars there is *prima facie* evidence in the care taken to have the smoothest and flattest snrface of the stones composing the chamber always turned inwards. Moreover, cup marks, and other primitive markings when found on the capstones or supports, are almost invariably on their inside, as, for example, at the dolmens of Keriaval, Kercado, Dol au Marchant, Gavr'inis (Morbihan), and the great tumulus at New Grange (Ireland). From its position in the centre of a large circular inclosnre no dolmen could be more suggestive of public sacrifices than that within the Giant's Ring near Belfast; yet nothing could be more inappropriate for snch a purpose than its capstone, which is in fact a large granite bonlder presenting on its upper side an nnusually rounded snrface.

No chronological sequence can be detected in the evolution of the rude stone monuments, with perhaps the exception of the primitive cist which gave origin to the allée couvertes, giant graves, etc., and these again to the tumnli with microlithic bnilt chambers. Much less can their appearance in different countries be said to indicate contemporaneity. The dolmens of Africa are often fonnd to contain objects peculiar to the Iron Age, and it is said that in some parts of India the people are still in the habit of erecting dolmens and other megalithic monnments. Scandinavian archæologists assign their dolmens exclnsively to the Stone Age. It wonld therefore appear as if a subsequent stage of degradation occnrred, when a tamer style of interment ensued, and the Bronze Age barrows replaced the dolmens, and these again gave way to the Iron Age burials—the ship-barrows and large tumuli of the vikings, as manifested in the three tumnli of Thor, Odin, and Freya at Gamla Upsala, and the Gokstad monnd on the Sandefiord, the scene of the recent discovery of the viking ship.

[1] *Compte Rendu du Congrés International d'Anth. et d'Arch., Bruxelles*, p. 408.

[2] *Société Jersèaise*, 9e *Bulletin*, 1884.

Literature.—Fergusson, *Rude Stone Monuments; Compte Rendu du Congrès International d' Anthropologie et de Archéologie Préhistoriques;* by G. de Mortillet, *Les Études Préhistoriques;* Lubbock, *Prehistoric Times; Inventaire des Monuments Mégalithiques de France;* Bonstetten, *Essai sur les Dolmens; Proceedings,* etc., of the various antiquarian societies. (R. MU.)

RUDOLPH I. (1218–1291), German king, eldest son of Albert IV., count of Hapsburg, was born on the 1st May, 1218. By marriage and in other ways he greatly extended his hereditary dominions, so that when he became king he was lord not only of Hapsburg but of the counties of Kyburg and Lenzburg and of the landgraviate of Alsace. At different times he carried on war with the bishop of Strasburg, the Abbot of St. Gall and the city of Basel. He was engaged in his second struggle with Basel in 1273 when Frederick, burgrave of Nuremberg, brought the intelligence that he had been elected to the German crown. Basel at once submitted, and Rudolph went to Aix la Chapelle, where he was crowned on the 28th October, 1273. The princes had become so independent during the Great Interregnum that they would have preferred to have no supreme ruler; but Pope Gregory X. had threatened that if they did not elect a king he would himself appoint one. The Pope now cordially supported Rudolph, who proved to be much more energetic than the electors had anticipated. Having secured the friendship of the palsgrave Louis and Duke Albert of Saxony by allowing them to marry his daughters, he advanced against Ottocar, king of Bohemia, and Henry, duke of Bavaria, both of whom had refused to do him homage. Henry was soon won over to the new king's side, and then Ottocar had to sue for peace. His request was granted only on condition that he should cede Austria, Styria, Carinthia, and Carniola. By and by Ottocar again rebelled, and was slain in 1278 in a battle fought on the Marchfield. Rudolph gave Bohemia and Moravia to Wenceslaus, Ottocar's son; but Austria, Styria, and Carniola he granted to his own sons Albert and Rudolph. Carinthia was given to Meinhard, count of Tyrol, who agreed that if his descendants in the male line died out the land should pass to Rudolph's family. Rudolph compelled Otho, count of Upper Burgundy, and other nobles, who tried to make themselves independent of the German crown, to acknowledge his supremacy; and he recovered certain fiefs in what is now Switzerland, which had been seized by the count of Savoy. He also restored peace in Bohemia, and gave his daughter in marriage to the young king, Wenceslaus. He often visited troubled parts of the kingdom, settling local disputes, and destroying the towers of robber barons. On the whole, his rule was a beneficent one, but he did not succeed in reëstablishing the authority of the crown, nor did he see how great an element of strength he might have found in an alliance with the cities. The electors he was forced to confirm in the possession of important rights, which were maintained under his successors. His reign is memorable chiefly because he was the founder of the greatness of the house of Hapsburg. In 1281 his first wife died, and in 1284 he married Elizabeth, daughter of Hugo IV., duke of Burgundy. He died at Germersheim on the 15th July, 1291.

See Lorenz, *Deutsche Geschichte im* 13 *und* 14 *Jahrh.* (1867); Huber, *Rudolf vor seiner Thronbesteigung* (in the *Almanach der kaiserlichen Akademie,* 1873); Hirn, *Rudolf von Habsburg* (1874.)

RUDOLPH II. (1552–1612), Holy Roman emperor, was the son of the emperor Maximilian II., and was born on the 18th July, 1552. In 1572 he obtained the crown of Hungary, in 1575 that of Bohemia, with the title "King of the Romans;" and in 1576, after his father's death, he became emperor. He was of an indolent and melancholy disposition, and preferred the study of astrology and alchemy to the responsibilities of government. He surrendered himself absolutely to the control of the Jesuits, under whose influence he had been brought up at the gloomy court of Spain; and in his hereditary lands they labored assiduously to destroy Protestantism. The Protestants were deprived of the right of public worship in Vienna and other towns; their schools were closed, and many of their preachers banished. Almost all public offices, too, were placed in the hands of Roman Catholics. In the lands which Rudolph ruled, not by hereditary right, but as emperor, his advisers could exercise less authority; but there also they did what they could to foster the Catholic reaction. In 1607 Maximilian, duke of Bavaria, was allowed to seize the imperial city Donauwörth, the Protestant inhabitants of which had quarrelled with the abbot. This and other high-handed proceedings alarmed the Protestants of Germany, and in 1608, under the leadership of Frederick IV., elector of the Palatinate, they formed a confederation called the Union for the protection of their interests. The Catholic princes, guided by Duke Maximilian of Bavaria, responded by forming the League. Civil war seemed inevitable, but it was postponed by the murder of Henry IV. of France, who had promised to support the Union, and by the death of the elector Frederick IV. Meanwhile, the greatest confusion prevailed in Hungary, due in part to religious oppression, in part to a war with the Turks. In 1604 the Hungarians rebelled, and peace was not restored until 1606, when Matthias, the emperor's brother, with the sanction of his younger brothers, who acknowledged him as head of the family, came to terms both with the Hungarians and with the sultan. Matthias allied himself with the Protestants, and compelled Rudolph to give up to him Hungary, Moravia, and the greater part of Austria. The emperor then tried to strengthen his position by granting to the nobles, knights, and towns of Bohemia perfect religious freedom, with the right to build Protestant churches and schools on their own and on the royal lands. Even after they had obtained the letter of majesty in which these concessions were embodied, the Bohemians did not trust Rudolph; and, when at his request the Archduke Leopold appeared in their country with an army, they invited Matthias to come to their aid. Matthias went, and the emperor had no alternative but to resign to him in 1611 the remainder of his hereditary territories. Rudolph died on the 20th January, 1612.

See Kurz, *Geschichte Oesterreichs unter Kaiser Rudolf* (1821); Gindely, *Rudolf II. und seine Zeit* (1863–65).

RUDOLSTADT, capital of the German principality of Schwarzburg-Rudolstadt, and chief residence of the prince, is situated on the left bank of the Saale, 18 miles due south of Weimar, in one of the most beautiful districts of Thuringia. The picturesque little town is a favorite summer watering place, with pine baths, as well as a frequented tourist resort. Besides containing the Government buildings of the little principality, Rudolstadt is fairly well provided with schools and other institutions, including a library of 60,000 volumes. The residence of the prince is in the Heidecksburg, a palace on an eminence 200 feet above the Saale, rebuilt after a fire in 1735, and containing various show apartments. The Ludwigsburg, another palace within the town, built in 1742, accommodates the natural history collections belonging to the prince. The principal church dates from the end of the 15th century. In the Anger, a tree-shaded public park between the town and the river, is the theatre. Various memorials in and near the town commemorate the visits of Schiller to the neighborhood in 1787 and 1788. The industries of the district include the manufacture of porcelain and of dyestuffs, wool spinning, and bell-founding. The population (4100 in 1817) was 8747 in 1880.

The name of Rudolstadt occurs in an inventory of the possessions of the Abbey of Hersfeld in the year 800. After passing through the possession of the German Emperor and of the rulers of Orlamünde and Weimar, it came into the hands of the dukes of Schwarzburg in 1355. Its town rights

were confirmed in 1404; and since 1599 it has been the residence of the ruling house.

RUEDA, Lope de. See Drama, vol. vii. p. 363.

RUFF, a bird so called from the very beautiful and remarkable frill of elongated feathers that, just before the breeding season, grow thickly round the neck of the male, who is considerably larger than the female, known as the Reeve. In many respect this species, the *Tringa pugnax* of Linnæus and the *Machetes pugnax* of the majority of modern ornithologists, is one of the most singular in existence, and yet its singularities have been very ill appreciated by zoological writers in general.[1] These singularities would require almost a

Ruff.

volume to describe properly. The best account of them is unquestionably that given in 1813 by Montagu (*Suppl. Orn. Dictionary*), who seems to have been particularly struck by the extraordinary peculiarities of the species, and, to investigate them, expressly visited the fens of Lincolnshire, possibly excited thereto by the example of Pennant, whose information, personally collected there in 1769, was of a kind to provoke further inquiry, while Daniel (*Rural Sports*, iii. p. 234) had added some other particulars, and subsequently Graves, in 1816, repeated in the same district the experience of his predecessors. Since that time the great changes produced by the drainage of the fen-country have banished this species from nearly the whole of it, so that Lubbock (*Obs. Fauna of Norfolk*, pp. 68–73) and Mr. Stevenson (*Birds of Norfolk*, ii. pp. 261–271) can alone be cited as modern witnesses of its habits in England, while the trade of netting or snaring Ruffs and fattening them for the table has for many years practically ceased.

The cock-bird, when out of his nuptial attire, or, to use the fenman's expression, when he has not "his show on," and the hen at all seasons, offer no very remarkable deviation from ordinary sandpipers, and outwardly[2] there is nothing, except the unequal size of the two sexes, to rouse suspicion of any abnormal peculiarity. But when spring comes all is changed. In a surprisingly short time the feathers clothing the face of the male are shed, and their place is taken by *papillæ* or small caruncles of bright yellow or pale pink. From each side of his head sprouts a tuft of stiff curled feathers, giving the appearance of long ears, while the feathers of the throat change color, and beneath and around it sprouts the frill or ruff already mentioned as giving the bird his name. The feathers which form this remarkable adornment, quite unique among birds, are, like those of the "ear-tufts," stiff and incurved at the end, but much longer—measuring more than two inches. They are closely arrayed, capable of depression or elevation, and form a shield to the front of the breast impenetrable by the bill of a rival.[3] More extraordinary than this, from one point of view, is the great variety of coloration that obtains in these temporary outgrowths. It has often been said that no one ever saw two Ruffs alike. That is perhaps an over-statement; but considering the really few colors that the birds exhibit, the variation is something marvellous, so that fifty examples or more may be compared without finding a very close resemblance between any two of them, while the individual variation is increased by the "ear-tufts," which generally differ in color from the frill, and thus produce a combination of diversity. The colors range from deep black to pure white, passing through chestnut or bay, and many tints of brown or ashy-gray, while often the feathers are more or less closely barred with some darker shade, and the black is very frequently glossed with violet, blue, or green—or, in addition, spangled with white, gray, or gold color. The white, on the other hand, is not rarely freckled, streaked, or barred with gray, rufous-brown, or black. In some examples the barring is most regularly concentric, in others more or less broken up or undulating, and the latter may be said of the streaks. It was ascertained by Montagu, and has since been confirmed by the still wider experience and if possible more carefully conducted observation of Mr. Bartlett, that every Ruff in each successive year assumes tufts and frill exactly the same in color and markings as those he wore in the preceding season; and thus, polymorphic as is the male as a species, as an individual he is unchangeable in his wedding-garment—a lesson that might possibly be applied to many other birds. The white frill is said to be the rarest.

That all this wonderful "show" is the consequence of the polygamous habit of the Ruff can scarcely be doubted. No other species of Limicoline bird has, so far as is known, any tendency to it. Indeed, in many species of *Limicolæ*, as the Dotterel, the Godwits (vol. x. p. 642), Phalaropes, and perhaps some others, the female is larger and more brightly colored than the male, who in such cases seems to take upon himself some at least of the domestic duties. Both Montagu and Graves, to say nothing of other writers, state that the Ruffs in England were far more numerous than the Reeves; and their testimony can hardly be doubted; though in Germany Naumann (*Vög Deutschland's*, vii. p. 544) considers that this is only the case in the earlier part of the season, and that later the females greatly outnumber the males. It remains to

[1] Mr. Darwin, though frequently citing (*Descent of Man and Sexual Selection*, i., pp. 270, 306; ii. pp. 41, 42, 48, 81, 84, 100, 111) the Ruff as a witness in various capacities, most unfortunately seems never to have had its peculiarities presented to him in such a form that he could fully perceive their bearings. However, the significance of the lesson that the Ruff may teach was hardly conceivable before he began to write; but the fact is not the less to be regretted that he never elucidated its importance, not only in regard to "Sexual Selection," but more especially with respect to "Polymorphism." He appears not to have consulted Montagu's original account of this bird, and seems to have known it only by the excerpt given by Macgillivray, in which were not included the important passages on the extreme diversity of plumage exhibited by the males—that author passing over this wonderful peculiarity in a paragraph of less than a score of lines.

[2] Internally there is great difference in the form of the posterior margin of the sternum, as long ago remarked by Nitzsch.

[3] This "ruff" has been compared to that of Elizabethan or Jacobean costume, but it is essentially different, since that was open in front and widest and most projecting behind, whereas the bird's decorative apparel is most developed in front and at the sides and scarcely exists behind.

say that the moral characteristics of the Ruff exceed even anything that might be inferred from what has been already stated. By no one have they been more happily described than by Wolley, in a communication to Hewitson (*Eggs of Brit. Birds*, 3d ed., p. 346), as follows :

"The Ruff, like other fine gentlemen, takes much more trouble with his courtship than with his duties as a husband. Whilst the Reeves are sitting on their eggs, scattered about the swamps, he is to be seen far away flitting about in flocks, and on the ground dancing and sparring with his companions. Before they are confined to their nests, it is wonderful with what devotion the females are attended by their gay followers, who seem to be each trying to be more attentive than the rest. Nothing can be more expressive of humility and ardent love than some of the actions of the Ruff. He throws himself prostrate on the ground, with every feather on his body standing up and quivering; but he seems as if he were afraid of coming too near his mistress. If she flies off, he starts up in an instant to arrive before her at the next place of alighting, and all his actions are full of life and spirit. But none of his spirit is expended in care for his family. He never comes to see after an enemy. In the [Lapland] marshes, a Reeve now and then flies near with a scarcely audible *ka-ka-kuk;* but she seems a dull bird, and makes no noisy attack on an invader."

Want of space forbids a fuller account of this extremely interesting species. Its breeding-grounds extend from Great Britain[1] across northern Europe and Asia ; but the birds become less numerous towards the east. They winter in India, reaching even Ceylon, and Africa as far as the Cape of Good Hope. The Ruff also occasionally visits Iceland, and there are several well-authenticated records of its occurrence on the eastern coast of the United States, while an example is stated (*Ibis*, 1875, p. 332) to have been received from the northern part of South America.

(A. N.)

RUFINUS, Tyrannius (Turranius, Toranus), the well-known contemporary of Jerome, was born at or near Aquileia about the year 345. In early life he studied rhetoric, and while still comparatively young he entered the cloister as a catechumen, receiving baptism about 370. About the same time a casual visit of Jerome to Aquileia led to the formation of a close and intimate friendship between the two students, and shortly after Jerome's departure for the East Rufinus also was drawn thither (in 372 or 373) by his interest in its theology and monasticism. He first settled in Egypt, hearing the lectures of Didymus, the Origenistic teacher at Alexandria, and also cultivating friendly relations with Macarius and other ascetics in the desert. In Egypt, if not even before leaving Italy, he had become intimately acquainted with Melania, a wealthy and devout Roman matron, who since the death of her husband had devoted all her means to religious and charitable works; and when she removed to Palestine, taking with her a number of clergy and monks on whom the persecutions of Valens had borne heavily, Rufinus ultimately (about 378) followed her. While his patroness lived in a convent of her own in Jerusalem, Rufinus, in close coöperation with her and at her expense, gathered together a number of monks in a monastery on the Mount of Olives, devoting himself at the same time with much ardor to the study of Greek theology. When Jerome came to reside at Bethlehem in 386 the friendship formed at Aquileia was renewed. Another of the intimates of Rufinus was John, bishop of Jerusalem, and formerly a Nitrian monk, by whom he was ordained to the priesthood in 390. In 394, in consequence of the attack upon the doctrines of Origen made by Epiphanius of Salamis during a visit to Jerusalem, a fierce quarrel broke out, which found Rufinus and Jerome ranged on different sides; and, though three years afterwards a formal reconciliation was brought about between Jerome and John through the intervention of third parties, the breach between Jerome and Rufinus remained unhealed.

In the autumn of 397 Rufinus embarked for Rome, where, finding that the theological controversies of the East were exciting much interest and curiosity, he published a Latin translation of the *Apology* of Pamphilus for Origen, and also (398–399) a somewhat free rendering of the *περὶ ἀρχῶν* of that author himself. In the preface to the latter work he had referred to Jerome as an admirer of Origen, and as having already translated some of his works; this allusion proved very annoying to the subject of it, who was now exceedingly sensitive as to his reputation for orthodoxy, and the consequence was a bitter pamphlet war, very wonderful to the modern onlooker, who finds it difficult to see anything discreditable in the accusation against a Biblical scholar that he had once thought well of Origen, or in the countercharge against a translator that he had avowedly exercised editorial functions as well. Some time during the pontificate of Anastasius (398–402) Rufinus was summoned from Aquileia to Rome to vindicate his orthodoxy, but he excused himself from personal attendance in a written *Apologia pro fide sua;* the pope in his reply expressly condemned Origen, but leniently left the question of Rufinus's orthodoxy to his own conscience. In 408 we find Rufinus at the monastery of Pinetum (in the Campagna ?) ; thence he was driven by the arrival of Alaric to Sicily, being accompanied by Melania in his flight. In Sicily he was engaged in translating the *Homilies* of Origen when he died in 410.

The original works of Rufinus are—(1) *De Adulteratione Librorum Origenis*—an appendix to his translation of the *Apology* of Pamphilus, and intended to show that many of the features in Origen's teaching which were then held to be objectionable arise from interpolations and falsifications of the genuine text; (2) *De Benedictionibus XII Patriarcharum Libri II*,—an exposition of Gen. xlix.; (3) *Apologia s. Invectivarum in Hieronymum Libri II.;* (4) *Apologia pro Fide Sua ad Anastasium Pontificem;* (5) *Historia Eremitica*—consisting of the lives of thirty-three monks of the Nitrian desert; (6) *Expositio Symboli*. The *Historiæ Ecclesiasticæ Libri XI* of Rufinus consist partly of a free translation of Eusebius (10 books in 9) and partly of a continuation (bks. x. and xi.) down to the time of Theodosius the Great. The other translations of Rufinus are—(1) the *Instituta Monachorum* and some of the *Homilies* of Basil; (2) the *Apology* of Pamphilus, referred to above; (3) Origen's *Principia;* (4) Origen's *Homilies* (Gen.-Kings, also Cant. and Rom.); (5) *Opuscula* of Gregory of Nazianzus; (6) the *Sententiæ* of Sixtus, an unknown Greek philosopher; (7) the *Sententiæ* of Evagrius; (8) the *Clementine Recognitions* (the only form in which that work is now extant; (9) the *Canon Paschalis* of Anatolius Alexandrinus.

Vallarsi's uncompleted edition of Rufinus (vol. i., fol., Verona, 1745) contains the *De Benedictionibus*, the *Apologies*, the *Expositio Symboli*, the *Historia Eremitica*, and the two original books of the *Hist. Eccl.* See also Migne, *Patrol.* (vol. xxi. of the Latin series). For the translations, see the various editions of Origen, Eusebius, etc.

RUGBY, a market-town of Warwickshire, is finely situated on a table-land rising from the southern bank of the Avon, at the junction of several railway lines, and near the Grand Junction Canal, 30 miles E.S.E. of Birmingham, and 20 S.S.W. of Leicester. It is a well-built town, with a large number of modern houses erected for private residences. It occupies a gravel site, is well drained, and has a good supply of water. It owes its importance to the grammar school, built and endowed by Laurence Sheriff, a merchant grocer and servant to Queen Elizabeth, and a native of the neighboring village of Brownsover. The endowment consisted of the parsonage of Brownsover, Sheriff's mansion house in Rugby, and one-third (8 acres) of his estate in Middlesex, near the Foundling Hospital, London, which, being let on building leases, gradually increased to about £5000 [$24,300] a year. The full endowment was obtained in 1653. The school originally stood opposite the parish church, and was removed to its present site on the south side of the town between 1740 and 1750. In 1809 it was rebuilt from designs

[1] In England of late years it has been known to breed only in one locality, the name or situation of which it is not desirable to publish.

by Hakewill; the chapel, dedicated to St. Lawrence, was added in 1820. At the tercentenary of the school in 1867 subscriptions were set on foot for founding scholarships, building additional schoolrooms, rebuilding or enlarging the chapel, and other objects. The chapel was rebuilt and reconsecrated in 1872. A swimming bath was erected in 1876; the Temple observatory, containing a fine equatorial refractor by Alvan Clark, was built in 1877, and the Temple reading room with the art museum in 1878. The workshops underneath the gymnasium were opened in 1880, and a new big school and class rooms were erected in 1885. There are three major and four minor exhibitions for students to any university in the United Kingdom. From about 70 in 1777 the numbers attending the school have increased to over 400. A great impulse was given to the progress of the school during the headmastership of Dr. Arnold, 1827–1842. The best known of Arnold's successors are Tait, afterwards archbishop of Canterbury, and Temple, the present bishop of London. The parish church of St. Andrew's is, with the exception of the tower and the north arcade in the nave, entirely modern, having been built from designs by Mr. Butterfield at a cost of £22,000 [$106,920], and reconsecrated in 1879. The daughter church of the Holy Trinity, a handsome building by Sir Gilbert Scott, in close proximity to St. Andrew's, was erected in 1853. St. Marie's Catholic Church is in the Early English style. A town-hall was erected in 1858, at a cost of £7000 [34,020]. There are a number of charities, including Laurence Sheriff's almshouses (founded 1567), Elborow's almshouses (1707), Miss Butlin's almshouses (1851), and the hospital of St. Cross, opened in 1884, at a cost of £20,000 [$97,200]. A public recreation ground was provided by the local government board in 1877. The town has an important cattle market. The population of the urban sanitary district (area 1617 acres) in 1871 was 8385, and in 1881 it was 9891.

Rugby was originally a hamlet of the adjoining parish of Clifton-on-Dunsmore, and is separately treated of as such in Domesday Book. Ernaldus de Boseo (Ernald de Bois), lord of the manor of Clifton, seems to have erected the first chapel in Rugby, in the reign of Stephen, about 1140. It was afterwards granted by him, with certain lands, to endow the abbey of St. Mary, Leicester, which grant was confirmed by his successors and by royal charter of Henry II. In the second year of King John (1200) a suit took place between Henry de Rokeby, lord of the manor of Rugby, and Paul, abbot of St. Mary, Leicester, which resulted in the former obtaining possession of the advowson of Rugby, on condition of homage and service to the abbot of Leicester. By virtue of this agreement the chapel was converted into a parish church, and the vicarage into a rectory. In 1350 Ralph, Lord Stafford, became possessed of the manor and advowson of Rugby, and considerably enlarged the parish church. Subsequent alterations, notably in 1814 and 1831, left little of this structure remaining except the tower and north arcade in the nave. The advowson of Rugby is now the property of the earl of Craven; and the late rector was widely known and honored as "the poet pastor," John Moultrie.

RUGE, Arnold (1803–1880), German philosophical and political writer, was born at Bergen, in the island of Rügen, on the 13th September, 1803. He studied at Halle, Jena, and Heidelberg, and became an enthusiastic adherent of the party which sought to create a free and united Germany. For his zeal in this cause he had to spend five years in the fortress of Kolberg, where he devoted himself to the study of classical writers, especially Plato and the Greek poets. On his release in 1830, he published *Schill und die Seinen*, a tragedy, and a translation of *Œdipus in Colonus*. Ruge settled in Halle, where in 1838, in association with his friend Echtermayer, he founded the *Hallesche Jahrbücher für deutsche Kunst und Wissenschaft*. In this periodical, which soon took a very high place, he discussed all the great questions which were then agitating the best minds in Europe, dealing with them from the point of view of the Hegelian philosophy, interpreted in the most liberal sense. The *Jarbücher* was detested by the orthodox party in Prussia; but, as it was published in Leipsic, the editors fancied that it was beyond the reach of the Prussian Government. In 1840, however, soon after the accession of King Frederick William IV., they were ordered, on account of the name of the periodical, to have it printed in Halle, subject to the censorship there. Thereupon Ruge went to Dresden, and the *Jahrbücher* (with which Echtermayer was no longer connected) continued to appear in Leipsic, but with the title *Deutsche Jahrbücher*, and without the names of the editors. It now became more liberal than ever, and in 1843 was suppressed by the Saxon Government. In Paris Ruge tried to act with Karl Marx as co-editor of the *Deutsch-Französische Jahrbücher*, but the two friends soon parted, Ruge having little sympathy with Marx's socialist theories. Ruge next associated himself with a publishing firm in Zürich, and when it was put down he attempted to establish a firm of his own in Leipsic, but his scheme was thwarted by the Saxon Government. In the revolutionary movement of 1848 Ruge played a prominent part. He organized the Extreme Left in the Frankfort parliament, and for some time he lived in Berlin as the editor of the *Reform*, in which he advocated the opinions of the Left in the Prussian National Assembly. The career of the *Reform* being cut short by the Prussian Government, Ruge soon afterwards visited Paris, hoping to establish, through his friend Ledru-Rollin, some relations between German and French republicans; but in 1849 both Ledru-Rollin and Ruge had to take refuge in London. Here, in company with Mazzini and other advanced politicians, they formed a "European Democratic Committee." From this committee Ruge soon withdrew, and in 1850 he went to Brighton, where he supported himself by working both as a teacher in schools and as a writer. He took a passionate interest in the events of 1866 and 1870, and as a publicist vigorously supported the cause of Prussia against Austria, and that of Germany against France. In his last years he received from the German Government a pension of 3000 marks [$720]. He died on the 31st December, 1880.

Ruge was a man of generous sympathies and an able writer, but he did not produce any work of enduring importance. In 1846–48 his *Gesammelte Schriften* were published in ten volumes. After this time he wrote, among other books, *Unser System*, *Revolutionsnovellen*, *Die Loge des Humanismus*, and *Aus früherer Zeit* (his memoirs). He also wrote many poems, and several dramas and romances, and translated into German various English works, including the *Letters of Junius* and Buckle's *History of Civilization*.

RÜGEN, the largest island belonging to Germany, is situated in the Baltic Sea, immediately opposite the town of Stralsund, 1½ miles off the northwest coast of Pomerania in Prussia, from which it is separated by the narrow Strelasund. Its shape is exceedingly irregular, and its coast-line is broken by very numerous bays and peninsulas, sometimes of considerable size. The general name is applied by the natives only to the roughly triangular main trunk of the island, while the larger peninsulas, the landward extremities of which taper to very narrow necks of land, are considered to be as distinct from Rügen as the various adjacent smaller islands which are also statistically included under the name. The chief peninsulas are those of Jasmund and Wittow on the north, and Mönchgut, at one time the property of the monastery of Eldena, on the southeast; and the chief neighboring islands are Ummanz and Hiddensoe, both off the northwest coast. The greatest length of Rügen from north to south is 32 miles; its greatest breadth is 25½ miles; and its area is 377 square miles. The surface gradually rises towards the west to Rugard (335 feet), the "eye of Rügen," near Bergen, but the highest point is the Herthaburg (505 feet) in Jasmund. Erratic blocks are scattered throughout the island, and the roads are

made with granite. Though much of Rügen is flat and sandy, the fine beech-woods which cover great part of it and the northern coast scenery combine with the convenient sea-bathing offered by the various villages round the coast to attract large numbers of visitors annually. The most beautiful and attractive part of the island is the peninsula of Jasmund, which terminates to the north in the Stubenkammer (from two Slavonic words meaning "rock steps"), a sheer chalk cliff by the sea, the summit of which, known as the Königsstuhl, is 420 feet above sea-level. The east of Jasmund is clothed with an extensive beech-wood called the Stubbenitz, in which lies the Burg or Hertha Lake. Connected with Jasmund only by the narrow isthmus of Schabe to the west is the peninsula of Wittow, the most fertile part of the island. At its northwest extremity rises the height of Arcona, with a lighthouse.

The official capital of the island is Bergen (3662 inhabitants), connected since 1883 with Stralsund by a railway and ferry. The other chief places are Garz (2014), Sagard (1447), Gingst (1285), and Putbus (1752). The last is the old capital of a barony of the princes of Putbus. Sassnitz, Göhren, and Putbus are among the favorite bathing resorts. Schoritz was the birthplace of the patriot and poet, Arndt (1769–1860). Ecclesiastically, Rügen is divided into 27 parishes, in which the pastoral succession is said to be almost hereditary. The inhabitants are distinguished from those of the mainland by peculiarities of dialect, costume, and habits; and even the various peninsulas differ from each other in these particulars. The peninsula of Mönchgut has best preserved its peculiarities; but there too primitive simplicity is yielding to the influence of the annual stream of summer visitors. The inhabitants rear some cattle, and Rügen has long been famous for its geese; but the only really considerable industry is fishing,—the herring-fishery being especially important. Rügen, with the neighboring islands, forms a governmental department, with a population (1880) of 46,115.

The original Germanic inhabitants of Rügen were dispossessed by Slavs; and there are still various relics of the long reign of paganism that ensued. In the Stubbenitz and elsewhere Huns' or giants' graves (see p. 58, *supra*) are common; and near the Hertha Lake are the ruins of an ancient edifice which some have sought (though perhaps erroneously) to identify with the shrine of the heathen deity Hertha or Nerthus, referred to by Tacitus. On Arcona in Wittow are the remains of an ancient fortress, enclosing a temple of the four-headed god Svantevit, which was destroyed in 1168 by the Danish king Waldemar I., when he made himself master of the island. From that date until 1325 Rügen was ruled by a succession of native princes, at first under Danish supremacy; and, after being for a century and a half the possession of a branch of the ruling family in Pomerania, it was finally united with that province in 1478, and passed with it into the possession of Sweden in 1648. With the rest of Western Pomerania Rügen has belonged to Prussia since 1815.

RUHNKEN, David (1723–1798), one of the most illustrious scholars of the Netherlands, was of German origin, having been born in Pomerania in 1723. His parents had him educated for the church, but after a residence of two years at the university of Wittenberg, he determined to live the life of a scholar. His biographer (Wyttenbach) somewhat quaintly exhorts all studious youths who feel the inner call as Ruhnken did to show the same boldness in crossing the wishes of their parents. At Wittenberg, Ruhnken lived in close intimacy with the two most distinguished professors, Ritter and Berger, who fired his passion for things ancient, and guided his studies. To them he owed a thorough grounding in ancient history and Roman antiquities and literature; and from them he learned what distinguished him among the scholars of his time, a pure and at the same time a vivid Latin style. At Wittenberg, too, Ruhnken derived valuable mental training from study in mathematics and Roman law. Probably nothing would have severed him from his surroundings there but a desire which daily grew upon him to explore the inmost recesses of Greek literature. Neither at Wittenberg nor at any other German university was Greek in that age seriously studied. It was taught in the main to students in divinity for the sake of the Greek Testament and the early fathers of the church,—taught as a necessary appendage to Hebrew and Syriac, and generally by the same professors. F. A. Wolf is the real creator of Greek scholarship in modern Germany, and Porson's gibe that "the Germans in Greek are sadly to seek" was barbed with truth. It is significant of the state of Hellenic studies in Germany in 1743 that their leading exponents were Gesner and Ernesti. Ruhnken was well advised by his friends at Wittenberg to seek the university of Leyden, where, stimulated by the influence of Bentley, the great scholar Tiberius Hemsterhuis had founded the only real school of Greek learning which had existed on the Continent since the days of Joseph Scaliger and Isaac Casaubon.

Perhaps no two men of letters ever lived in closer friendship than Hemsterhuis and Ruhnken during the twenty-three years which passed from Ruhnken's arrival in the Netherlands in 1743 to the death of Hemsterhuis in 1766. A few years made it clear that Ruhnken and Valckenaer were the two pupils of the great master on whom his inheritance must devolve. As his reputation spread, many efforts were made to attract Ruhnken back to Germany, but the air of freedom which he drew in the Netherlands was more to him than all the flesh-pots his native land could offer. Indeed, after settling in Leyden, he only left the country once, when he spent a year in Paris, ransacking the public libraries (1755). For work achieved, this year of Ruhnken may compare even with the famous year which Ritschl spent in Italy. In 1757 Ruhnken was appointed lecturer in Greek, to assist Hemsterhuis, and in 1761 he succeeded Oudendorp, with the title of "ordinary professor of history and eloquence," but practically as Latin professor. This promotion drew on him the enmity of some native Netherlanders, who deemed themselves (not without some show of reason) to possess stronger claims for a chair of Latin. The only defence made by Ruhnken was to publish works on Latin literature which eclipsed and silenced his rivals. In 1766 Valckenaer succeeded Hemsterhuis in the Greek chair. The intimacy between the two colleagues was only broken by Valckenaer's death in 1785, and stood without strain the test of common candidature for the office (an important one at Leyden) of university librarian, in which Ruhnken was successful. Ruhnken's later years were clouded by severe domestic misfortune, and by the political commotions which, after the outbreak of the war with England in 1780, troubled the Netherlands without ceasing, and threatened to extinguish the university of Leyden. The year of Ruhnken's death was 1798.

Personally, he was as far as possible removed from being a recluse or a pedant. He had a well-knit and even handsome frame, attractive manners (though sometimes tinged with irony), and a nature simple and healthy, and open to impressions from all sides. Fond of society, he cared little to what rank his associates belonged, if they were genuine men in whom he might find something to learn. His biographer even says of him in his early days that he knew how to sacrifice to the Sirens without proving traitor to the Muses. Life in the open air had a great attraction for him; he was fond of sport, and would sometimes devote to it two or three days in the week. In his bearing towards other scholars Ruhnken was generous and dignified, distributing literary aid with a free hand, and meeting onslaughts for the most part with a smile. It would be difficult to point out in the history of scholarship the name of another man who so thoroughly possessed the *savoir vivre*.

In the records of learning Ruhnken occupies an im-

portant position. He forms a principal link in the chain which connects Bentley with the modern scholarship of the Continent. The spirit and the aims of Hemsterhuis, the great reviver of Continental learning, were committed to his trust, and were faithfully maintained. He greatly widened the circle of those who valued taste and precision in classical scholarship. He powerfully aided the emancipation of Greek studies from theology; nor must it be forgotten that he first in modern times dared to think of rescuing Plato from the hands of the professed philosophers—men presumptuous enough to interpret the ancient sage with little or no knowledge of the language in which he wrote.

Ruhnken's principal works are editions of (1) Timæus's *Lexicon of Platonic Words*, (2) Thalelæus and other Greek commentators on Roman law, (3) Rutilius Lupus and other grammarians, (4) Velleius Paterculus, (5) the works of Muretus. He also occupied himself much with the history of Greek literature, particularly the oratorical literature, with the Homeric hymns, the scholia on Plato, and the Greek and Roman grammarians and rhetoricians. A discovery famous in its time was that in the text of the work of Apsines on rhetoric a large piece of a work by Longinus was embedded. Recent views of the writings attributed to Longinus have lessened the interest of this discovery without lessening its merit. The biography of Ruhnken was written by his great pupil Wyttenbach, soon after his death.

(J. S. R.)

RUHRORT, a busy trading town in Prussia, is situated at the junction of the Ruhr and Rhine, in the midst of a productive coal district, 15 miles north of Düsseldorf. Ruhrort has the largest river harbor in Germany, with very extensive quays; and most of the 1½ million tons of coal which are annually exported from the neighborhood are despatched in a fleet of steam-tugs and barges which belong to the port. About one-half of the coal goes to Holland, and the rest to towns on the upper Rhine. Grain and timber are also exported. In 1881 11,282 craft, carrying 1,791,213 tons, left the harbor. The goods traffic between Ruhrort and Homberg on the opposite bank of the Rhine is carried on by large steam ferry boats, in which the railway wagons are placed with the help of towers, 128 feet high, on each side of the river. The industries of the town include active shipbuilding, iron and tin working, and the making of cordage and machinery. The inhabitants numbered 1443 in 1816, and 9130 in 1880. Ruhrort formerly belonged to Cleves; it received town rights in 1587.

RULHIÈRE, or RULHIÈRES, CLAUDE CARLOMAN DE (1735–1791), poet and historian, was born at Bondy in 1735, and died at Paris in 1791. He was for a time a soldier, and served under Richelieu in Germany. But at twenty-five he accompanied Breteuil to St. Petersburg as secretary of legation. Here he actually saw the revolution which seated Catherine II. on the throne, and thus obtained the facts of his best-known and best work, the short sketch called *Anecdotes sur la Revolution de Russie en* 1762. It was not published till after the empress's death. The later years of Rulhière's life were spent either in Paris, where he held an appointment in the foreign office and went much into society, or else in travelling over Germany and Poland. The distracted affairs of this latter country gave him the subject of his longest work, *Histoire de l'Anarchie de Pologne* (1807), which was never finished, and which the patriotism of its latest editor, M. Ostrowski, has rather unjustifiably rebaptized *Révolutions de Pologne*. Rulhière was made an Academician in 1787. Besides the historical works mentioned, he wrote one on the Revocation of the Edict of Nantes (1788).

Rulhière as an historian has much merit of style and arrangement, and the short sketch of the Russian revolution is justly ranked among the masterpieces of the kind in French. Of the larger *Poland* Carlyle, as justly, complains that its allowance of fact is too small in proportion to its bulk. The author was also a fertile writer of *vers de société*, short satires, epigrams, etc., which show much point and polish, and he had a considerable reputation among the witty and ill-natured group also containing Chamfort, Rivarol, Champcenetz, etc. On the other hand he has the credit of being long and disinterestedly assiduous in caring for J. J. Rousseau in his morose old age, until Rousseau as usual quarrelled with him.

Rulhière's works were published by Anguis in 1819 (Paris, 6 vols. 8vo). The *Russian Revolution* may be found in the *Chefs-d'œuvre Historiques* of the Collection Didot, and the *Poland*, with title altered as above, in the same collection.

RUM is a spirituous liquor, prepared from molasses, skimmings of the boiling house, and other saccharine bye-products, and the refuse juice of the cane-sugar manufacture. Its distillation, which is a simple process, may be conducted in connection with any cane-sugar establishment, but the rum which comes to the American and European markets is chiefly the produce of the West India Islands and Guiana. The ordinary method of working in the West Indies is the following. A wash is prepared consisting of sugar skimmings 4 parts, lees of still or dunder 5 parts, and molasses 1 part, the quantity prepared being equal to the capacity of the still in use. Dunder consists of the residue of the still from previous distillations, and it takes the place of a ferment, besides which the acetic acid it contains, derived from the fermenting wash of previous operations, has a favorable influence on the progress of attenuation. The wash prepared as above is placed in the fermenting vat, where, according to weather and other conditions, the fermentation proceeds more or less briskly; but usually a week or ten days is the period required for attenuation, during which time the scum formed is removed from the surface of the vat twice daily. When sufficiently attenuated, the wash is run into the still, which is generally of a simple construction, and distilled off, the first product being "low wines," which on redistillation come over as "high wines" or strong rum. When a Pontefex still is used, which contains two intermediate "retorts" between the still and the worm, a strong spirit is obtained at the first distillation. The charge of wash yields from 10 to 12 per cent. of rum, of an average strength of 25° over proof. Pure distilled rum is an entirely colorless liquid, but as imported and sold it generally has a deep brown color imparted by caramel or by storage in sherry casks. It has a peculiar aroma, derived principally from the presence of a minute proportion of butyric ether. Rum varies very considerably in quality, the finest being known as Jamaica rum, whether it is the product of that island or not. An inferior quality of rum is known among the French as *tafia;* and the lowest quality, into the wash for which débris of sugar cane enters, is called negro rum, and is mostly consumed by the colored workers in the sugar houses and distilleries. The planters sometimes put rinds and slices of pine-apple into the barrels in which rum is matured, to improve and add to its flavor, and occasionally anise and other flavoring ingredients are also used. The spirit prepared from molasses of beet-sugar factories cannot be classed with rum. The product has a highly disagreeable odor and taste, and it can only be rendered fit for consumption by repeated distillation and concentration to a high degree of strength, whereby the spirit is rendered "silent," or has only a faint rum flavor. In this condition it is used for mixing with strongly flavored rum, and for the preparation of a fictitious rum, the flavor of which is due to "rum essence,"—a mixture of artificial ether, birch bark oil, and other substances. Cane-sugar molasses enters largely into the materials from which ARRACK (*q.v.*), the spirit of Java and the Indian Archipelago, is prepared, but its flavor depends more on palm-tree toddy, which also is a constituent of the wash. The imports of rum into the United Kingdom and the home consumption have been decreasing for a number of years.[1]

[1] *Rum Shrub* is a kind of liqueur, or cold punch, the basis of which is rum, lemon juice, and sugar. It is prepared by adding

RUMFORD, Count. See Thompson, Sir Benjamin.

RÚMÍ. Mohammed b. Mohammed b. Husain albalkhí, better known as Mauláná Jalál-uddín Rúmí, the greatest Súfic poet of Persia, was born on the 30th of September, 1207 (604 A.H. 6th of Rabí' I.) at Balkh, in Khorásán, where his family had resided from time immemorial, rich in property and public renown. He claimed descent from the caliph Abúbekr, and from the Khwárism sháh Sultán 'Alá-uddín b. Tukush (1199–1220), whose only daughter, Malika-i-Jahán, had been married to Jalál-uddín's grandfather. Her son, Mohammed, commonly called Bahá-uddín Walad, was a famous doctor of Balkh, who, to escape the jealousy with which the sultan viewed his influence, emigrated to Asia Minor in 1212. Young Jalál-uddín was only five years old at that time, but the signs of his future greatness in spiritual matters began already to manifest themselves in precocious knowledge and in ecstasies and visions. After residing for some time at Malatíyah and afterwards at Erzinján in Armenia, Bahá-uddín was called to Lárindah in Asia Minor, as principal of the local college, and there young Jalál-uddín, who had meanwhile grown under the careful tuition of his father in wisdom and holiness, attained his maturity, and married in 1226 Jauhar Khátún, the daughter of Lálá Sharaf-uddín of Samarkand. Finally, Bahá-uddín was invited to Iconium by 'Aláuddín Kaikubád (1219–1236), the sultán of Asia Minor, or, as it is commonly called in the East, Rúm,—whence Jalál-uddín's surname (*takhallus*) Rúmí.

After Bahá-uddín's death in 1231, Jalál-uddín went to Aleppo and Damascus for a short time to study, but, as the mere positive sciences in which he had been particularly trained failed to satisfy him, on his return to Iconium, where he became by and by professor of four separate colleges, he took for nine years as his spiritual guide Sayyid Burhán-uddín Husainí of Tirmidh, one of his father's disciples, and later on the wandering Súfí Shams-uddín of Tabríz, who arrived in Iconium on the 29th of November, 1244, and soon acquired the most powerful influence over Jalál-uddín, who even adopted his name as takhallus in his ghazals or mystic odes. Shams-uddín's rather aggressive character, however, roused the indignation of the people of Iconium against him, and during a riot in which Jalál-uddín's eldest son, 'Alá-uddín, was killed, he was arrested and probably executed; at least he was no more seen. This fate of his teacher and friend, together with the untimely death of his son, threw Jalál-uddín into deep melancholy, and in remembrance of these victims of popular wrath he founded the order of the Maulawí or (in Turkish pronunciation) Mewlewí dervishes, famous for their piety as well as for their peculiar garb of mourning, their music and their mystic dance (samá), which is the outward representation of the circling movement of the spheres, and the inward symbol of the circling movement of the soul caused by the vibrations of a Súfí's fervent love to God. The establishment of this order, which still possesses numerous cloisters throughout the Turkish empire, and the leadership of which has been kept in Jalál-uddín's family in Iconium uninterruptedly for the last six hundred years, gave a new stimulus both to the zeal and energy and the poetical inspiration of the great shaikh. Most of his matchless odes, in which he soars on the wings of a genuine enthusiasm, high over earth and heaven up to the throne of Almighty God, were composed in honor of the Maulawí dervishes, and even his *opus magnum*, the *Mathnawí* or, as it is usually called, *The Spiritual Mathnawí* (mathnawí-i-ma'nawí), a production of the highest poetical and religious intuition in six books or daftars, with 30,000 to 40,000 double rhymed verses, can be traced to the same source. The idea of this immense collection of ethical and moral precepts, interwoven with numerous anecdotes and comments on verses of the Korán and sayings of the Prophet, which the Eastern world reveres as the greatest devotional work, the study of which secures eternal bliss, was first suggested to the poet by his favorite disciple Hasan, better known as Husám-uddín, who became in 1258 Jalál-uddín's chief assistant. He had frequently observed that the members of the Maulawí fraternity read with great delight the mystic mathnawís of Saná'í and Faríd-uddín 'Áttár, and induced his master to compose a similar poem on a larger scale. Jalál-uddín readily fell in with this suggestion and dictated to him, with a short interruption, the whole work during the remaining years of his life. Soon after the completion of this masterpiece Jalál-uddín died on the 17th of December, 1273 (672 A.H. 5th of Jumádá II.), worshipped as a saint by high and low. His first successor in the rectorship of the Maulawí fraternity was Husám-uddín himself, after whose death in 1284 Jalál-uddín's younger and only surviving son, Shaikh Baháudd-ín Ahmed, commonly called Sultán Walad, and favorably known as author of the mystical mathnawí, *Rabábnáma*, or the Book of the Guitar (died 1312), was duly installed as grand-master of the order.

Jalál-uddín's life is fully described in Shams-uddín Ahmed Aflákí's *Manákib-ul'árifín* (written between 718 and 754 A.H.), the most important portions of which have been translated by J. W. Redhouse in the preface to his English metrical version of *The Mesnevi, Book the First* (London, 1881; Trübner's Oriental series). Complete editions have been printed in Bombay, Lucknow, Tabriz, Constantinople, and in Bulak (with a Turkish translation, 1268 A.H.), at the end of which a seventh daftar is added, the genuineness of which is refuted by a remark of Jalál-uddín himself in one of the Bodleian copies of the poem, Ouseley, 294 (f. 328*a sq.*). The revised edition by 'Abd-ullatíf (made between 1024 and 1032 A.H.) is still unpublished, but the same author's commentary on the *Mathnawí*, *Latá'if-ulma'nawí*, and his glossary, *Latá'if-allughát*, have been lithographed in Cawnpore (1876) and Lucknow (1877) respectively, the latter under the title *Farhang-i-mathnawí*. For the other numerous commentaries and for further biographical and literary particulars of Jalál-uddín see Rieu's *Cat. of the Persian MSS. of the Brit. Mus.*, vol. ii. p. 584 *sq.*; A. Sprenger's *Oudh Cat.*, p. 489; Sir Gore Ouseley, *Notices of Persian Poets*, p. 112 *sq.*; and H. Ethé, in *Morgenländische Studien*, Leipsic, 1870, p. 95 *sq.* Select poems from Jalál-uddín's díwán (often styled *Díwán-i-Shams-i-Tabríz*) have been translated in German verse by V. von Rosenzweig, Vienna, 1838. (H. E.)

RUMINANTS. See Mammalia, vol. xv. p. 435.

RÜMKER, Carl Ludwig Christian (1788–1862), German astronomer, was born in Mecklenburg on May 28, 1788. He served in the British navy for some years until 1817; in 1821 he went to New South Wales as astronomer at the observatory built at Parramatta by Sir Thomas Brisbane (see Observatory, vol. xvii. p. 737.) He returned to Europe in 1831, and took charge of the school of navigation at Hamburg and the observatory attached to it. His principal work is a *Catalogue* of 12,000 fixed stars from meridian observations made at Hamburg, published in 1843. In 1857 he retired and went to reside in Lisbon, where he died on December 21, 1862.

RUNCIMAN, Alexander (1736–1785), historical painter, was born in Edinburgh in 1736. He studied at the Foulis's Academy, Glasgow, and at the age of thirty proceeded to Rome where he spent five years. It was at this time that he became acquainted with Fuseli, a kindred spirit, between whose productions and those of Runciman there is a marked similarity. The painter's earliest efforts had been in landscape;

to 34 gallons of proof rum 2 oz. of the essential oil of orange and an equal quantity of essential oil of lemon dissolved in one quart of spirit, and 300 lb of refined sugar dissolved in 20 gallons of water. This combination is thoroughly mixed together, after which there is added sufficient orange juice or solution of tartaric acid to produce a slight pleasant acidity. After agitating the mixture again for some time, 20 gallons of water are added, bringing the quantity up to 100 gallons, and the agitation of the whole is continued for half an hour. In about a fortnight's time the shrub should be brilliant and ready for bottling. Other flavoring ingredients are occasionally added, and the compound may be varied according to taste.

"other artists," it was said of him, "talked meat and drink, but he talked landscape." He soon, however, turned to historical and imaginative subjects, exhibiting his Nausicaa at Play with her Maidens in 1767 at the Free Society of British Artists, Edinburgh. On his return from Italy, after a brief residence in London, where in 1772 he exhibited in the Royal Academy, he settled in Edinburgh, and was appointed master of the Trustees' Academy. He was patronized by Sir James Clerk, whose hall at Penicuik House he decorated with a series of subjects from Ossian. He also executed various religious paintings and an altarpiece in the Cowgate Episcopal Church, Edinburgh, and easel pictures of Cymon and Iphigenia, Sigismunda Weeping over the Heart of Tancred, and Agrippina Landing with the Ashes of Germanicus. He died in Edinburgh on October 4, 1785. His works, while they show high intention and considerable imagination, are frequently defective in form and extravagant in gesture.

RUNCIMAN, John (1744–1766), historical painter, a younger brother of the above, accompanied him to Rome, and died at Naples in 1766. He was an artist of great promise. His Flight into Egypt, in the National Gallery of Scotland, is remarkable for the precision of its execution and the mellow richness of its coloring.

RUNCORN, a market-town and seaport of Cheshire, is pleasantly situated on the south side of the Mersey and near the terminus in that river of the Bridgewater, the Mersey and Irwell, and the Trent and Mersey Canals, 15 miles S.E. of Liverpool and 15 N. E. Chester. The Mersey, which here contracts to 400 yards at high water, is crossed by a wrought-iron railway bridge 1500 feet in length. The modern prosperity of the town dates from the completion in 1773 of the Bridgewater Canal, which here descends into the Mersey by a succession of locks. The town was made an independent landing port in 1847, and within recent years large additions have been made to the docks and warehouses. The town possesses shipbuilding yards, iron founderies, rope works, tanneries, and soap and alkali works. The population of the urban sanitary district (area 1490 acres) in 1871 was 12,443, and in 1881 it was 15,126.

Owing to the Mersey being here fordable at low water, the place was in early times of considerable military importance. On a rock which formerly jutted some distance farther into the Mersey Ethelfleda erected a castle in 916, but of the building there are now no remains. She is also said to have founded a town, but probably it soon afterwards fell into decay, as it is not noticed in Domesday. The ferry is noticed in a charter in the 12th century.

RUNE. See Alphabet, vol. i. pp. 534, 538, and Scandinavian Languages.

RUNEBERG, Johan Ludwig (1804–1877), Swedish poet, was born at Jakobstad, in Finland, on the 5th of February, 1804. Brought up by an uncle at Uleåborg, he entered the university of Åbo in the autumn term of 1822, and in 1826 began to contribute verses to the local newspapers. In the spring of 1827 he received the degree of doctor of philosophy, and shared in the calamity which, in September of the same year, destroyed the city and university of Åbo with fire. Runeberg accepted a tutorship at Saarijärvi, in the interior of Finland, where he remained for three years, studying hard and writing actively. The university had been removed after the great fire to Helsingfors, and in 1830 the young poet returned thither, as amanuensis to the council of the university. In the same year he published his first volume of *Dikter* (Poems), and a collection of Servian folksongs translated into Swedish. In 1831 his verse romance *Grafven i Perrho* (The Grave in Perrho) received the small gold medal of the Swedish Academy, and the poet married the daughter of Dr. Tengström, archbishop of Finland. For a tractate on the *Medea* of Euripides he was in the same year appointed university lecturer on Roman literature. In 1832 he leaped at one bound to the foremost place among Swedish poets with his beautiful little epic *Elgskyttarne* (The Elk-Hunters); and in 1833 he published a second collection of lyrical poems. His comedy *Friaren från Landet* (The Country Lover) was not a success in 1834. He returned to more characteristic fields in 1836, when he published the charming idyl in hexameters called *Hanna*. In 1837 Runeberg accepted the chair of Latin at Borgå College, and resided in that little town for the rest of his life.

From Borgå he continued to pour forth volumes of verse, and he was now recognized in his remote Finland retirement as second only to Tegnér among the poets of Sweden. In 1841 he published *Nadeschda*, a romance of Russian life, and *Julqväll* (Christmas Eve), an idyl. The third volume of his lyrical pieces bears the date 1843, and the noble cycle of unrhymed verse romances called *Kung Fjalar* was published in 1844. Finally, in 1848, he achieved a great popular success by his splendid series of poems about the war of independence in 1808, a series which bears the name of *Fänrik Ståls Sägner* (Ensign Steel's Stories); a second series of these appeared in 1860. From 1847 to 1850 the poet was rector of Borgå College, a post which he laid down to take the only journey out of Finland which he ever accomplished, a visit to Sweden in 1851. His later writings may be briefly mentioned. In 1853 he collected his prose essays into a volume entitled *Smärre Berättelser*. In the same year he was made president of a committee for the preparation of a national Psalter, which issued, in 1857, a Psalm-Book largely contributed by Runeberg for public use. He once more attempted comedy in his *Kan ej* (Can't) in 1862, and tragedy, with infinitely more success, in his stately *Kungarne på Salamis* (The Kings at Salamis) in 1863. He collected his writings in six volumes in 1873–74. Runeberg died at Borgå on the 6th of May, 1877.

The poems of Runeberg show the influence of the Greeks and of Goethe upon his mind; but he possesses a great originality. In an age of conventionality he was boldly realistic, yet never to the sacrifice of artistic beauty. Less known to the rest of Europe than Tegnér, he yet is now generally considered to excel him as a poet, and to mark the highest attainment hitherto reached by imaginative literature in Sweden.

The life of Johan Ludvig Runeberg has not yet been written in detail, although it is said to be in preparation. The fullest account of his life and works is that which forms the introduction to the *Samlade Skrifter* of 1873. It was written by Prof. Nyblom. A minute criticism of Runeberg's principal poems, with translations, occupies pp. 98–133 of Gosse's *Studies in the Literature of Northern Europe*, 1879. A selection of his lyrical pieces was published in an English translation by Messrs. Magnusson and Palmer in 1878.

RUNNING. In this mode of progression the step is lighter and gait more rapid than in walking, from which it differs in consisting of a succession of springs from toe to toe, instead of a series of steps from toe to heel. As an athletic exercise, it has been in vogue from the earliest times, and the simple foot race, *δρόμος*, run straight from starting point to goal, was a game of the Greek pentathlon. It was diversified with the *διαυλοδρόμος*, in which a distance mark was rounded and the starting and winning points were the same, and also by the *δρόμος ὁπλιτῶν*, which might be compared to the modern heavy marching order race. In ancient Italy running was practiced in circus exhibitions, as described by Virgil (*Æn.* v. 286 *sq.*). In modern times it has been developed almost into a science by the Anglo-Saxon race in Great Britain and North America, till the distances recently covered appear almost fabulous compared with the performances up to the end of the first half of the century. In all kinds of running the entire weight of the body is thrown on the toes, from which light strides are taken with all possible freedom of action from the hips. At starting the feet are placed about a foot apart, the body being inclined slightly forward, with

the weight of it on the right or hindermost foot. A bent double position with the feet wide apart is on no account advisable. The start cannot be made too quickly on the signal being given. Two or three short steps are taken to get fairly into stride, after which the runner should look straight before him, set his eyes steadfastly on the goal, and run towards it at his longest and quickest stride, care being taken not to swerve or get out of stride.

Running is usually thus classified: (1) sprinting includes all distances up to 400 yards; (2) medium distances range from one-quarter to three-quarters of a mile; (3) long distances are those of one mile and upwards. The first-named is the most popular, and is much practiced in the north of England, especially at Sheffield, which may be termed the home of sprint running. It is less fatiguing than long distances and requires less arduous training, while strength to a certain extent replaces wind. A great point in sprinting is to obtain a good start, for which purpose incessant practice is required. A first-class sprinter when at full speed will clear from 8 to 9 feet in each stride, and his toes leave the ground with inconceivable rapidity. When in good condition he will run 100 yards at top speed in one breath, and probably 150 yards without drawing a second one. The quickest authenticated times in which short distances have been run on perfectly level ground are as follows: 120 yards, 11½ sec.; 150 yards, 15 sec.; 200 yards, 19½ sec.; 300 yards, 30 sec., and 400 yards, 43⅘ sec.

Of medium distances the quarter mile race is by far the most difficult to run, as a combination of speed and endurance is requisite. In fact a runner should be able to sprint the whole way. Six hundred yards and half a mile are the other chief distances in this class of running. The stride is slower than in sprinting, and a man cannot maintain the same speed throughout as is possible up to 300 yards. The best authenticated times are—quarter mile, 48¼ sec.; 600 yards, 1 min. 11⅘ sec.; half mile, 1 min. 53½ sec.; 1000 yards, 2 min. 13 sec.; three-quarter mile, 3 min. 7 sec.

Light wiry men are best fitted for long-distance running, where stamina and wind are more useful than speed. The strides must be long and light. After some miles a runner is unable to keep the weight of the body on his toes any longer owing to fatigue, puts his heels down and runs flat-footed. The times accomplished of late years by long-distance runners are most remarkable. Those for the chief distances are as follows: 1 mile, 4 min. 16½ sec.; 2 miles, 9 min. 11½ sec.; 3 miles, 14 min. 36 sec.; 4 miles, 19 min. 36 sec.; 5 miles, 24 min. 40 sec.; 10 miles, 51 min. 6⅘ sec.; 20 miles, 1 h. 56 min. 38 sec.; 30 miles, 3 h. 15 min. 9 sec.; 40 miles, 4 h. 34 min. 27 sec.; 50 miles, 6 h. 8 min.; 100 miles, 13 h. 26 min. 30 sec.; 200 miles, 35 h. 9 min. 28 sec.; 300 miles, 58 h. 17 min. 6 sec.; 400 miles, 85 h. 52 min.; 500 miles, 109 h. 18 min. 20 sec.; 600 miles, 137 h. 25 min. 10 sec.; 610 miles, 140 h. 34 min. 10 sec.

Nearly all running contests now take place on prepared cinder paths, which from their springiness assist speed considerably. A runner's dress should be as light as possible, and consist merely of a thin jersey, a pair of drawers covering the waist and loins and extending downwards to the top of the knee cap, and heelless running shoes with a few short spikes in the soles just under the tread of the foot. The spikes are longer for sprinting. Chamois leather socks for the toes and ball of the foot may be added, since they diminish concussion as each foot reaches the ground. Since the introduction of Athletic Sports (see vol. iii. p. 12) into England and America commenced in 1860 the popularity of amateur running races has vastly increased. These contests are governed by the rules of the Amateur Athletic Association. At Sheffield a code of rules has been drawn up for the regulation of the more important professional handicaps.

RUPERT (Hrodbert), St., a kinsman of the Merovingian house, and bishop of Worms, was invited (696) to Regensburg (Ratisbon) by Theodo of Bavaria, but finally settled in Salzburg, the bishopric of which was his foundation. He is regarded as the apostle of the Bavarians, not that the land was up to that time altogether heathen, but because of his services in the promotion and consolidation of its Christianity.

The *Gesta Sancti Hrodberti Confessoris* have been printed in the *Archiv für Oesterreich. Geschichte*, 1882, from a 10th-century MS.

RUPERT (1619–1682), prince of Bavaria, the third son of Frederick V., elector palatine and king of Bohemia, and of Elizabeth, sister of Charles I. of England, was born at Prague on December 18, 1619. In 1630 he was placed at the university of Leyden, where he showed particular readiness in languages and in military discipline. In 1633 he was with the prince of Orange at the siege of Rhynberg, and served against the Spaniards as a volunteer in the prince's life-guard. In December, 1635, he was at the English court, and was named as leader of the proposed expedition to Madagascar. In 1636 he visited Oxford, when he was made master of arts. Returning to The Hague in 1638, he made the first display of his reckless bravery at the siege of Breda, and shortly afterwards was taken prisoner by the Austrians in the battle before Lemgo. For three years he was confined at Linz, where he withstood the endeavors made to induce him to change his religion and to take service with the emperor. Upon his release in 1642 he returned to The Hague, and from thence went to Dover, but, the Civil War not having yet begun, he returned immediately to Holland. Charles now named Rupert general of the horse, and he joined the king at Leicester in August, 1642, being present at the raising of the standard at Nottingham. He was also made a knight of the Garter. It is particularly to be noticed that he brought with him several military inventions, and, especially, introduced the "German discipline" in his cavalry operations. He at once displayed the most astonishing activity, fought his first action with success at Worcester in September, and was at Edgehill on October 23. At Aylesbury and Windsor, on the march to London, he received severe checks, but after desperate fighting took Brentford. In 1643 he captured Cirencester, but failed before Gloucester, and in February issued his declaration denying the various charges of inhumanity which had been brought against him. At the end of March he set out from Oxford to join the queen at York, took Birmingham, and, after a desperate resistance, Lichfield, but was there suddenly recalled to the court at Oxford to meet Essex's expected attack. Chalgrove fight, at which during one of his incessant raids he met Hampden, was fought on June 18. On July 11 he joined the queen at Stratford-on-Avon, and escorted her to the king at Edgehill. He then began the siege of Bristol, which he took on July 26, and he took part in the futile attempt on Gloucester, where he failed to repulse Essex's relieving force. In the skirmish previous to the first battle of Newbury he checked the enemy's advance, and in the battle itself displayed desperate courage, following up the day's work by a night attack on the retiring army. In the beginning of 1644 he was rewarded by being made earl of Holderness, duke of Cumberland, and president of Wales. In February he was at Shrewsbury, from whence he administered the affairs of Wales; in March he went to relieve Newark, and was back at Shrewsbury by the end of the month. He then marched north, relieving Lathom and taking Bolton, and finally relieving York in July. At Marston Moor he charged and routed the Scots, but was in turn completely beaten by Cromwell's Ironsides. He escaped to York, and thence to Richmond, and finally by great skill reached Shrewsbury on July 20. On November 21 he was repulsed at Abingdon, and on 23d he entered Oxford with Charles. He had meanwhile been made generalissimo of the armies and master of the horse. Against him, however, was a large party of courtiers, with Digby at their head. The influence of the queen, too, was uniformly exerted against him. In May, 1645, he took Newark by storm. His advice to march northwards was overruled, and on June 14 the experiences of Marston Moor were repeated at Naseby. Rupert fled to Bristol, whence he counselled the king to come to terms with the parliament. In his conduct of the defence of the town, this "boldest attaquer in the world for personal courage" showed how much he "wanted the patience and seasoned head to consult and advise for defence" (Pepys). His surrender of

the town after only a three weeks' siege, though he had promised Charles to keep it four months, caused his disgrace with the king, who revoked all his commissions by an order dated September 14, and in a cold letter ordered him to seek his subsistence beyond seas, for which purpose a pass was sent him. Rupert, however, broke through the enemy, reached the king at Oxford, and was there reconciled to him. He challenged an investigation of his conduct, and was triumphantly acquitted by the council of war. He appears, too, to have remonstrated personally with Charles in terms of indecent violence. He then applied to the parliament for a pass. This, however, was offered only on unacceptable conditions. On June 24 Rupert was taken prisoner by Fairfax at Oxford, and on July 5, at the demand of the parliament, sailed from Dover for France. He was immediately made a marshal in the French service, with the command of the English there. He received a wound in the head at Armentières during 1647. The greater part of the English fleet having adhered to Charles, and having sailed to Holland, Rupert went with the prince of Wales to The Hague, where the charge of it was put into his hand. He immediately set out in January, 1649, upon an expedition of organized piracy. In February, after passing without molestation through the Parliamentary ships, he was at Kinsale, of which he took the fort. He relieved John Grenville at the Scilly Isles, and practically crippled the English trade. Attacked by Blake, he sailed to Portugal, and was received with kindness by the king; Blake, however, blockaded him in the Tagus, and demanded his surrender. Rupert broke through the blockade and sailed to the Mediterranean, landing at Barbary, and refitting at Toulon; thence he proceeded to Madeira, the Canaries (in 1652), the Azores, Cape de Verd, and the West Indies, sweeping the ocean between the latter places for a considerable time. Finding it impossible, however, to escape the indefatigable pursuit of Blake, he returned to France in 1653. He was now invited to Paris by Louis XIV., who made him master of the horse; he had also an offer from the emperor to command his forces. He travelled for some while, and was again in Paris in 1655. His movements, however, at this time are very uncertain, but he appears to have devoted his enforced leisure to engraving, chemistry, the perfection of gunpowder, and other arts, especially those of military science. Whether he was the actual discoverer of mezzotinto engraving, in which he was skilful, is uncertain, but this seems probable.

At the end of September, 1660, Rupert returned to England; he was abroad during 1661, was placed on the privy council in April, 1662, and in October was one of the commissioners for Tangiers; in December he became a member of the Royal Society. In August, 1664, he was appointed to command the Guinea fleet against the Dutch, and set sail in October. On June 5, 1665, he gained with Monk a great victory over the Dutch, and on his return had his portrait painted by Lely along with the other admirals present at the battle. He again put to sea in May, 1666, to hinder the junction of the Dutch and French, and returned in the beginning of June after a heavy defeat, his ship having stuck on the Galloper sands during the fight. He was obliged to justify himself before the council. In January, 1667, he was very ill, but recovered after the operation of trepanning. At this time he is mentioned as one of the best tennis players in the nation. On October 22, 1667, he received with Monk the thanks of the House of Commons for his exertions against the Dutch at Chatham, and he was again at sea in April, 1668. He was always stanch in his Protestant principles, and was carefully kept in ignorance of Charles's Catholic plot in 1670. In August of that year he was constable of Windsor, and busied himself with the fitting up of the Round Tower, a turret of which he converted into a workshop. He shared in the prevailing immorality of the time, his favorite mistress being the celebrated actress, Mrs. Hughes. In 1673 he was appointed lord high admiral, and fought two battles with the Dutch Fleet on May 28 and August 11, but could do little through the backwardness of the French in coming to his assistance. This appears to have so annoyed him that he henceforward eagerly helped the anti-French party. He was an active member of the Board of Trade, and governor of the Hudson's Bay Company. Till his death, on November 29, 1682, he lived in complete retirement at Windsor. (O. A.)

RUPERT'S LAND. See HUDSON'S BAY COMPANY and NORTHWEST TERRITORY.

RUPTURE. See HERNIA.

RUSH. Under the name of rush or rushes, the stalks or fistular stem-like leaves of several plants have minor industrial applications. The common rushes (species of *Juncus*) are used in many parts of the world for chair-bottoms, mats, and basket work, and the pith they contain serves as wicks in open oil-lamps and for tallow candles,—whence rushlight. The bulrush, *Typha elephantina*, is used in Sindh for mats and baskets. Under the name of rushes, species of *Scirpus* and other *Cyperaceæ* are used for chair-bottoms, mats, and thatch. The elegant rush mats of Madras are made from *Papyrus pangorei*. The sweet rush, yielding essential oil, is *Andropogon Schœnanthus*, known also as lemon grass. Large quantities of the "horse tail," *Equisetum hiemale*, are used under the name of the Dutch or scouring rush, for scouring metal and other hard surfaces on account of the large proportion of silica the plant contains.

RUSH, BENJAMIN[1] (1745–1813), the Sydenham of America, was born near Bristol (12 miles from Philadelphia), on a homestead founded by his grandfather, who had followed Penn from England in 1683, being of the Quaker persuasion, and a gunsmith by trade. After a careful education at school and college, and an apprenticeship of six years with a doctor in Philadelphia, Rush went for two years to Edinburgh, where he attached himself chiefly to Cullen. He took his M.D. degree there in 1768, spent a year more in the hospitals of London and Paris, and began practice in Philadelphia at the age of twenty-four, undertaking at the same time the chemistry class at the new medical school. He at once became a leading spirit in the political and social movements of the day. He was a friend of Franklin's, a member of Congress for the State of Pennsylvania in 1776, and one of those who signed the Declaration of Independence the same year. He had already written on the Test Laws, "Sermons to the Rich," and on Negro Slavery, having taken up the last-named subject at the instance of Anthony Benezet, whose *Historical Account of Guinea* was the inspiration of Clarkson's celebrated college essay twelve years after. In 1774 he started along with James Pemberton the first anti-slavery society in America, and was its secretary for many years. When the political crisis ended in 1787 with the convention for drawing up a federal constitution, of which he was a member, he retired from public life, and gave himself up wholly to medical practice. In 1789 he exchanged his chemistry lectureship for that of the theory and practice of physic; and when the medical college, which he had helped to found, was absorbed by the university of Pennsylvania in 1791 he became

[1] [Dr. Rush's birthplace was Byberry now in one of the northern wards of Philadelphia. He graduated at Princeton and married Julia, daughter of Richard Stockton, a signer of the Declaration of Independence from New Jersey. He was appointed surgeon-general of the army in 1777 and had charge of the hospitals of the middle department, but in a few months he relinquished these posts from discontent with the supply service. For his humane exertions during the yellow-fever epidemic of 1793 he received costly testimonials from Marie Louise, the ill-starred queen of Etruria, from Frederick William III. of Prussia, and from Alexander I. of Russia. To him is due the establishment of the first dispensary in the United States, and American editions of Sydenham's works. For further account of some of his descendants see VOL. XXVIII.—AM. ED.]

professor of the institutes of medicine and of clinical practice, succeeding in 1805 to the chair of the theory and practice of physic. He was the central figure in the medical world of Philadelphia, as Cullen was at Edinburgh and Boerhaave at Leyden. Much of his influence and success was due to his method and regularity of life on the Franklin model. During the thirty years that he attended the Pennsylvania Hospital as physician, he is said to have never missed his daily visit and never to have been more than ten minutes late. Notwithstanding a weak chest, which troubled him the greater part of his life, he got through an enormous amount of work, literary and other; he was a systematic early riser, and his leisure at the end of the day was spent in reading poetry, history, the moral sciences, and the like, with his pen always in his hand. His temperament was of the gentle sort, and his conversation and correspondence abounding in ideas. It is stated by his friend, Dr. Hosack of New York, that Rush was successively a Quaker, an Anabaptist, a Presbyterian, and an Anglican. He gained great credit when the yellow fever devastated Philadelphia, in 1793, by his assiduity in visiting the sick (as many as one hundred and twenty in a day), and by his bold and apparently successful treatment of the disease by bloodletting. When he began to prosper in practice, he gave a seventh part of his income in charity. He died in 1813, after a five days' illness from typhus fever. Nine out of a family of thirteen children survived him, all prosperously settled.

Rush's writings cover an immense range of subjects, including language, the study of Latin and Greek, the moral faculty, capital punishment, medicine among the American Indians, maple sugar, the blackness of the negro, the cause of animal life, tobacco smoking, spirit drinking, as well as a long list of more strictly professional topics. His last work was an elaborate treatise on the *Diseases of the Mind* (1812). He is best known now by the five volumes of *Medical Inquiries and Observations*, which he brought out at intervals from 1789 to 1798 (two later editions revised by the author). Epidemiology, and yellow fever in particular, was the subject on which he wrote to most purpose. His treatment of yellow fever by bloodletting helped more than anything else to make him famous, although the practice would now be condemned. His views as to the origin and diffusion of yellow fever have a more permanent interest. He stoutly maintained, as against the doctrine of importation from the West Indies, that the yellow fever of Philadelphia was generated on the spot by noxious exhalations, although he does not appear to have suspected that there was something special or specific in the filthy condition of soil or harbor mud which gave rise to the miasmata. For a number of years he expressed the opinion that yellow fever might become catching from person to person, under certain aggravated circumstances; but in the end he professed the doctrine of absolute non-contagiousness. He became well known in Europe as an authority on the epidemics of fever, and was elected an honorary member of several foreign societies.

See eulogy by Hosack (*Essays*, i., New York, 1824), with biographical details taken from a letter of Rush to President John Adams; also references in the works of Thacker, Gross, and Bowditch on the history of medicine in America. His part in the yellow fever controversies is indicated by La Roche (*Yellow Fever in Philadelphia from* 1699 *to* 1854, 2 vols., Philadelphia, 1855) and by Bancroft (*Essay on the Yellow Fever*, London, 1811). His services as an abolitionist pioneer are recorded in Clarkson's *History of the Abolition of the African Slave Trade.*

RUSHWORTH, John (*c.* 1607–1690), the compiler of the *Historical Collections* commonly described by his name, was born in Northumberland about the year 1607. After a period of study at Oxford, but not, it appears, as a member of the university, he came to London, was entered at Lincoln's Inn, and was in due course called to the bar. As early as 1630 he seems to have commenced attendance at the courts, especially the Star Chamber and the Exchequer Chamber, not for the purpose of practising his profession, but in order that he might observe and record the more remarkable of their proceedings. On the meeting of the Long Parliament in 1640 he was appointed assistant clerk to the House of Commons, and was in the habit of making short-hand notes of the speeches he heard delivered in debate. He himself states that it was from his report that the words used by Charles I. during his memorable attempt to seize the "five members" were printed for public distribution under the king's orders. Being an expert horseman, it seems that Rushworth was frequently employed by the House as their messenger as well as in the capacity of clerk. When the king left London, and while the earl of Essex was general, he was often the bearer of communications from the parliament to one or the other of them. In 1645 Sir Thomas Fairfax, to whom he was distantly related, and who was then in command of the Parliamentary forces, made him his secretary, and he remained with the army almost continuously until 1650. In 1649 he was at Oxford, and the degree of master of arts was conferred on him by the university. In 1652 he was nominated one of the commissioners for the reform of the common law, and in 1658 he was elected member for Berwick in the parliament of the commonwealth. Almost immediately before the Restoration he published the first volume of his *Historical Collections*, which had been submitted in manuscript to Oliver Cromwell, with a very laudatory dedication to Richard Cromwell, then Lord Protector. But the turn of events induced him to withdraw this dedication, and he subsequently endeavored without success to conciliate Charles II. by presenting him with some of the registers of the privy council which had come into his possession. In the convention of 1660, which recalled the king, he sat again as member for Berwick. In 1677 he was made secretary to Sir Orlando Bridgeman, then lord keeper, and he was returned for Berwick a third and a fourth time to the parliaments of 1679 and 1681. Soon after this he appears to have fallen into straitened circumstances. In 1684 he was arrested for debt, and cast into the King's Bench prison, where he died, after lingering for some time in a condition of mental infirmity, the result of excessive drinking, in 1690.

Rushworth's *Historical Collections of Private Passages of State, Weighty Matters in Law, and Remarkable Proceedings in Parliament* was reprinted in eight folio volumes in 1721. The eighth volume of this edition is an account of the trial of the earl of Strafford, the other seven volumes being concerned with the miscellaneous transactions of the period from 1618 to 1648. Only the first three volumes and the trial of Strafford were originally published in Rushworth's lifetime; but the manuscript of the other volumes was left by him ready for the press. The extreme value of the work is well known to all inquirers into the history of the Civil War, and much of the information it contains is to be found nowhere else. Its impartiality, however, can hardly be seriously maintained, and hence it is necessary to consult it with some caution.

RUSSELL, John Russell, Earl (1792–1878), a statesman who for nearly half a century faithfully represented the traditions of Whig politics, was the third son of John, sixth duke of Bedford, and was born in Hertford Street, Mayfair, London, 18th August, 1792, one of the most terrible months in the annals of the French Revolution. Whilst still a child he was sent to a private school at Sunbury, and for a short time he was at Westminster School. Long and severe illness led to his being placed, with many other young men sprung from Whig parents, with a private tutor at Woodnesborough in Kent. Following in the footsteps of Lord Henry Petty, Brougham, and Horner, he went to the university of Edinburgh, then the academic centre of Liberalism, and dwelt in the house of Prof. Playfair, whom he afterwards described as "one of the best and noblest, the most upright, the most benevolent, and the most liberal of all philosophers." On leaving the university, he determined upon taking a foreign tour, and, as the greater part of Europe was overrun by French troops, he landed at Lisbon with the intention of exploring the countries of Portugal and Spain. Lord John Russell had previously arrived at the conclusion that the continuance of the war with

France was necessary for the restoration of the peace of Europe, and his convictions were deepened by the experience of travel. On the 4th May, 1813, ere he was of age, he was returned for the ducal borough of Tavistock, and in this he resembled Lord Chesterfield and other aristocratic legislators, who were entrusted with the duty of law-making before they had arrived at years of discretion. After the battle of Waterloo the Whig representatives in parliament concentrated their efforts in promoting financial reform, and in resisting those arbitrary settlements of the Continental countries which found favor in the eyes of Metternich and Castlereagh. In foreign politics Lord John Russell's oratorical talents were especially shown in his struggles to prevent the union of Norway and Sweden. In domestic questions he cast in his lot with those who opposed the repressive measures of 1817, and protested that the causes of the discontent at home should be removed by remedial legislation. When failure attended all his efforts he resigned his seat for Tavistock, and meditated permanent withdrawal from public life, but was dissuaded from this step by the arguments of his friends, and especially by a poetic appeal from Tom Moore. In the parliament of 1818–20 he again represented the family borough in Devon, and in May, 1819, began his long advocacy of parliamentary reform by moving for an inquiry into the corruption which prevailed in the Cornish constituency of Grampound. During the first parliament (1820–26) of George IV. the county of Huntingdon accepted Lord John Russell's services as its representative, and it was his good fortune to secure in 1821 the disfranchisement of Grampound, but his satisfaction at this triumph was diminished by the fact that the seats were not transferred to the constituency which he desired. This was the sole parliamentary victory which the advocates of a reform of the representation obtained before 1832, but they found cause for congratulation in other triumphs. Lord John Russell paid the penalty for his advocacy of Catholic emancipation with the loss in 1826 of his seat for Huntingdon county, but he found a shelter in the Irish borough of Bandon Bridge. He led the attack against the Test Act by carrying in February, 1828, with a majority of forty-four, a motion for a committee to inquire into their operations, and after this decisive victory they were repealed. He warmly supported the Wellington ministry when it realized that the king's government could only be carried on by the passing of a Catholic Relief Act. For the greater part of the short-lived parliament of 1830–31 he served his old constituency of Tavistock, having been beaten in a contest for Bedford county at the general election by one vote; and, when Lord Grey's Reform ministry was formed, Lord John Russell accepted the office of paymaster-general, though, strange to say, he was not admitted into the sacred precincts of the cabinet. This exclusion from the official hierarchy was rendered the more remarkable by the circumstance that he was selected (1st March, 1831) to explain the provisions of the Reform Bill, to which the cabinet had given its formal sanction. The Whig ministry were soon met by defeat, but an appeal to the country increased the number of their adherents, and Lord John Russell himself had the satisfaction of being chosen by the freeholders of Devon as their member. After many a period of doubt and defeat, "the bill, the whole bill, and nothing but the bill" passed into law, and Lord John stood forth in the mind of the people as its champion. Although it was not till some years later that he became the leader of the Liberal party, the height of his fame was attained in 1832. After the passing of the Reform Bill he sat for the southern division of Devon, and continued to retain the place of paymaster-general in the ministries of Lord Grey and Lord Melbourne. The former of these cabinets was broken up by the withdrawal of Mr. Stanley, afterwards Lord Derby, on the proposal for reforming the Irish Church, when he emphasized Lord John Russell's part in the movements by the saying "Johnny's upset the coach;" the latter was abruptly, if not rudely, dismissed by William IV. when the death of Lord Spencer promoted the leader of the House of Commons, Lord Althorp, to the peerage, and Lord John Russell was proposed as the spokesman of the ministry in the Commons. At the general election which ensued the tories received a considerable accession of strength, but not sufficient to insure their continuance in office, and the adoption by the House of Commons of the proposition of the Whig leader, that the surplus funds of the Irish Church should be applied to general education, necessitated the resignation of Sir Robert Peel's ministry. In Lord Melbourne's new administration Lord John Russell became home secretary and leader of the House of Commons, but on his seeking a renewal of confidence from the electors of South Devon, he was defeated and driven to Stroud. Although the course of the Whig ministry was not attended by uniform prosperity, it succeeded in passing a Municipal Reform Bill, and in carrying a settlement of the tithe question in England and Ireland. At the close of its career the troubles in Canada threatened a severance of that dependency from the home country, whereupon Lord John Russell, with a courage which never deserted him, took charge of the department, at that time a dual department, of war and the colonies. In May, 1839, on an adverse motion concerning the administration of Jamaica, the ministry was left with a majority of five only, and promptly resigned the seals of office. Sir Robert Peel's attempt to form a ministry was, however, frustrated by the refusal of the queen to dismiss the ladies of the bedchamber, and the Whigs resumed their places. Their prospects brightened when Sir John Yarde Buller's motion of "no confidence" was defeated by twenty-one, but the glimpse of sunlight soon faded, and a similar vote was some months later carried by a majority of one, whereupon the Whig leader announced a dissolution of parliament (1841). At the polling booth his friends were smitten hip and thigh; the return of Lord John Russell for the City of London was almost their solitary triumph. On Sir Robert Peel's resignation (1846) the task of forming an administration was entrusted to Lord John Russell, and he remained at the head of affairs from 1846 to 1852, but his tenure of office was not marked by any great legislative enactments. His celebrated Durham letter, on the threatened assumption of ecclesiastical titles by the Roman Catholic bishops, weakened the attachment of the "Peelites" and alienated his Irish supporters. The impotence of their opponents, rather than the strength of their friends, kept the Whig ministry in power, and, although beaten by a majority of nearly two to one on Mr. Locke King's County Franchise Bill in February, 1851, it could not divest itself of office. Lord Palmerston's unauthorized recognition of the French *coup d'état* was followed by his dismissal, but he had his revenge in the ejectment of his old colleagues a few months later. During Lord Aberdeen's administration Lord John Russell led the Lower House, at first as foreign secretary, then without portfolio, and lastly as president of the council. In 1854 he brought in a Reform Bill, but in consequence of the war with Russia the bill was allowed, much to its author's mortification, to drop. His popularity was diminished by this failure, and although he resigned in January, 1855, on Mr. Roebuck's Crimea motion, he did not regain his old position in the country. At the Vienna conference (1855) Lord John Russell was England's representative, and immediately on his return he became secretary of the colonies; but the errors in his negotiations at the Austrian capital followed him and forced him to retire. For some years after this he was the "stormy petrel" of politics. He was the chief instrument in defeating Lord Palmerston in 1857. He led the attack on the Tory Reform Bill of 1859. A

reconciliation was then effected between the rival Whig leaders, and Lord John Russell consented to become foreign secretary in Lord Palmerston's ministry, and to accept an earldom. During the American War Earl Russell's sympathies with the North restrained his country from embarking in the contest, but he was not equally successful in his desire to prevent the spoliation of Denmark. On Lord Palmerston's death (October, 1865) Earl Russell was once more summoned to form a cabinet, but the defeat of his ministry in the following June on the Reform Bill which they had introduced was followed by his retirement from public life. His leisure hours were spent after this event in the preparation of numberless letters and speeches, and in the composition of his *Recollections and Suggestions*, but everything he wrote was marked by the belief that all philosophy, political or social, was summed up in the Whig creed of fifty years previously. Earl Russell died at Pembroke Lodge, Richmond Park, 28th May, 1878.

For more than half a century Earl Russell lived in the excitement of political life. He participated in the troubles of Whiggism before 1832, and shared in its triumph after that event. He expounded the principles of the first Reform Bill and lived to see a second carried into law by the Conservative ministry of Lord Derby. Unlimited confidence in his own resources exposed him to many jests from both friend and foe, but he rightly estimated his powers, and they carried him to the highest places in the state. His tragedies and his essays are forgotten, but his works on Fox are among the chief authorities on Whig politics. Earl Russell was twice married,—first, in 1835, to Adelaide, daughter of Mr. Thomas Lister, and widow of Thomas, second Lord Ribblesdale, and secondly, in 1841, to Lady Frances Ann Maria, daughter of the second earl of Minto. By the former he had two daughters, by the latter three sons and one daughter. His eldest son, Lord Amberley, predeceased him 9th January, 1876. (W. P. C.)

RUSSELL, William Russell, Lord (1639–1683), the third son of Lord Russell, afterwards fifth earl and still later first duke of Bedford, and Lady Anne Carr, daughter of the infamous countess of Somerset, was born September 29, 1639. Nothing is known of his early youth, except that about 1654 he was sent to Cambridge with his elder brother Francis. On leaving the university the two brothers travelled abroad, visiting Lyons and Geneva, and residing for some while at Augsburg. His account of his impressions is spirited and interesting. He was at Paris in 1658, but had returned to Woburn in December, 1659. At the Restoration he was elected for the family borough of Tavistock. For a long while he appears to have taken no part in public affairs, but rather to have indulged in the follies of court life and intrigue; for both in 1663 and 1664 he was engaged in duels, in the latter of which he was wounded. In 1669 he married the second daughter of the earl of Southampton, the widow of Lord Vaughan, thus becoming connected with Shaftesbury, who had married Southampton's niece. With his wife Russell always lived on terms of the greatest affection and confidence.

It was not until the formation of the "country party," in opposition to the policy of the Cabal and Charles's French-Catholic plots, that Russell began to take an active part in affairs. He then joined Cavendish, Birch, Hampden, Powell, Lyttleton, and others in vehement antagonism to the court. With a passionate hatred and distrust of the Catholics, and an intense love of political liberty, he united the desire for ease to Protestant Dissenters. His first speech appears to have been on January 22, 1673, in which he inveighed against the stop of the exchequer, the attack on the Smyrna fleet, the corruption of courtiers with French money, and "the ill ministers about the king." He also supported the proceedings against the duke of Buckingham. In 1675 he moved an address to the king for the removal of Danby from the royal councils, and for his impeachment. On February 15, 1677, in the debate on the fifteen months' prorogation, he moved the dissolution of parliament; and in March, 1678, he seconded the address praying the king to declare war against France. The enmity of the country party against Danby and James, and their desire for a dissolution and the disbanding of the army, were greater than their enmity to Louis. The French king therefore found it easy to form a temporary alliance with Russell, Hollis, and the opposition leaders, by which they engaged to cripple the king's power of hurting France, and to compel him to seek Louis's friendship, that friendship, however, to be given only on the condition that they in their turn should have Louis's support for their cherished objects. Russell in particular entered into close communication with Rouvigny, who came over with money for distribution among members of parliament. By the testimony of Barillon, however, it is clear that Russell himself utterly refused to take any part in the intended corruption.

By the wild alarms which culminated in the Popish Terror Russell appears to have been affected more completely than his otherwise sober character would have led people to expect. He threw himself into the party which looked to Monmouth as the representative of Protestant interests, a grave political blunder, though he afterwards was in confidential communication with Orange. On November 4, 1678, he moved an address to the king to remove the duke of York from his person and councils. At the dissolution of the pensionary parliament, he was, in the new elections, returned for Bedfordshire. Danby was at once overthrown, and in April, 1679, Russell was one of the new privy council formed by Charles on the advice of Temple. Only six days after this we find him moving for a committee to draw up a bill to secure religion and property in case of a Popish successor. He does not, however, appear to have taken part in the exclusion debates at this time. In June, on the occasion of the Covenanters' rising in Scotland, he attacked Lauderdale personally in full council.

In January, 1680, Russell, along with Cavendish, Capell, Powell, Essex, and Lyttleton, tendered his resignation to the king, which was received by Charles "with all my heart." On June 16 he accompanied Shaftesbury, when the latter indicted James at Westminster as a Popish recusant; and on October 26 he took the extreme step of moving "how to suppress Popery, and to prevent a Popish successor"; when on November 2, now at the height of his influence, he went still further by seconding the motion for exclusion in its most emphatic shape, and on the 19th carried the bill to the House of Lords for their concurrence. The limitation scheme he opposed, on the ground that monarchy under the conditions expressed in it would be an absurdity. The statement, made by Echard alone, that he joined in opposing the indulgence shown to Lord Strafford by Charles in dispensing with the more horrible parts of the sentence of death—an indulgence afterwards shown to Russell himself—is entirely unworthy of credence. On December 18 he moved to refuse supplies until the king passed the Exclusion Bill. The Prince of Orange having come over at this time, there was a tendency on the part of the opposition leaders to accept his endeavors to secure a compromise on the exclusion question. Russell, however, refused to give way a hair's breadth.

On March 26, 1681, in the parliament held at Oxford, Russell again seconded the Exclusion Bill. Upon the dissolution he retired into privacy at his country seat of Stratton in Hampshire. It was, however, no doubt at his wish that his chaplain wrote the *Life of Julian the Apostate*, in reply to Dr. Hickes's sermons, in which the lawfulness of resistance in extreme cases was defended. In the wild schemes of Shaftesbury after the election of Tory sheriffs for London in 1682 he had no share; upon the violation of the charters, however, in 1683, he began seriously to consider as to the best means of resisting the Government, and on

one occasion attended a meeting at which treason, or what might be construed as treason, was talked. Monmouth, Essex, Hampden, Sidney, and Howard of Escrick were the principal of those who met to consult. On the breaking out of the Rye Plot, of which neither he, Essex, nor Sidney had the slightest knowledge, he was accused by informers of promising his assistance to raise an insurrection and compass the death of the king. Refusing to attempt to escape, he was brought before the council, when his attendance at the meeting referred to was charged against him. He was sent on June 26, 1683, to the Tower, and, looking upon himself as a dying man, betook himself wholly to preparation for death. Monmouth offered to appear to take his trial, if thereby he could help Russell, and Essex refused to abscond for fear of injuring his friend's chance of escape. Before a committee of the council Russell, on June 28, acknowledged his presence at the meeting, but denied all knowledge of the proposed insurrection. He reserved his defence, however, until his trial. He would probably have saved his life but for the perjury of Lord Howard. The suicide of Essex, the news of which was brought into court during the trial, was quoted as additional evidence against him, as pointing to the certainty of Essex's guilt. On July 19 he was tried at the Old Bailey, his wife assisting him in his defence. Evidence was given by an informer that, while at Shaftesbury's hiding-place in Wapping, Russell had joined in the proposal to seize the king's guard, a charge indignantly denied by him in his farewell paper, and that he was one of a committee of six appointed to prepare the scheme for an insurrection. Howard, too, expressly declared that Russell had urged the entering into communications with Argyll in Scotland. Howard's perjury is clear from other witnesses, but the evidence was accepted. Russell spoke with spirit and dignity in his own defence, and, in especial, vehemently denied that he had ever been party to a design so wicked and so foolish as those of the murder of the king and of rebellion. It will be observed that the legality of the trial, in so far as the jurors were not properly qualified and the law of treason was shamefully strained, was denied in the Act of 1 William and Mary which annulled the attainder. Hallam maintains that the only overt act of treason proved against Russell was his concurrence in the project of a rising at Taunton, which he denied, and which, Ramsay being the only witness, was not sufficient to warrant a conviction.

Russell was sentenced to die. Many attempts were made to save his life. The old earl of Bedford offered £50,000 [$243,000] or £100,000 [$486,000], and Monmouth, Legge, Lady Ranelagh, and Rochester added their intercessions. Russell himself, in petitions to Charles and James, offered to live abroad if his life were spared, and never again to meddle in the affairs of England. He refused, however, to yield to the influence of Burnet and Tillotson, who endeavored to make him grant the unlawfulness of resistance, although it is more than probable that compliance in this would have saved his life. He drew up, with Burnet's assistance, a paper containing his apology, and he wrote to the king a letter, to be delivered after his death, in which he asked Charles's pardon for any wrong he had done him. A suggestion of escape from Lord Cavendish he refused. He behaved with his usual quiet cheerfulness during his stay in the Tower, spending his last day on earth as he had intended to spend the following Sunday if he had reached it. He received the sacrament from Tillotson, and Burnet twice preached to him. Having supped with his wife, the parting from whom was his only great trial, he slept peacefully, and spent the last morning in devotion with Burnet. He went to the place of execution in Lincoln's Inn Fields with perfect calmness, which was preserved to the last. He died on July 21, 1683, in the forty-fourth year of his age.

A true and moderate summing up of his character will be found in his *Life*, by Lord John Russell. (O. A.)

RUSSELL, JOHN SCOTT (1808–1882), was born in 1808 near Glasgow, a "son of the manse," and was at first destined for the ministry. But this intention on his father's part was changed in consequence of the boy's early leanings towards practical science. He attended in succession the universities of St. Andrews, Edinburgh, and Glasgow,—taking his degree in the last-named at the age of sixteen. After spending a couple of years in workshops, he settled in Edinburgh as a lecturer on science, and soon collected large classes. In 1832–33 he was engaged to give the natural philosophy course at the university, the chair having become vacant by the death of Leslie. In the following year he began that remarkable series of observations on waves, whose results, besides being of very great scientific importance, were the chief determining character of his subsequent practical career. Having been consulted as to the possibility of applying steam-navigation to the Edinburgh and Glasgow Canal, he replied that the question could not be answered without experiments, and that he was willing to undertake such if a portion of the canal were placed at his disposal. The results of this inquiry are to be found in the *Transactions of the Royal Society of Edinburgh* (vol. xiv.), and in the *British Association Reports* (seventh meeting). We need not say more than that the existence of the *long wave*, or *wave of translation*, as well as many of its most important features, were here first recognized, and (to give one very simple idea of the value of the investigation) that it was clearly pointed out *why* there is a special rate, depending on the depth of the water, at which a canal-boat can be towed at the least expenditure of effort by the horse. The elementary mathematical theory of the long wave is very simple, and was soon supplied by commentators on Scott Russell's work; a more complete investigation has been since given by Stokes; and the subject may be considered as certainly devoid of any special mystery. Russell held an opposite opinion, and it led him to many extraordinary and groundless speculations, some of which have been published in a posthumous volume, *The Wave of Translation* (1885). His observations led him to propose and experiment on a new system of shaping vessels, which is known as the *wave system*. This culminated in the building of the enormous and unique "Great Eastern," of which it has been recently remarked by a competent authority that "it is probable that, if a new 'Great Eastern' were now to be built, the system of construction employed by Mr. Scott Russell would be followed exactly."

Though his fame will rest chiefly on the two great steps we have just mentioned, Scott Russell's activity and ingenuity displayed themselves in many other fields,—steam-coaches for roads, improvements in boilers and in marine engines, the immense iron dome of the Vienna exhibition, cellular double bottoms for iron ships, etc. Along with Mr. Stafford Northcote (now Lord Iddesleigh), he was joint secretary of the Great Exhibition of 1851; and he was one of the chief founders of the Institution of Naval Architects, from the twenty-third volume of whose *Transactions* we have extracted much of what is stated above. Russell contributed the articles STEAM, STEAM ENGINE, STEAM NAVIGATION, etc., to the 7th edition of the *Encyclopædia Britannica*. He died at Ventnor, June 8, 1882.

RUSSIA
IN EUROPE

SCALE OF MILES
0 50 100 150 200 250

Railroads
Submarine Cables
Canals

Size of type indicates relative importance of places

ARCTIC OCEAN
KARA SEA
GULF OF OB
NOVA ZEMLA
Yalmal Peninsula
Vaigach I.
Kara Bay
Jugor Str.
Burrough or Kara Strait
C. Britvin
Moller B.
Goose Land
Mezdubursky I.
Black C.
C. Menschikoff
North Cape
Hammerfest
Nordkyn
Tana
Vardo
Varanger Fiord
Ribachi Peninsula
Catharine Harbor
Enara L.
Enara
Alexandrovsk
C. Terliberski
Kolguev I.
C. Russaki Sovarut
Pechora R.
Dolgi I.
Pac-Khoi Mts.
Kara I.
Ob R.
Obdorsk
Pac-yer
Kanin Noss
C. Cherni Sviatoi Noss
Kanin Penin.
Indiga B.
Cheskaia Bay
Pustozersk
Pilvor-yakha
Ussa R.
Ussa
Koshva
Ust Zylma
Sabita
Berezov
Ob R.
Yeshevskoye
WESTERN SIBERIA
ARCTIC CIRCLE
Vaiden Is.
Lapland
Kola Peninsula
Kandalaksha
Kandalaksha G.
L. Imandro
Ponoi R.
C. Orlov
Ponoi
Pulonga
G. of Mezen
Mezen
Safonova
Mezen R.
Pechora R.
Kolguev I.
Kanin Noss
Songela
L. Notozero
Kola R.
Kittila
Gellivare
Luosma R.
Pello
Kemitrask
Kemi R.
Kuusamo
Torneo
Kengis
Lulea
Pitea
Jo
Brahestad
Uleaborg
Kajana
Kajanaki
L. Pavo
L. Topo
Keret
Kutno Lakes
Kem
WHITE SEA
Solo
Archangel Gulf
Archangel
Solombola
Pinega
Onega Gulf
Onega Bay
Onega
Cholmogory
Onega R.
Syskoi
Pinega R.
Pashka R.
Kolnas
Mezen R.
Tchuki
Skollapa
Troitzkoye
Ilytsk R.
Sosna R.
Ishma
Potcherye
Toll-Poss-Ia
Valping Nor
Berezov
Ob R.
Sabita
Ust Zylma
Koshva
Ussa R.
Pechora R.
Pilvor-yakha
Ussa R.
Yeshevskoye
Ob R.
Odorsk
Pac-yer
Pac-Khoi Mts.
Kara I.
Dolgi I.
Chaipudyrskaia R.
Kolguev I.
C. Russaki Sovarut
Pechora R.
Kanin Noss
Kanin Penin.
Indiga B.
Cheskaia Bay
Pustozersk
Ussa R.
Ussa
Koshva
Ust Zylma
Sabita
Berezov
Ob R.
Yeshevskoye
WESTERN SIBERIA
Gellivare
Kittila
Pello
Kemitrask
Kemi R.
Kuusamo
Torneo
Kengis
Lulea
Pitea
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Brahestad
Uleaborg
Kajana
Kajanaki
Songela
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Enara L.
Enara
Alexandrovsk
C. Terliberski
Kanin Noss
C. Cherni Sviatoi Noss
Kanin Penin.
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Ussa R.
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Koshva
Ust Zylma
Sabita
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Ob R.
Yeshevskoye
WESTERN SIBERIA
Kola Peninsula
Kandalaksha
L. Imandro
Ponoi R.
C. Orlov
Ponoi
Pulonga
G. of Mezen
Mezen
Safonova
Mezen R.
Pechora R.
Kolguev I.
Kanin Noss
Kandalaksha G.

RUSSIA.

Part I.—General Survey of the Russian Empire.

THE Russian empire is a very extensive territory in eastern Europe and northern Asia, with an area exceeding 8,500,000 square miles, or one-sixth of the land surface of the globe (one twenty-third of its whole superficies). It is, however, but thinly peopled on the average, including only one-fourteenth of the inhabitants of the earth. It is almost entirely confined to the cold and temperate zones. In Nova Zembla (Novaya Zemlya) and the Taimyr peninsula, it projects within the Arctic Circle as far as 77° 2′ and 77° 40′ N. lat.; while its southern extremities reach 38° 50′ in Armenia, about 35° on the Afghan frontier, and 42° 30′ on the coasts of the Pacific. To the west it advances as far as 20° 40′ E. long. in Lapland, 18° 32′ in Poland, and 29° 42′ on the Black Sea; and its eastern limit—East Cape in the Behring Strait—extends to 191° E. longitude.

Plate II.

The Arctic Ocean—comprising the White, Barents, and Kara Seas—and the northern Pacific, that is, the Seas of Behring, Okhotsk, and Japan, bound it in the north and east. The Baltic, with its two deep indentations, the Gulfs of Bothnia and Finland, limits it on the northwest; and two sinuous lines of frontier separate it respectively from Sweden and Norway on the northwest and from Prussia, Austria, and Roumania on the west. The southern frontier is still unsettled, and has never remained unaltered for so many as twenty consecutive years. Quite recently it has been pushed southwards, on both the western and the eastern shores of the Black Sea, parts of Roumania and Asia Minor having been annexed in 1878. In Asia, beyond the Caspian, the southern boundary of the empire remains vague; the advance into the Turcoman Steppes and Afghan Turkestan and on the Pamir plateau is still in progress. Bokhara and Khiva, though represented as vassal khanates, are in reality mere dependencies of Russia. An approximately settled frontier-line begins only farther east, where the Russian and the Chinese empires meet on the borders of Eastern Turkestan, Mongolia, and Manchuria. But even there, the province of Kuldja has recently been occupied by Russia, and again restored to China; while in eastern Mongolia, the great overland route from Kiakhta to Peking, *via* Urga, is in fact in the hands of Russia, and it is difficult to predict how far Russian influence may extend should circumstances lead it to seek a footing on the thinly-peopled plateaus of Central Asia.

Boundaries.

Russia has no oceanic possessions, and has abandoned those she owned in last century; her islands are mere appendages of the mainland to which they belong. Such are the Åland archipelago, Hochland, Tütters, Dagö, and Ösel in the Baltic Sea; Nova Zembla, with Kolgueff and Vaigatch, in the Barents Sea; the Sołovetsky Islands in the White Sea; the New Siberian archipelago, and the small group of the Medvyezhii Islands off the Siberian coast; the Commandor Islands off Kamchatka; the Shantar Islands and Saghalin in the Sea of Okhotsk. The Aleutian archipelago was sold to the United States in 1867, together with Alaska, and in 1874 the Kurile Islands were ceded to Japan.

Islands.

A vast variety of physical features is obviously to be expected in a territory like this, which comprises on the one side the cotton and silk regions of Turkestan and Transcaucasia, and on the other the moss and lichen-clothed Arctic *tundras* and the Verkhoyansk Siberian pole of cold—the dry Transcaspian deserts and the regions watered by the monsoons on the coasts of the Sea of Japan. Still, if the border regions, that is, two narrow belts in the north and south, be left out of account, a striking uniformity of physical feature prevails. High plateaus, like those of Pamir (the "Roof of the World") or of Armenia, and high mountain chains like the snow-clad summits of the Caucasus, the Alay, the Thian-Shan, the Sayan, are met with only on the outskirts of the empire.

Leading physical features.

Viewed broadly by the physical geographer, it appears as occupying the territories to the northwest of that great plateau-belt of the old continent—the backbone of Asia—which spreads with decreasing height and width from the high tableland of Tibet and Pamir to the lower plateaus of Mongolia, and thence northeastwards through the Vitim region to the furthest extremity of Asia. It may be said to consist of the immense plains and flat lands which extend between the plateau-belt and the Arctic Ocean, including also the series of parallel chains and hilly spurs which skirt the plateau-belt on the northwest. It extends over the plateau itself, and crosses it, beyond Lake Baikal only.

Plateau belt of Asia.

This belt—the oldest geological continent of Asia—being unfit for agriculture and for the most part unsuited for permanent settlement, while the oceanic slopes of it have from the dawn of history been occupied by a dense population, has long prevented Slavonian colonization from reaching the Pacific. Russians happened to cross it in the 17th century, only in its narrowest and most northerly part, thus reaching the Pacific on the foggy and frozen coasts of the Sea of Okhotsk; and two centuries elapsed ere, after colonizing the depressions of the plateau around Lake Baikal, the Russians crossed the plateau in a more genial zone and descended to the Pacific by the Amur, rapidly spreading farther south, up the nearly uninhabited Usuri, to what is now the Gulf of Peter the Great. In the southwestern higher portions of the plateau-belt the empire has only recently planted its foot on the Pamir; as we write, it is endeavoring to get command of the lower passages which give an easy access to the Afghan portion of the plateau; while already, within the present century, it has established itself firmly on the plateaus of Armenia.

A broad belt of hilly tracts—in every respect alpine in character, and displaying the same variety of climate and organic life as alpine tracts usually do—skirts the plateau-belt throughout its length on the north and northwest, forming an intermediate region between the plateaus and the plains. The Caucasus, the Elburz, the Kopet-dagh, and Paropamisus, the intricate and imperfectly known network of mountains west of the Pamir, the Thian-Shan and Ala-tau mountain regions, and farther northeast the Altai, the still unnamed complex of Minusinsk mountains, the intricate mountain-chains of Sayan, with those of the Olekma, Vitim, and Aldan, all of which are ranged *en échelon*—the former from northwest to southeast, and the others from southwest to northeast—all of these belong to one immense alpine belt bordering that of the plateaus. These have long been known to Russian colonists, who, seeking to escape religious prosecutions and exactions by the state, early penetrated into and rapidly pushed their small settlements up the better valleys of these tracts, and continued to spread everywhere as long as they found no obstacles in the shape of a former population or in unfavorable climatic conditions.

The alpine belt.

As for the flat-lands which extend from the Alpine hill-foots to the shores of the Arctic Ocean, and assume the character either of dry deserts in the Aral-Caspian depression, or of low table-lands in central Russia and eastern Siberia, of lake-regions in northwest Russia and Finland, or of marshy prairies in western Siberia, and of *tundras* in the far north,—their monotonous surfaces are di-

The flat-lands.

versified by only a few, and these for most part low, hilly tracts. Recently emerged from the Post-Pliocene sea, or cleared of their ice-sheet coverings, they preserve the very same features over immense stretches; and the few portions that rise above the general elevation have more the character of broad and gentle swellings than of mountain-chains. Of this class are the swampy plateaus of the Kola peninsula, gently sloping southwards to the lake-regions of Finland and northwest Russia; the Valdai table-lands, where all the great rivers of Russia take their rise; the broad and gently-sloping meridional belt of the Ural Mountains; and lastly, the Taimyr, Tunguska, and Verkhoyansk ridges in Siberia, which do not reach the snow-line, notwithstanding their sub-Arctic position. As to the picturesque Bureya mountains on the Amur, the forest-clothed Sikhota-alin on the Pacific, and the volcanic chains of Kamchatka, they belong to quite another orographical world; they are the border-ridges of the terraces by which the great plateau-belt descends to the depths of the Pacific Ocean.

Rivers.

It is owing to these leading orographical features—divined by Carl Ritter, but only within the present day revealed by geographical research—that so many of the great rivers of the old continent are comprised within the limits of the Russian empire. Taking rise on the plateau-belt, or in its Alpine outskirts, they flow first, like the upper Rhone and Rhine, along high longitudinal valleys formerly filled up with great lakes; next they find their way through the rocky walls; and finally they enter the lowlands, where they become navigable, and, describing great curves to avoid here and there the minor plateaus and hilly tracts, they bring into water-communication with one another places thousands of miles apart. The double river-systems of the Volga and Kama, the Obi and Irtish, the Angara and Yenisei, the Lena and Vitim on the Arctic slope, the Amur and Sungari on the Pacific slope, are instances. They were the true channels of Russian colonization.

A broad depression,—the Aral-Caspian desert—has arisen where the plateau-belt has reached its greatest height and suddenly changes its direction from a northwestern into a northeastern one; this desert is now filled only to a small extent by the salt waters of the Caspian, Aral, and Balkash inland seas; but it bears unmistakable traces of having been during Post-Pliocene times an immense inland basin. There the Volga, the Ural, the Sir Daria, and the Oxus discharge their waters without reaching the ocean, but continue to bring life to the rapidly drying Transcaspian Steppes, or connect by their river network, as the Volga does, the most remote parts of European Russia.

The extension of colonization.

The above-described features of the physical geography of the empire explain the relative uniformity of this wide territory, in conjunction with the variety of physical features on its outskirts. They explain also the rapidity of the expansion of Slavonic colonization over these thinly peopled regions; and they also throw light upon the internal cohesion of the empire, which cannot fail to strike the traveller as he crosses this immense territory, and finds everywhere the same dominating race, the same features of life. In fact, in their advance from the basins of the Volkhoff and Dnieper to the foot of the Altai and Sayan Mountains, that is, along nearly a quarter of the earth's circumference, the Russian colonizers could always find the same physical conditions, the same forests and prairies as they had left at home, the same facilities for agriculture, only modified somewhat by minor topographical features. New conditions of climate and soil, and consequently new cultures and civilizations, the Russians met with, in their expansion towards the south and east, only beyond the Caucasus, in the Aral-Caspian region, and in the basin of the Usuri on the Pacific coast. Favored by these conditions the Russians not only conquered northern Asia—they colonized it.

Population.

The total population of the Russian empire was stated at 102,000,000 by estimates made in 1878–82; but it is multiplying rapidly, and, as the surplus of births over deaths reaches nearly 1,250,000 every year, it must now be somewhat more than 106 millions.

Within the empire a very great diversity of nationalities is comprised, due to the amalgamation or absorption by the Slavonian race of a variety of Ural-Altaic stems, of Turco-Tartars, Turco-Mongolians, and various Caucasian stems. Statistics as to their relative strength are still very imperfect, and their ethnical relations have not as yet been completely determined; but, considered broadly, they may be classified as follows:

A. The Letto-Slavonians comprise (*a*) the Lithuanians and Letts on the lower Niemen and Düna, and (*b*) the Slavonians, that is, the Poles on the Vistula and Niemen and the Russians—Great, Little, and White—whose proper abodes are in European Russia, south of a line drawn from the Gulf of Finland to the middle Volga. Spreading from this region towards the northeast, east, and southeast, they have colonized northeast Russia, the Ural region, Caucasus, Siberia, and large parts of the Kirghiz Steppe,—the leading feature of their colonization having always been penetration in compact masses among the original inhabitants. Thus, on northern Caucasus the Russians (chiefly Little Russians) already constitute a compact rural population of nearly 1,500,000, that is, about a quarter of the total population of Caucasia. In Western Siberia the Great Russians already number more than 2,300,000 agriculturists, constituting four-fifths of the entire population; in Eastern Siberia they number more than 1,000,000, that is, probably more than the original inhabitants; and the Kirghiz Steppe has also begun rapidly to be colonized within the last twenty years. It is only in the more densely peopled Turkestan, and in the recently annexed Transcaspian region, that Russian settlers continue to bear but a small proportion to the natives (who are more than 4,600,000 strong). The Slavonians altogether number more than 75,000,000, of which number 5,600,000 are Poles.

Swedes (310,000), Germans (1,240,000), Roumanians, Serbs, etc., may number altogether about 2,500,000.

B. A great variety of populations belonging to the Caucasian race, but not yet well classified, some of which are considered to be remainders of formerly larger nationalities pushed aside into the mountain tracts during their migrations, are met with on Caucasus. Such are the Georgians, Ossetes, Lesghians, who fall little short of 2,500,000, and the Armenians, about 1,000,000.

C. The Iranian branch is represented by some 130,000 Persians and Kurds in Caucasia and Transcaucasia, and by Tajiks in Turkestan, mixed with Turco-Tartar Sarts. The nomad Tsigans, or Gypsies, numbering nearly 12,000, may be mentioned under this head.

D. The Semitic branch consists of upwards of 3,000,000 Jews in Poland, in west and southwest Russia, and on Caucasus and in the towns of Central Asia, and of a few thousand Karaite Jews.

E. The Ural-Altaic branch comprises two great subdivisions—the Finnish and the Turco-Tartarian stems, mixed to some extent with Mongolians. The former (see below) occupy, broadly speaking, a wide stretch of territory to the north of the Slavonians, from the Baltic to the Yenisei, and include the Baltic Finns, the Northern Finns, the Volga Finns, and the Ugrians. The Russians have already spread among the last two in compact masses, and, while some stems, like the Ostiaks, are rapidly disappearing,

others, like the Mordvinians, Permians, etc., are losing their national character, and becoming assimilated to the Russians. The West Finns alone have fully maintained their national features, and happen to have constituted a nationality developing into a separate state.

The Turco-Tartars (nearly 10,000,000) comprise the Tartars, the Bashkirs, the Kirghizes, the Uzbegs, and the Turcomans of the Aral-Caspian region, the Yakuts on the Lena, and a variety of smaller stems in East Russia and Caucasia. They occupy another broad belt which extends from the Aral-Caspian depression to the eastern parts of the Arctic coast.

F. The Mongol-Manchurian stems of the Tunguses, and the Golds, and the Manchus proper, come next, occupying the eastern parts of the mountain-belt and the plateau itself in Siberia, the Tunguses also projecting northwestwards, so as to separate the Yakuts from their southern Turkish brethren. Small stems of the same family also pass a nomad existence in the basin of the Amur. They are rapidly diminishing in number, and can hardly be estimated at more than 50,000.

G. The Mongolian branch is represented by nearly half a million of Kalmucks on the Altai outskirts of the great plateau and around the Caspian, and by nearly 250,000 Buriats in and around the Baikal depression.

H. A variety of stems, not yet well classified, are met with on the Pacific coasts. Such are the Tchuktchies, the Kamchadales, the Koryaks in the northeast, the Ghilyaks on the Amur, and the Ainos in Saghalin.

Statistics of the relative strength of different nationalities in the Russian empire, which, however, must be considered only as rough estimates, are given (in millions) in Table I.

The area and population of the various divisions of the Russian empire are given in Table II.

Of the areas given in the table, the following (298,636 square miles) are occupied by internal waters (larger lakes and estuaries):

European Russia	25,804	square miles.
Poland	141	"
Finland	18,471	"
Caucasus	1,628	"
Siberia	18,864	"
Turkestan	4,511	"
Kirghiz Steppes	14,888	"
Transcaspian region	455	"
Sea of Azoff, Caspian Sea, Lake Aral	213,874	"

The islands included in the above statement have the following areas (total 91,182 square miles):

In the White Sea	191	square miles.
" Barents Sea	38,540	"
" Baltic Sea (Russian)	1,579	"
" " (Finnish)	2,000	"
" Black Sea	21	"
" Sea of Azoff	41	"
" Caspian Sea	551	"
" Siberian Arctic Ocean	16,496	"
" Pacific	31,763	"

TABLE I.

	European Russia.	Poland.	Finland.	Caucasia.	Kirghiz Steppes, Turkestan, and Transcaspian.	Siberia.	Total.
Russians	63.316	0.790	0.017	1.530	0.640?	3.380	69.673
Poles	1.020	4.550	...	...	...		5.570
Other Slavonians	0.118	...	...	...	...	...	0.118
Letts	1.254	...	...	...	...	...	1.254
Lithuanians	1.380	0.370	...	...	...	...	1.750
Swedes	0.017	...	0.293	...	...	...	0.310
Germans	0.780	0.460	0.001	...	...	0.003	1.243
Other Europeans	0.910	...		...	...	...	0.911
Persians and Kurds	...	...	...	0.130	...	...	0.130
Armenians	0.050	...	...	0.905	...	...	0.955
Tsigans and other Iranians	0.015	...	...	...	...	...	0.015
Caucasians	...	...	...	2.450	...	...	2.450
Semites	2.203	0.913	...	?	...	0.007	3.123
Finns, Karelians	0.316	...	1.750	...	...	...	2.066
Esthonians, Lives	0.903	...	...	...	...	...	0.903
Other West Finns	0.101	...	...	...	...	...	0.101
Lapps, Samoyedes	0.014	...	...	...	...	0.025	0.039
Volga Finns and Ugrians	1.731	...	...	...	...	0.047	1.778
Tartars	1.510	...	...	1.520		0.100	
Bashkirs	0.906	...	...	...		...	
Kirghizes	0.194	...	...	...		...	
Turcomans	0.002	...	...	...	4.298?	...	9.750?
Yakuts	...	...	...	...		0.200	
Other Turco-Tartars	1.020	...	...	...		...	
Kalmucks	0.118	...	...	...	0.300?	0.020	0.438
Buriats	...	...	...	...	...	0.250	0.250
Tunguses and other Mongol-Manchurians	...	...	...	...	...	0.050	0.050
Tchuktchies, Koryaks, Kamchadales	...	...	...	...	...	0.012	0.012
Total	77.878	7.083	2.061	6.535	5.238?	4.094	102.889

The Russian empire falls into two great subdivisions, the European and the Asiatic, the latter of which, representing an aggregate of nearly 6,500,000 square miles, with a population of only 16 million inhabitants, may be considered as held by colonies. The European dominions comprise European Russia, Finland, which is in fact a separate nationality treated to some extent as an allied state, and Poland, whose very name has been erased from official documents, but which nevertheless continues to pursue its own development. The Asiatic dominions comprise the following great subdivisions: CAUCASIA (*q.v.*), under a separate governor-general; the Transcaspian region, which is under the governor-general of Caucasus; the Kirghiz Steppes; TURKESTAN (*q.v.*), under separate governors-general; Western Siberia and Eastern Siberia (see SIBERIA); Subdivisions of the empire.

and the Amur region, which last comprises also the Pacific coast region and Kamchatka (see KAMCHATKA and MARITIME PROVINCE). The administrative subdivisions, with their populations, as estimated for 1882 for European Russia, Poland, and Caucasus, 1881 for Finland, and 1878–82 for the remainder (no regular

TABLE II.—*Area and Population of the Russian Empire.*[1]

Provinces.	Area, Square Miles.	Population.
1. *European Russia.*		
Archangel	331,505	315,367
Astrakhan	91,327	790,338
Bessarabia	17,619	1,419,762
Courland	10,535	642,570
Don Cossacks	61,886	1,474,133
Ekaterinoslaff	26,148	1,697,061
Esthonia	7,818	379,875
Grodno	14,931	1,226,946
Kaluga	11,942	1,140,337
Kazañ	24,601	1.955,590
Kharkoff	21,041	2,160,263
Kherson	27,523	1,865,164
Kieff	19,691	2,507,231
Kostroma	32,702	1,278,856
Kovno	15,692	1,444,614
Kursk	17,937	2,314,300
Livonia	18,158	1,173,951
Minsk	35,293	1,569,342
Moghilcff	18,551	1,146,470
Moscow	12,859	2,137,179
Nijni-Novgorod	19,797	1,427,893
Novgorod	47,236	1,127,881
Olonetz	57,439	327,323
Orel	18,042	1,892,932
Orenburg	73,816	1,196,133
Penza	14,997	1,382,732
Perm	128,210	2,539,874
Podolia	16,224	2,276,518
Połtava	19,265	2,473,958
Pskoff	17,069	894,712
Ryazañ	16,255	1,713,581
St. Petersburg	20,760	1,622,768
Samara	58,321	2,224,093
Saratoff	32,624	2,113,077
Simbirsk	19,110	1,471,164
Smolensk	21,638	1,191,172
Tamboff	25,710	2,490,313
Taurida	24,539	964,329
Tchernigoff	20,233	1,970,094
Tula	11,954	1,340,866
Tver	25,225	1,617,685
Ufa	47,112	1,771,988
Vilna	16,421	1,204,746
Vitebsk	17,440	1,170,987
Vladimir	18,864	1,352,140
Volhynia	27,743	2,062,270
Vologda	155,498	1,161,551
Voronezh	25,443	2,433,657
Vyatka	59,117	2,740,953
Yaroslavl	13,751	1,082,782
Sea of Azoff	14,478	...
Total, Russian provinces, 1882	1,902,092	77,879,521
2. *Poland.*		
Kalisz	4,392	774,759
Kielce	3,897	643,629
Lomża	4,667	559,316
Lublin	6,499	882,616
Piotrków	4,729	865,777
Płock	4,200	538,141
Radom	4,769	644,827
Siedlce	5,535	630,238
Suwałki	4,846	603,174
Warsaw	5,623	940,998
Total, Poland	49,157	7,083,475
3. *Finland.*		
Åbo-Björneborg	9,335	344,649
Kuopio	16,499	256,420
Nyland	4,586	202,806
St. Michel	8,819	167,310
Tavastchus	8,334	221,360
Uleåborg	63,971	207,782
Wasa	16,627	358,480
Wiborg	16,084	301,975
Total, Finland	144,255	2,060,782
Total, European Russia	2,095,504	87,023,778

Provinces.	Area, Square Miles.	Population.
4. *Russia in Asia.*		
Kubañ[2]	36,497	1,107,922
Stavropol	26,531	637,893
Terek[2]	23,548	615,660
Northern Caucasia	86,576	2,361,475
Baku	15,516	569,992
Daghestan[2]	17,048	529,271
Elizabethpol	11,469	636,316
Erivañ	10,705	583,957
Kars[2]	7,175	162,979
Kutais[4]	14,005	863,195
Tchernomorsk[2]	2,824	25,983
Tiflis	15,578	726,685
Zakataly[3]	1,609	75,000
Transcaucasia	95,929	4,173,378
Caucasus, 1882–83	182,505	6,534,853
Akhal-Tekke[3]	1,640	39,200
Krasnovodsk[3]	40,790	15,700
Manghishlak[3]	80,260	34,500
Merv[3]	about 97,000	about 90,000
Tedjeñ[3]		about 5,000
Iol-otan		about 10,000
Serakhs		about 12,000
Caspian Sea	169,670	...
Transcaspian region,[5] about	390,000	206,000
Akmolinsk[2]	210,564	463,347
Semipalatinsk[2]	188,299	538,385
Turgai, with Lake Aral[2]	202,192	326,706
Uralsk[2]	141,474	525,332
Kirghiz Steppes	742,529	1,853,770
Amu-daria[3]	39,976	222,200
Ferghana[2]	28,045	808,000
Semiryetchensk[2]	155,297	685,945
Sir-daria[2]	166,003	1,109,542
Zerafshan[3]	19,665	351,897
Turkestan	408,986	3,177,584
Central Asia, about	1,541,500	5,237,354
Tobolsk	531,982	1,283,168
Tomsk	329,039	1,134,748
Western Siberia	861,021	2,417,916
Irkutsk	309,190	398,873
Transbaikalia[2]	240,781	497,760
Yakutsk[2]	1,517,127	243,443
Yeniscisk	992,870	421,010
Eastern Siberia	3,059,968	1,561,086
Amur[2]	173,559	40,533
Maritime, or Primorskaya[2]	730,022	74,000
Amur region	903,581	114,533
Total Siberia	4,824,570	4,093,535
Total, Asiatic Russia, about	6,548,600	15,865,742
Grand total, Russian empire, about	8,644,100	102,889,520

[1] The figures are taken, for the areas, from Strelbitzky's *Superficies de l'Europe*, and, for the population, from the *Sbornik Svedeniy o Evropeiskoi Rossii* for 1882, the *Izvestia* of the Caucasus Geographical Society, the *Russkiy Kalendar*, etc. The areas have been reduced, taking the square kilometre as equal to 0.3861167 English square mile.

[2] *Oblasts*, or provinces.

[3] *Okrugs*, or *otdyels* (territories) under military government, the remainder being governments (*gubernii*) under civil governors.

[4] Including Batum and Sukhum.

[5] According to General Meyer, in *Izvestia* of the Russian Geogr. Society, 1885, 4. The areas for the first three districts are given according to M. Seidlitz in *Russische Revue*, 1885, 4; for the remainder, according to General Meyer. The oasis of Merv proper extends to about 2100 square miles. The populations are given without the Russian military. M. Seidlitz estimates them as follows: Akhal Tekke, 42,000; Krasnovodsk, 15,300; Manghishlak, 34,500; Merv, 160,000; Tedjeñ, 7500; total, 260,000. The total population, excluding military, is estimated by military authorities at 214,000.

census having been taken since 1858), are shown above in Table II.

Cities.

The empire contains only twelve cities with a population exceeding 100,000: St. Petersburg, 929,090 (1881); Moscow, 753,469 (1884); Warsaw, 406,260 (1882); Odessa, 217,000 (1882); Riga, 169,330 (1881); Kharkoff, 159,660 (1883); Kazañ, 140,730 (1883); Kishineff, 130,000; Kieff, 127,250 (1874); Łodz, 113,146, in Poland (1884); Saratoff, 112,428 (1882); Tiflis, 104,020 (1883); and Tashkend, 100,000. According to the most recent returns Vilna, Orel, Rostoff, Astrakhan, Nikolaieff, Dünaburg, Tula, Samara, Taganrog, Kherson, Nijni-Novgorod, Berditcheff, Bobruisk, Zhitomir, Minsk, Vitebsk, Elisabetgrad, Reval, and Voronezh had from 94,000 to 50,000 inhabitants, while 61 towns more in European Russia, Finland, and Poland, and 20 in the Asiatic dominions, had from 50,000 to 20,000 inhabitants. The number of towns above 10,000 is considerable, but they are mostly mere administrative centres; many villages have greater importance.

Only 9,263,000 (or 9 per cent.) of the aggregate population of Russia inhabit towns, the number of which is 601 in the 50 Russian governments. The great number of the Russian towns are mere villages; their inhabitants depend on agriculture, and the houses are mostly built of wood, only 127,000 out of about 787,000 houses in towns being built of stone. Of the 68,600,000 who in 1882 formed the rural population of European Russia the greater part were settled in 555,278 villages, almost entirely built of wood; nearly one-seventieth of the houses are destroyed by fire yearly (164,400 out of 10,649,000 in 1882).

Government.

Russia is an absolute and strongly centralized monarchy. The primary unit of state organization is the village community, or *mir*. A number of such communities are united into *volosts*, whose peasant inhabitants elect an elder (*volostnoy starshina*) and a peasants' tribunal (*volostnoy sud*). Placed, however, under the uncontrolled rule of a state official—the *mirovoy posrednik*—and of the police, the elder of the volost and his clerk have become mere organs of the local police and tax-gatherers, while the tribunal of the volost is at the mercy both of influential land-proprietors and of the wealthier peasants or merchants. The system of local self-government is continued in the elective district and provincial assemblies—the *zemstvo*—on the one hand, and on the other in the elective justices of the peace (*mirovoy sudia*), whose periodical gatherings (*mirovoy syezd*) are courts of appeal against the decisions of the individual justices. But neither of these institutions—and least of all the zemstvo—is capable of acquiring the necessary independence. The zemstvos—one for each district, and another for the province—consist of a representative assembly (*zemskoye sobraniye*) and an executive (*zemskaya uprava*) nominated by the former. The sobraniye consists of three classes of delegates: the landed proprietors (all nobles possessing more than 590 acres, and delegates from the remainder, along with delegates from the clergy in their capacity of landed proprietors); representatives of the merchants, artisans, and urban population; and representatives of the peasants, indirectly elected,—matters being usually so adjusted that this class is less numerous than the aggregate of the other two. In theory the zemstvos have large powers in relation to the incidence of taxation, as well as in matters affecting education, public health, roads, etc. But in reality they are for the most part compelled to limit themselves to the adjustment of the state taxation, which is so high that new taxes for education, sanitary purposes, and so on, must necessarily be very limited. Moreover, the decisions of the zemstvos are jealously controlled by the representative of the central Government,—the governor,—and promptly annulled whenever they manifest a different spirit from that prevailing for the time at the court. Disobedience is punished by dissolution, sometimes by administrative exile. These circumstances have helped to eliminate from the zemstvos the better elements which at first entered into their composition. The greater number of them are inspired now with the same red-tapeism as the ministerial chancelleries, or are refuges for proprietors in search of a salary. Still, in several provinces a good deal of most useful work has been done, especially educational, by those zemstvos in which the peasants are in a majority or the proprietors are inspired with a more liberal spirit; while several other zemstvos have recently made extensive and most valuable inquiries into the condition of agriculture, industry, etc.

Since 1870 the municipalities have had institutions like those of the zemstvos. All owners of houses, and tax-paying merchants, artisans, and workmen, are enrolled on lists in a descending order according to their assessed wealth. The total valuation is then divided into three equal parts, each of which elects an equal number of representatives to the *duma*. The executive is in the hands of an elective mayor and an *uprava* which consists of several members elected by the *duma*. Both are, in fact, functionaries under the governor, and the municipal institutions have no real independent life.[1]

The organs of the central government in the provinces are the *uryadniks* (a kind of *gardes-champêtres*) in the villages, the *stanovoys* and *ispravniks* (chiefs of the police) in the districts, and the governors (a kind of Napoleonic prefect) in each government—all invested, the *uryadniks* included, with powers which are the more extensive as they are totally undefined. There is also in each government a special gendarmerie under the "chief of gendarmes," who usually is also the head of the "third section" of the Imperial Chancery. The name of the third section has been recently abolished, but the institution still continues. It has charge of the secret police of the state, and has most varied functions, such as the arrest of supposed political offenders, their exile to Siberia, the delivery of separation papers to spouses desiring divorce, and so on. Several governments are placed under special governors-general, whom the recent law on the "state of siege" invests with almost dictatorial powers.

The higher administration is represented by the emperor, who unites the supreme legislative, executive, and judicial powers, and is surrounded by four distinct councils—the committee of ministers, the council of the empire, the senate, and the Holy Synod. The ministers, who are considered as executing the will of the czar, and are nominated by him, are invested with very extensive powers; their circulars for the interpretation of laws have greater weight than the laws themselves. The council of the empire, which consisted in 1884 of 64 members, nominated by the emperor, besides the ministers and several members of the imperial family, is a consultative body for matters of legislation. The senate, also nominated by the emperor, has two distinct functions. Seven "departments" of it are administrative; they promulgate the laws, examine the acts of governors, adjudicate in their conflicts with zemstvos, and, in theory, can make remonstrances to the emperor,—in fact they merely register and promulgate laws. Two other "departments" are courts of cassation. A special department, reinforced by representatives of nobility, pronounces judgment in political cases. The Holy Synod, consisting of metropolitans and bishops who sit there in turn, has the superintendence of religious affairs.

Justice.

The judicial system introduced in 1864 was conceived in a very liberal spirit, which, unfortunately, has not been maintained. Thus a "preliminary instruction," made by the "third section" in political cases, or by the police, has been subsequently in-

[1] See Golovatchoff, *Ten Years of Reforms in Russia; The Finances of the Zemstvos* (official publication); Dityatin, *Municipal Self-Government in Russia*, 2 vols.; and very numerous and valuable papers in the reviews *Vyestnik Evropy*, *Otetchestvennyya Zapiski*, *Russkaya Mysl*, etc.

troduced. The "judges of instruction," irremovable by law, have not yet been nominated, their functions being discharged by substitutes entirely dependent upon the ministry. Elective justices of the peace decide in all cases involving less than 500 roubles [$243], or less than six months' imprisonment. Their decisions can be brought by appeal before the district gathering of the justices of the peace, and thence before the senate. All criminal cases involving severer penalties are tried by juries, whose verdicts can be set aside only by a court of cassation, but are not respected in cases having a so-called "political" aspect. Political offences are tried by tribunals composed *ad hoc*. Civil cases in which more than 500 roubles [$243] are involved are tried by courts of justice, with appeal to chambers of justice.

Crime.

In 1879 in European Russia,—exclusive of six Lithuanian and White Russian governments,—42,530 persons were tried before the courts, and 59,600 before the justices of the peace, the convictions being respectively 27,397 and 36,742. The aggregate number of condemnations pronounced in 1882 was 46,018 in European Russia, that is, 5.9 condemned in each 10,000; only 4836 of them were women. On January 1, 1882, 93,108 persons were in jail; 530,307 men and 66,073 women (the latter with 30,769 children) were imprisoned during the year, while 625,280 prisoners were liberated or exiled, and on January 1, 1883, the number of prisoners in jail (excluding those of Saghalin and Caucasus) was 97,337. More than 20,000 are annually transported to Siberia.

Administrative divisions.

The empire is divided for administrative purposes into governments (*guberniya*) or territories (*oblast*), of which there are 50 in European Russia and 10 in Poland. Each government, or territory, is divided into eight to fifteen districts (*uyezd*). The Asiatic dominions are divided into one lieutenancy (*namyestnitchestvo*), that of Caucasia, and four general governments—Turkestan, Stepnoye (Kirghiz Steppes), East Siberia, and Amur. They comprise thirty-three governments and territories, besides a few districts (*okrug, otdyel*) in Transcaucasia and the Transcaspian region, regarded almost as separate governments. In Siberia the governors and governors-general are assisted by councils which have a consultative voice. The Baltic provinces have some peculiar institutions. Finland is a separate state, having its own finances, army, and representative institutions, with limited rights, but its ministers of war and the exterior are those of the empire, and its institutions are not always respected by the emperor.

The church.

The emperor is not the head of the church, all decisions in theological matters having to be given by the Synod. His influence, however, is very great, as the nomination of the bishops rests with him. In 1882 there were in Russia 40,569 Orthodox churches and about 14,000 chapels, with 37,318 priests, 7009 deacons, and 45,395 singers. There were also 6752 monks and 3957 aspirants, 4945 nuns and 13,803 female aspirants. The church budget was 18,974,887 roubles [$9,221,795] in 1884. The monasteries and churches are possessed of great wealth, including 2950 square miles of land (a territory greater than that of Oldenburg), an invested capital of 22,634,000 roubles [$11,000,124], an annual subsidy of 408,000 roubles [$198,288] from Government, and a very great number of inns, shops, printing establishments, burial grounds, etc., with whole towns covering an aggregate area of 10½ square miles. Their total annual revenue is estimated at 9,000,000 roubles [$4,374,000].

Education.

Much still remains to be done for the diffusion of the first elements of a sound education throughout the empire; unhappily the endeavors of private persons in this field and of the zemstvos are for political reasons discouraged by the Government. There are seven universities—Dorpat, Kazan, Kharkoff, Kieff, Moscow, Odessa, and St. Petersburg—to which may be added those of Warsaw and Helsingfors. In 1883 the seven Russian universities had 605 professors and 10,528 students, and there were 81 professors and 1228 students at Warsaw. The standard of teaching on the whole is high, and may be compared to that of the German universities. The students are hardworking, and generally very intelligent. Mostly sons of poor parents, they live in extreme poverty, supporting themselves chiefly by translating and by tutorial work. Severe measures have been taken in 1885 in regard to the universities. Explicit regulations for the interpretation of science have been issued, and restrictions laid upon the teaching of philosophy and natural science generally; comparative legislation has been excluded from the programmes; teaching in Russian (instead of German) has been ordered at Dorpat. The students are placed under rigorous regulations in regard to their life outside the university. About 950 students in theological academics and 2500 in higher technical schools must be added to the above.

The state of secondary education still leaves very much to be desired. There were, in 1883, 180 gymnasiums and progymnasiums for boys in European Russia, and 24 in the Asiatic dominions, and 27 and 10 respectively for girls; there were also 73 "real" schools in European Russia and 8 in the Asiatic dominions, and 48 normal schools in Russia and 10 in the Asiatic dominions. To these must be added the 14,800 pupils in 53 theological seminaries, and about 3000 in various secondary schools. The steady tendency of Russian society towards increasing the number of secondary schools, where instruction would be based on the study of the natural sciences, is checked by Government in favor of the classical gymnasiums. The aggregate number of schools for secondary instruction in European Russia in 1882 was 456 for boys and 384 for girls, with 107,930 male and 79,625 female scholars. Of these, 355 schools (45,303 boys and 3199 girls) give professional education.

For primary instruction there were in 1882 in European Russia proper 28,329 schools, with 1,177,504 male and 362,471 female pupils. Of the 6,231,160 roubles [$3,028,343.76] expended on primary schools only 747,772 roubles [$363,417.19] were contributed by Government, the remainder being supplied by the zemstvos (2,512,113 roubles) [$1,220,886.92], by municipalities, or by private persons. Sunday schools and public lectures are virtually prohibited.

A characteristic feature of the intellectual movement in Russia is its tendency to extend to women the means of receiving higher instruction. The gymnasiums for girls are both numerous and good. In addition to these, notwithstanding Government opposition, a series of higher schools, where careful instruction in natural and social sciences is given, have been opened in the chief cities under the name of "Pedagogical Courses." At St. Petersburg a women's medical academy, the examinations of which were even more searching than those of the ordinary academy (especially as regards diseases of women and children), was opened, but after about one hundred women had received the degree of M.D., it has been suppressed by Government. In several university towns there are also free teaching establishments for women, supported by subscription, with programmes and examinations equal to those of the universities. In 1882 the students numbered 914 at St. Petersburg, about 500 at Moscow, and 389 at Kazañ.

Scientific societies.

The natural sciences are much cultivated in Russia, especially during the last twenty years. Besides the Academy of Science, the Moscow Society of Naturalists, the Mineralogical Society, the Geographical Society, with its Caucasian and Siberian branches, the archæological societies and the scientific societies of the Baltic provinces, all of which are of old and recognized standing, there have lately sprung up a series of new societies in connection with each university, and their serials are yearly growing in importance, as also are those of the recently founded Moscow Society of Friends of Natural Science, the Chemico-Physical Society, and various medical, educational, and other societies. The work achieved by Russian savants, especially in biology, physiology, and chemistry, and in the sciences descriptive of the vast territory of Russia, are well known to Europe.

Finance.

The finances of the empire are in a most unsatisfactory condition. Although the revenue has doubled since 1856, and had reached 697,980,983 roubles (£69,798,098)[1] [or $339,218,757.74] in 1883, the expenditure, which was estimated at 721,337,844 roubles [$350,570,192.18] the same year, is always in excess of the income. The national debt is rapidly augmented both by loans and by issues of paper money so depreciated as to be worth only about 60 to 63 per cent. of its nominal value. On January 1, 1884, no less than 1,085,000,000 paper roubles [$527,310,000] were in circulation; and the national debt, the paper-money included, reached about £578,000,000 [$2,797,720,000], inclusive of the railway debt. The great defect of Russian finance is that its direct taxes are chiefly paid by the peasantry (91 per cent. of the whole), and the revenue is chiefly based on excise duties (direct taxes, 136,105,320 roubles [$66,147,185.52]; excise duties on spirits, 250,291,380 [$121,641,610.68]; duties on tobacco and sugar, 28,569,500 [$13,884,777]; import duties, 101,053,000 [$49,111,758]). Of the yearly revenue no less than 436,000,000

[1] Unless metallic or silver roubles are expressly mentioned, the rouble is to be taken throughout the present article as the paper rouble, the recent average value of which has been 2s. sterling [48.6 cents]. The metallic rouble (277.71 grains of pure silver) is equivalent to 38.046 pence sterling [76.09 cents]; but the paper rouble has gradually declined from 94.5 per cent. of its nominal value in 1861-65 to 60 per cent. in 1882 (see below, p. 95).

roubles [$211,896,000] are spent in interest and sinking fund on the debt, and for war purposes.[1]

The zemstvos, which have an aggregate yearly income of about thirty million roubles [$14,580,000], have also a yearly deficit of from three to five million roubles. The municipalities had in 1882 an income of only 40,076,748 roubles [$19,477,299.53], there being only nine cities which had a budget of more than 500,000 roubles [$243,000], and five above one million.

Army. The Russian army has been completely reorganized since the Crimean War, and compulsory military service was introduced in 1874. In 1884 the strength of the army on a peace footing was 532,764 men serving with the colors, 68,786 reserve troops, 55,599 Cossacks and irregulars, 72,626 local, depôt, and instruction troops, 27,468 officers, 129,736 horses, and 1844 guns. On a war footing there were 986,000 in the active army, 563,373 in the reserve, 148,057 Cossacks and irregulars, 178,450 local, depôt, and instruction troops, 41,551 officers, 366,354 horses, and 3778 guns; that is, about 1,300,000 men in field, to which number 1,000,000 untrained militia could be added in case of need. These high figures ought, however, to be much reduced on account of the deficiences of mobilization.

The irregular troops consist of ten *voiskos*—Don, Kubañ, Terek, Astrakhan, Orenburg, Ural, West Siberia, Semiryetchensk, Transbaikalia, and Amur. All the men of these voiskos between sixteen and forty-one years of age are bound to be ready for service in turn in time of peace, and to equip themselves at their own expense, train and artillery being provided by Government. In their twofold capacity as peasant settlers and a military force, these men have contributed much to the conquest of Asia.

Since 1878 compulsory military service has been introduced in Finland. The Finnish troops (nine battalions of 4833 riflemen) must be employed, as a rule, for the defence of their own country.

Navy. Notwithstanding large recent outlays, the Russian navy is by no means adapted to the exigencies of modern warfare; much stress is therefore laid on the good organization of the torpedo flotilla. The navy consists of 358 vessels, of 196,575 tons, carrying 24,500 men and 671 guns. Only 40 of these are armored ships, the remainder being unarmored frigates, corvettes, and cruisers, or torpedo boats (119), while a great number are mere transports and small craft.

Fortresses. The extensive frontier is defended by many fortresses, chiefly on the west. Poland to the west of the Vistula remains quite unprotected, fortifications being only now in course of construction in the southwest; but the Vistula is defended by the first-class fortresses of Modlin (Novogeorgievsk), Warsaw, and Ivangorod, with Brest-Litovsk in the rear. For protecting this line in rear new fortifications are being erected. The space between Poland and the Düna is protected only by the citadel of Vilna and the marshes of the Pripet. The second line of fortresses has been erected on the Düna and Dnieper,—Riga, Dünaburg, Vitebsk, Bobruisk, and Kieff. The southwestern frontier is under the protection of the advanced works of Bendery and Akerman, while the Black Sea coast is defended by Kinburn and Otchakoff at the entrances of the Dneiper and the Bug, Sebastopol in the Crimea, batteries at Odessa and Nikolaieff, and a series of minor fortifications. Formidable defensive works have been erected on the Baltic at Dünamünde, Reval, Narva, Cronstadt, Wiborg, Frederikshamn, Rohtensalm, Sveaborg, Hangöudd, and in the Åland Islands. A great number of minor forts are scattered throughout Caucasia, Transcaucasia, and Turkestau; but the Pacific coast has only earth-works at Vladivostok and Nikolaievsk.

Part II.—European Russia—Geography.

Boundaries. The administrative boundaries of European Russia, apart from Finland and Poland, broadly coincide on the whole with the natural limits of the East-European plains, where they suddenly take, eastward of the Baltic Sea, a great extension towards the north. In the north it is bounded by the Arctic Ocean; the islands of Nova Zembla, Kolgueff, and Vaigatch also belong to it, but the Kara Sea is reckoned to Siberia. To the east it has the Asiatic dominions of the empire, Siberia and the Kirghiz Steppe, from both of which it is separated by the Ural Mountains, the Ural river, and the Caspian—the administrative boundary, however, partly extending into Asia on the Siberian slope of the Urals. To the south it has the Black Sea and Caucasia, being separated from the latter by the double valley of the two Manytches —a channel which in Post-Pliocene times connected the Sea of Azoff with the Caspian. The western boundary is purely conventional: it crosses first the peninsula of Kola from the Varanger Fiord to the northern extremity of the Gulf of Bothnia, making an arbitrary deflection towards the west; thence it runs to the Kurische Haff in the Southern Baltic, and thence to the mouth of the Danube, taking a great circular sweep to the west to embrace Poland, and separating Russia from Prussia, Austrian Galicia, and Roumania.

Of this immense frontier line less than one-half is bordered by seas—nearly all of them inland seas. For it is a special feature of Russia—a feature which has impressed a special character on its history—that she has no free outlet to the high seas except on the ice-bound shores of the Arctic Ocean. Even the White Sea is merely a ramified gulf of that ocean. Another warmer gulf of the Aretic Ocean—the Varanger Fiord—separated from Russia by the uninhabitable plateaus of the peninsula of Kola, has been abandoned to Norway. The deep indentations of the Gulfs of Bothnia and Finland wash the shores of Finnish territory, and it is only at the very head of the latter gulf that the Russians happen to have taken a firm foothold by erecting their capital on the marshes at the month of the Neva. The Gulf of Riga and the southeastern Baltic belong also to territory which is not inhabited by Slavouians, but by Finnish stems, and by Germans. It is only very recently, within the last hundred years, that the Russians definitively took possession of the northern shores of the Black Sea and the Sea of Azoff. The eastern coast of the Black Sea belongs properly to Transcaucasia, a great chain of mountains separating it from Russia. But even this sea is an inland one, the only outlet of which, the Bosphorus, is in foreign hands, while the Caspian is but an immense shallow lake, bordered mostly by deserts, and possessing more importance as a link between Russia and her colonies than as a channel for intercourse with other countries.

Configuration. The great territory occupied by European Russia—1600 miles in length from north to south, and nearly as much from west to east—is on the whole a broad elevated plain, ranging between 500 and 900 feet above sea-level, deeply cut into by river-valleys, and bounded on all sides by broad hilly swellings or mountains: the lake plateaus of Finland and the Maanselkä heights in the northwest; the Baltic coast-ridge and spurs of the Carpathians in the west, with a broad depression between the two, occupied by Poland; the Crimean and Caucasian mountains in the south; and the broad but moderately high swelling of the Ural Mountains in the east.

From a central plateau which comprises Tver, Moscow, Smolensk, and Kursk, and projects eastwards towards Samara, attaining an average height of 800 to 900 feet above the sea, the surface gently slopes in all directions to a level of from 300 to 500 feet. Then it again gently rises as it approaches the hilly tracts enclosing the great plain. This central swelling may be considered a coutinnation towards the east-northeast of the great line of upheavals of western Europe; the heights of Finland would then appear as continuations of the Scanian plateaus, and the northern mountains of Finland as continuations of the Kjölen, while the other great line of upheaval of the old contiuent, which runs northwest and southeast, would be represented in Russia by the Caucasus in the south and the Timan ridge of the Petchora basin in the north.

The hilly aspects of several parts of the central plateau are not due to foldings of the strata, which for the most part appear to be horizontal, but chiefly to the excavating action of rivers, whose valleys are deeply dug out in the plateau, especially on its borders. The round flattened summits of the Valdai plateau do not rise above 1100 feet, and they present the appearauce of mountains only in consequence of the depth of the valleys—the levels of the rivers which flow towards the depression of Lake Peipus being only from 200 to 250 feet above the sea. The case is similar with the plateaus of Livonia, "Wendish Switzerland," and Kovno, which do not exceed 1000 feet at their highest points; so also with the eastern spurs of the Baltic coast-ridge between Grodno and Minsk. The same elevation is reached by a very few flat summits of the plateau about Kursk, and farther east on the Volga about Kamyshin, where the valleys are excavated in the plateau to a depth of from 800 to 900 feet, giving quite a hilly aspect to the country. It is only in the southwest, where spurs of the Carpathians enter Volhynia, Podolia, and Bessarabia, that ridges reaching 1100 feet are met with, intersected by deep ravines.

The depressions on the borders of the central plateau thus acquire a greater importance than the small differences in its height. Such is the broad depression of the middle

[1] *Sbornik Svedeniy* on European Russia; Brzeski, *State Debts of Russia*, 1884.

Volga and lower Kama, bounded on the north by the faint swelling of the Uvały, which is the water-shed between the Arctic Ocean and the Volga basin. Another broad depression, from 250 to 500 feet above the sea, still filled by Lakes Peipus, Ładoga, Onega, Bieło-ozero, Łatche, Vozhe, and many thousands of smaller ones, borders the central plateau on the north, and follows the same east-northeast direction. Only a few low swellings penetrate into it from the northwest about Lake Ouega, and reach 900 feet, while in the northeast it is enclosed by the high Timanskiy ridge (1000 feet). A third depression of a similar character, occupied by the Pripet and the middle Dnieper, extends to the west of the central plateau of Russia, and penetrates into Poland. The immense lacustrine basin is now broken up into numberless ponds, lakes, and extensive marshes (see MINSK). It is bounded on the south by the broad plateaus spreading east of the Carpathians. South of 50° N. lat. the central plateau gently slopes towards the south, and we find there a fourth depression, spreading west and east through Poltava and Kharkoff, but still reaching in its higher parts 500 to 700 feet. It is separated from the Black Sea by a gentle swelling which may be traced from Kremenetz to the lower Don, and perhaps farther southeast. This low swelling includes the Donetz coal-measures and the middle granitic ridges which cause the rapids of the Dnieper. Finally a fifth immense depression, which descends below the level of the ocean, extends for more than 200 miles to the north of the Caspian, comprising the lower Volga and the Ural and Emba rivers, and establishing a link between Russia and the Aral-Caspian region. The depression is continued farther north by plains below 300 feet which join the depression of the middle Volga, and extend as far as the mouth of the Oka.

The Ural Mountains present the aspect of a broad swelling whose strata no longer exhibit the horizontality we see in Russia, and moreover are deeply cut into by rivers. It is connected in the west with broad plateaus joining those of central Russia, but its orographical relations to other upheavals must be more closely studied before they can be definitely pronounced on.

The rhomboidal peninsula of the Crimea, connected by only a narrow isthmus with the continent, is occupied by a dry plateau gently sloping north and east, and bordered in the southeast by the Yaila Mountains, the summits of which range between 4000 and 5113 feet (see CRIMEA and TAURIDA).

Rivers.

Owing to the orographical structure of the East-European plains, which has just been described, the river-system has attained a very high development. Taking their origin from a series of great lacustrine basins scattered over the surface of the plateaus and differing slightly in elevation, the Russian rivers describe immense curves before reaching the sea, and flow with a very gentle gradient, receiving numerous large tributaries, which collect their waters from vast areas. Thus the Volga, the Dnieper, and the Don attain respectively a length of 2110, 1330, and 1125 miles, and their basins cover 645,000, 244,600, and about 115,000 square miles respectively. Moreover the chief rivers of Russia—the Volga, the Düna, the Dnieper, and even the Łovat and the Oka—take their rise in the northwestern part of the central plateau, so close to one another that they may be said to radiate from the same marshes. The sources of the Don are ramified among the tributaries of the Oka, while the upper tributaries of the Kama join those of the Dwina and Petchora. In consequence of this, the rivers of Russia have been from remote antiquity the true channels of trade and migration, and have contributed much more to the elaboration of the national unity than any political institutions. Boats could be conveyed over flat and easy portages, from one river-basin to another, and these portages were subsequently transformed with a relatively small amount of labor into navigable canals, and even at the present day these canals have more importance for the traffic of the country than most railways. By their means the plains of the central plateau —the very heart of Russia, whose natural outlet was the Caspian—were brought into water-communication with the Baltic, and the Volga basin connected with the Gulf of Finland. The White Sea has also been brought into connection with the central Volga basin, while the sister-river of the Volga—the Kama—became the main artery of communication with Siberia.

It must be observed, however, that, though ranking before the rivers of Western Europe in respect of length, the rivers of Russia are far behind as regards the amount of water discharged. They freeze in winter and dry up in summer, and most of them are navigable only during the spring-floods; even the great Volga becomes so shallow during the hot season that only light boats can pass its shoals.

Russia has a very large number of lakes. The aggregate area of the largest ones is stated at 25,800 square miles.

The following is a descriptive list of the principal rivers of European Russia.

A. *Arctic Ocean Basin.*—(1) The Petchora (1025 miles) rises in the northern Urals, and enters the ocean by a large estuary at the Gulf of Petchora. Its basin, thinly peopled and available only for cattle-breeding and for hunting, is quite isolated from Russia by the Timan ridge. The river is navigable for 770 miles; grain and a variety of goods conveyed from the upper Kama are floated down, while furs, fish, and other products of the sea are shipped up the river to be transported to Tcherdyn on the Kama. (2) The Kara (139 miles) enters the Kara Sea. (3) The Mezeñ (510 miles) enters the Bay of Mezeñ; it is navigable for 450 miles, and is the channel of a considerable export of timber. (4) The northern Dwina, or Dvina (950) miles, with a basin of about 150,000 square miles, is formed by the union of two great rivers, the Yug (270 miles) and the Sukhona (330 miles). The Sukhona has its origin in Lake Kubenskoye, in northwest Vologda, and flows rapidly southwards and eastwards, having a great number of rapids. It is navigable throughout its length, and, as Lake Kubenskoye communicates by the Alexander of Würtemberg Canal with Lake Biełoye, it is connected with the Caspian and Baltic. The Vytchegda (685 miles), which flows west-southwest to join the Sukhona, through a woody region, thinly peopled, is navigable for 500 miles and in its upper portion is connected by a canal with the upper Kama. The Dwina flows with a very slight gradient through a broad valley, receiving many tributaries, and reaches the White Sea at Archangel by a number of branches. Notwithstanding serious obstacles offered by shallows, corn, fish, salt, and timber are largely shipped to and from Archangel. (5) The Onega (245 miles) rises in Lake Łatche in the south of Olonetz, and flows into Onega Bay; it has rapids; timber is floated down in spring, and fishing and some navigation are carried on in the lower portion.

B. *Baltic Basin.*—(6) The Neva (46 miles) flows from Lake Ładoga into the Gulf of Finland (see ST. PETERSBURG). (7) The Volkhoff (135 miles), discharging into Lake Ładoga (see LADOGA), and forming part of the Vyshnevolotsk system of canals, is an important channel for navigation; it flows from Lake Ilmen (367 square miles), which receives the Msta (250 miles), connected with the Volga, the Łovat (310 miles), and many smaller tributaries. (8) The Svir (135 miles), also discharging into Lake Ładoga, flows from Lake Onega (4925 square miles), and being part of the Mariinsk canal system, is of great importance for navigation (see VOLGA). (9) The Narova (46 miles) flows out of Lake Peipus into the Gulf of Finland at Narva; it has remarkable rapids, notwithstanding which an active navigation is carried on by means of its waters. Lake Peipus, or Tchudskoye (136 square miles), receives—(10) the Velikaya (210 miles), a channel of traffic with southern Russia from remote antiquity, but now navigable only in its lower portion, and (11) the Embach (83 miles), navigated by steamers to Dorpat. (12) The Düna or West Dwina (577 miles), with a basin area of about 75,000 square miles, rises in the Ostashkoff district of Tver, and falls into the sea below Riga, after having described a great curve to the south. It is shallow above the rapids of Jacobstadt, but navigation is carried on as far as Vitebsk,—corn, timber for shipbuilding, potash, flax, etc., being the principal shipments of its navigable tributaries (the Obsha, Ulla, and Kasplya); the Ulla is connected by the Berezina canals with the Dnieper. (13) The Niemen (Memel), with a course of 470 miles in Russia, rises in the north of Minsk, leaves Russia at Yurburg, and enters the Kurische Haff; rafts are floated upon it almost from its sources, and steamers ply as far as to Kovno; the export of corn and timber to Prussia, and import of fish, grocery, and manufactured ware are considerable; it is connected by the Oginski Canal with the Dnieper. The chief tributaries are the Viliya and the Shara. For (14) the Vistula, with the Bug and Narew, see POLAND.

C. *Black Sea Basin.*—(15) The Pruth (505 miles) rises in Austrian Bukovina, and separates Russia from Roumania; it enters (16) the Danube, which flows along the Russian frontier for 100 miles below Reni, touching it with its Kilia branch. (17) The Dniester (530 miles within Russia and about 330 miles in Austria) rises in Galicia. Light boats and rafts are floated at all points, and steamers ply on its lower portion; its estuary has important fisheries. (18) The Dnieper (1330 miles), with a basin of about 245,000 square miles, with tributaries, waters thirteen governments, of which the aggregate population numbers about 15,000,000. It also originates in the northwestern parts of the central plateau, in the same marshy lakes which give rise to the Volga and Düna. It flows west, south, south-

east, and southwest, and enters a bay in the northwestern part of the Black Sea. In the middle navigable part of its course, from Dorogobuzh to Ekaterinoslaff, it is an active channel for traffic. It receives several large tributaries: on the right, the Berezina (285 miles), connected with the Dünа, and the Pripet (400 miles), both most important for navigation,—as well as several smaller tributaries on which rafts are floated; on the left the Sozh (330 miles), the Desna (590 miles), one of the most important rivers of Russia, navigated by steamers as far as Bryansk, the Suła (252 miles), the Psioł (415 miles), and the Vorskła (268 miles). Below Ekaterinoslaff the Dnieper flows for 46 miles through a series of thirteen rapids. At Kherson it enters its long (40 miles) but shallow estuary, which receives the West Bug (450 miles) and the Inguł (220 miles). The traffic of the Dnieper and its tributaries reached in 1882 an aggregate of 12.9 million cwts. shipped and 6.7 discharged, the principal items being corn, salt, and timber. (19) The Don (1125 miles), with a basin of about 120,000 square miles, and navigable for 880 miles, rises in southeastern Tula and enters the Sea of Azoff at Rostoff by thirty mouths, after describing a great curve to the east at Tsaritsyn, approaching the Volga, with which it is connected by a railway (40 miles). Its navigation is of great importance (5.4 million cwts. shipped, and 5.1 discharged), especially for goods brought from the Volga, and its fisheries are extensive. The chief tributaries are the Sosna (175 miles) and North Donetz (615 miles) on the right, and the Voronezh (305 miles), Khoper (565 miles), Medvyeditsa (410 miles), and Manytch (295 miles), on the left. (20) The Ylya (192 miles), (21) the Kubañ (510 miles), and (22) the Rion belong to Caucasia.

D. *The Caspian Basin.*—(23) The Volga, the chief river of Russia, has a length of 2110 miles, and its basin, about 648,000 square miles in area, contains a population of more than 40,000,000. It is connected with the Baltic by three systems of canals (see VOLGA). (24) The Great and the Little Uzeñ no longer reach the Caspian but lose themselves in the Babinskoye Lakes. (25) The Ural (1475 miles), in its lower part, constitutes the frontier between European Russia and the Kirghiz Steppe; it receives the Sakmara on the right and the Ilek on the left. (26) The East Manytch (175 miles) is on the Caucasian boundary. (27) The Kuma (405 miles), (28) the Terek (360 miles), and (29) the Kura (about 650 miles), with the Arax (about 650 miles), which receives the waters of Lake Gokcha, belong to Caucasia.[1]

Geology.

Almost every geological formation, from the oldest up to the most recent, is met with in Russia; but, as they are almost horizontal, they for the most part cover one another over immense spaces, so that the lower ones appear only at the bottom of the deeper valleys, and the oldest are seen only on the borders of the great Russian plain.

At the beginning of the Palæozoic period only a very few portions of what is now Russia—Finland, namely, and parts of Olonetz—rose above the surface of the sea; but, as the result of a gradual upheaval continued through Palæozoic times, it is supposed that at the end of this epoch Russia was a continent not greatly differing from the present one. In Mesozoic times the sea began again to invade it, but, while in the preceding period the oscillations resolved themselves into a gradual upheaval extending from west to east, in Mesozoic times the upheaval went on from northwest to southeast. The Mesozoic sea, however, did not extend beyond what is now central Russia, and did not cover the "Devonian plateau" of western Russia, which remained a continent from the Carboniferous epoch. A gradual rising of the continent followed, and was continued through Neozoic times, with perhaps a limited subsidence in the Post-Glacial period, when the actual seas extended their narrow gulfs up the valleys now occupied by the great rivers.

During the first part of the Glacial period Russia seems to have been covered by an immense ice-sheet, which extended also over central Germany, and of which the eastern limits cannot yet be determined.

The Archæan gneisses have a broad extension in Finland, northern Russia, the Ural Mountains, and the Caucasus; they form also the backbone of the ridge which extends from the Carpathians through southern Russia. They consist for the most part of red and gray gneisses and granulites, with subordinate layers of granite and granitite. The Finland *rappa-kivi*, the Serdobol gneiss, and the Pargas and Rustiala marble (with the so-called *Eozoon canadense*) yield good building stone; while iron, copper, and zinc ore are common in Finland and in the Urals. Rocks regarded as representing the Huronian system appear also in Finland, in northwestern Russia, as a narrow strip on the Urals, and in the Dnieper ridge. They consist of a series of unfossiliferous crystalline slates. The Cambrian is represented by blue clays, ungulite sandstones, and bituminous slates in Esthonia and St. Petersburg.

The Silurian system is widely developed, and it is most probable that with the exception of the Archæan continents of Finland and the Urals, the Silurian sea covered the whole of Russia. Being concealed by more recent deposits, Silurian rocks appear on the surface only in northwestern Russia (Esthonia, Livonia, St. Petersburg, and on the Volkoff), where all European subdivisions of the system have been found, in the Timan ridge, on the western slope of the Urals, in the Pai-kho ridge, and in the islands of the Arctic Ocean. In Poland it is met with in the Kielce mountains, and in Podolia in the deeper ravines.

The Devonian dolomites, limestones, and red sandstones cover immense tracts and appear on the surface over a much wider area. From Esthonia these rocks extend northeast to Lake Onega, and southeast to Moghileff; they form the central plateau, as also the slopes of the Urals and the Petchora region. In northwestern and middle Russia they contain a special fauna, and it appears that the Lower Devonian series of western Europe, represented in Poland and in the Urals, is missing in northwestern and central Russia, where only the Middle and Upper Devonian divisions are found.

Carboniferous deposits cover nearly all eastern Russia, their west boundary being a line drawn from Archangel to the upper Dnieper, thence to the upper Don, and south to the mouth of the last-named river, with a long narrow gulf extending west to encircle the plateau of the Donetz. They are visible, however, only on the western borders of this region, being covered towards the east by thick Permian and Triassic strata. Russia has three large coal-bearing regions—the Moscow basin, the Donetz region, and the Urals. In the Valdai plateau there are only a few beds of mediocre coal. In the Moscow basin, which was a broad gulf of the Carboniferous sea, coal appears as isolated inconstant seams amidst littoral deposits, the formation of which was favored by frequent minor subsidences of the sea coast. The Donetz coal measures, containing abundant remains of a rich land flora, cover nearly 16,000 square miles, and comprise a valuable stock of excellent anthracite and coal, together with iron mines. Several smaller coal fields on the slopes of the Urals and on the Timan ridge may be added to the above. The Polish coal fields belong to another Carboniferous area of deposit, which extended over Silesia.

The Permian limestones and marls occupy a strip in eastern Russia of much less extent than that assigned to them on geological maps a few years ago. The variegated marls of eastern Russia, rich in salt springs, but very poor in fossils, are now held by most Russian geologists to be Triassic. Indisputably Triassic deposits have been found only in the two Bogdo mountains in the Kirghiz Steppe (*Campiler-Schichten*) and in southwestern Poland.

During the Jurassic period the sea began again to invade Russia from southeast and northwest. The limits of the Russian Jurassic system may be represented by a line drawn from the double valley of the Sukhona and Vytchegda to that of the upper Volga, and thence to Kieff, with a wide gulf penetrating towards the northwest. Within this space three depressions, all running southwest to northeast, are filled up with Upper Jurassic deposits. They are much denuded in the higher parts of this region, and appear but as isolated islands in central Russia. In the southeast all the older subdivisions are represented, the deposits having the characters of a deep sea deposit in the Aral-Caspian region and on the Caucasus.

The Cretaceous deposits—sands, loose sandstones, marls, and white chalk—cover the region south of a line drawn from the Niemen to the upper Oka and Don, and thence northeast to Simbirsk, with the exception of the Dnieper and Don ridge, the Yaiła Mountains, and the upper Cau-

[1] *Bibliography.*—The lengths of the rivers of European Russia as ascertained by accurate measurements are given by Tillo, in *Izvestia* of Geogr. Soc., 1883. See also Stnekenberg, *Hydr. des R. Reichs;* Semenoff, *Geogr. Statis. Dictionary* (the most reliable source for all the geography of Russia). Strelbitzky, *Superficies de l'Europe;* H. Wagner, "Studien im Geb. d. Areal-statistik," in the *Stat. Monatsschrift*, viii.; official *Svod Materialoff*, with regard to Russian rivers, 1876; Statistical *Sbornik* of the Min. of Communications, vol. x. (freezing of Russian rivers and navigation). Besides the military statistical descriptions of separate governments, a great variety of monographs dealing with separate rivers and basins are also available; *e.g.*, Sidoroff, *The Petchora Region*, and *North Russia;* Helmersen, *Olonetzer Bergrevier;* Turbin, *The Dnieper;* Prasolenko, "The Dniester," in *Engin. Journ.*, 1881; Danilevsky, "Kubañ," in *Mem. Geogr. Soc.*, i.; Baer, *Caspische Studien;* Ragozin, *Volga;* Peretyatkovitch, *Volga;* Mikhailoff, *Kama*, etc. An oro-hydrographical map of Russia in four sheets was published in 1878; see also Tillo, *Orogr. Map of Russia;* the ordinance maps of Russia; and Tillo, "Magnetical Maps of Russia," in *Izv.* of Geogr. Soc., 1884 and 1885.

casus. They are rich in grinding stone, and especially in secondary layers of phosphorites.

The Tertiary formations occupy large areas in southern Russia. The Eocene covers wide tracts from Lithuania to Tsaritsyn, and is represented in the Crimea and Caucasus by thick deposits belonging to the same ocean which left its deposits on the Alps and the Himalayas. Oligocene, quite similar to that of North Germany, and containing brown coal and amber, has been met with only in Poland, Courland, and Lithuania. The Miocene (Sarmatian stage) occupies extensive tracts in southern Russia, south of a line drawn through Lublin to Ekaterinoslaff and Saratoff. Not only the higher chains of Caucasus and Yaïk, but also the Donetz ridge, rose above the level of the Miocene sea, which was very shallow to the north of this last ridge, while farther south it was connected both with the Vienna basin and with the Aral-Caspian. The Pliocene appears only in the coast region of the Black and Azoff Seas, but it is widely developed in the Aral-Caspian region, where, however, the Ust-Urt and the Obshchiy Syrt rose above the sea.

The thick Quaternary, or Post-Pliocene, deposits which cover nearly all Russia were for a long time a puzzle to geologists. They consist of a boulder clay in the north and of loess in the south. The former presents an intimate mixture of boulders brought from Finland and Olonetz (with an addition of local boulders) with small gravel, coarse sand, and the finest glacial mud,—the whole bearing no trace of ever having been washed up and sorted by water in motion, except in subordinate layers of glacial sand and gravel; the size of the boulders decreases on the whole from north to south, and the boulder clay, especially in northern and central Russia, often takes the shape of ridges parallel to the direction of the motion of the boulders. Its southern limits, roughly corresponding with those established by Murchison, but not yet settled in the southeast and east, are, according to M. Nikitin, the following: from the southern frontier of Poland to Ovrutch, Umañ, Krementchug, Poltava, and Razdornaya (50° N. latitude), with a curve northwards to Kozelsk (?); thence due north to Vetluga (58° north latitude), east to Glazova in Vyatka, and from this place towards the north and west along the watershed of the Volga and Petchora (?). South of the 50th parallel appears the loess, with all its usual characters (land fossils, want of stratification, etc.), showing a remarkable uniformity of composition over very large surfaces; it covers both watersheds and valleys, but chiefly the former. Such being the characters of the Quaternary deposits in Russia, the majority of Russian geologists now adopt the opinion that Russia was covered, as far as the above limits, with an immense ice-sheet which crept over central Russia and central Germany from Scandinavia and north Russia. Another ice-covering was probably advancing at the same time from the northeast, that is, from the northern part of the Urals, but the question as to the glaciation of the Urals still remains open. As to the loess, the view is more and more gaining ground which considers it as a steppe-deposit due to the drifting of fine sand and dust during a dry episode in the Pleistocene period.

The deposits of the Post-Glacial period are represented throughout Russia, Poland, and Finland, as also throughout Siberia and central Asia, by very thick lacustrine deposits, which show that, after the melting of the ice sheet, the country was covered with immense lakes, connected by broad channels, (the *fjärden* of the Swedes), which later on gave rise to the actual rivers. On the outskirts of the lacustrine region, closely resembling the area of the actual continent, traces of marine deposits, not higher than 200 or perhaps even 150 feet above the present sea level, are found alike on the Arctic Sea and on the Baltic and Black Sea coasts. A deep gulf of the Arctic Sea advanced up the valley of the Dwina; and the Caspian, connected by the Manytch with the Black Sea, and by the Uzboy valley with Lake Aral, penetrated north up the Volga valley as far as its Samara bend. Unmistakable traces show that, while during the Glacial period Russia had an arctic flora and fauna, the climate of the Lacustrine period was more genial than it is now, and a dense human population at that time peopled the shores of the numberless lakes.

The Lacustrine period has not yet reached its close in Russia. Finland and the northwest hilly plateaus are still in the same geological phase, and are dotted with numberless lakes and ponds, while the rivers continue to dig out their yet undetermined channels. But the great lakes which covered the country during the Lacustrine period have disappeared, leaving behind them immense marshes like those of the Pripet and in the northeast. The disappearance of what still remains of them is accelerated not only by the general decrease of moisture, but also by the gradual upheaval of northern Russia, which is going on from Esthonia and Finland to the Kola peninsula and Nova Zembla, at an average rate of about two feet per century. This upheaval,—the consequences of which have been felt even within the historic period, by the drainage of the formerly impracticable marshes of Novgorod and at the head of the Gulf of Finland,—together with the destruction of the forests, which must be considered, however, as a quite secondary and subordinate cause, contributes towards a decrease of precipitation over Russia and towards increased shallowness of the rivers. At the same time, as the gradients of her rivers are gradually increasing on account of the upheaval of the continent, the rivers dig their channels deeper and deeper. Consequently central and especially southern Russia witness the formation of numerous miniature cañons, or *ovraghi* (deep ravines), the summits of which rapidly advance and ramify in the loose surface deposits. As for the southern steppes, their desiccation, the consequence of the above causes, is in rapid progress.[1]

Soil.

The soil of Russia depends chiefly on the distribution of the boulder-clay and loess covering described above, on the progress made by the rivers in the excavation of their valleys, and on the moistness of climate. Vast areas in Russia are quite unfit for cultivation, 27 per cent of the aggregate surface of European Russia (apart from Poland and Finland) being occupied by lakes, marshes, sands, etc., 38 per cent. by forest, 14 per cent. by prairies, and only 21 per cent. being under culture. The distribution of all these is, however, very unequal, and the five following subdivisions may be established: (1) the *tundras;* (2) the forest region; (3) the middle region, comprising the surface available for agriculture and partly covered with forests; (4) the black-earth (*tchernoziom*) region; and (5) the Steppes. Of these the black-earth region,—about 150,000,000 acres,—which reaches from the Carpathians to the Urals, extending to the Pinsk marshes and the upper Oka in the north, is the most important. It is covered with a thick sheet of black earth, a kind of loess, mixed with 5 to 15 per cent. of humus, due to the decomposition of an herbaceous vegetation, which developed richly during the Lacustrine period on a continent relatively dry even at that epoch. On the three-fields system corn has been grown upon it for fifty to seventy consecutive years without manure. Isolated black-earth islands, less fertile of course, occur also in Courland and Kovno, in the Oka, Volga, and Kama depression, on the slopes of the Urals, and in a few patches in the north. Towards the Black Sea coast its thickness diminishes, and it disappears in the valleys. In the extensive region covered with boulder-clay the black earth appears only in isolated places, and the soil consists for the most part of a sandy clay, containing a much smaller admixture of humus. There culture is possible only with the aid of a considerable quantity of manure. Drainage finding no outlet through the thick clay covering, the soil of the forest region is often covered with extensive marshes, and the forests themselves are often mere thickets spreading over marshy ground; large tracts covered with sand appear in the west, and the admixture of boulders with the clay in the northwest renders agriculture increasingly difficult. On the Arctic coast the forests disappear, giving place to the tundras. Finally in the southeast, towards the Caspian, on the slopes of the southern Urals and the Obshchiy Syrt, as also in the interior of the Crimea, and in several parts of Bessarabia, there are large tracts of real desert, covered with coarse sand and devoid of vegetation.[2]

Climate.

Notwithstanding the fact that Russia extends from north to south through 26 degrees of latitude, the climate of its different portions, apart from the Crimea and the Caucasus, presents a striking uniformity. The aerial currents—cyclones, anti-cyclones, and dry southeast winds—extend over wide surfaces and cross the flat plains freely. Everywhere we find a cold winter and a hot summer, both varying in their duration, but differing relatively little in the extremes of temperature recorded. From Table III. (page 83) it will be seen that there is no place in Russia, Archangel and Astrakhan included, where the thermometer does not rise in

[1] *Bibliography.*—*Memoirs, Izvestia,* and Geological Maps of the Committee for the Geological Survey of Russia; *Memoirs* and *Sborniks* of the Mineralogical Society, of the Academy of Science, and of the Societies of Naturalists at the Universities; *Mining Journal;* Murchison's *Geology of Russia;* Helmersen's and Möller's *Geological Maps* of Russia and the Urals; Inostrantseff in Appendix to Russian translation of Reclus's *Géogr. Univ.,* and *Manual of Geology* (Russian).

[2] *Bibliography.*—Ruprecht, *Geo.-Botanical Researches on the Tchernoziom;* Dokutchaeff, *Russian Tchernoziom,* 1880; Id., *Phys. Chem. Researches; Materials for Statistics of Russia,* published by the Minister of Domains, v., 1871; Wasiltchikoff, "Tchernoziom and its Future," in *Mem. Moscow Soc. of Agr.,* 1877.

summer nearly to 86° Fahr. and descend in winter to —13° and —22°. It is only on the Black Sea coast that we find the absolute range of temperature reduced to 108°, while in the remainder of Russia it reaches 126° to 144°, the oscillations being between —22° to —31°, occasionally —54°, and 86° to 104°, occasionally, 109°. Everywhere the rainfall is small; if Finland and Poland, on the one hand and Caucasus with the Caspian depression on the other be excluded, the average yearly rainfall varies between the limits of 16 and 28 inches. Everywhere, too, we find that the maximum rainfall does not take place in winter (as in western Europe) but in summer, and that the months of advanced spring are warmer than the corresponding months of autumn.

Though thus exhibiting all the distinctive features of a continental climate, Russia is not altogether exempt from the moderating influence of the ocean. The Atlantic cyclones also reach the Russian plains, mitigating to some extent the cold of the winter, and in summer bringing with them their moist winds and thunderstorms; their influence is chiefly felt in western Russia, but extends also towards and beyond the Urals. They thus check the extension and limit the duration of the cold anticyclones.

Throughout Russia the winter is of long continuance. The last days of frost are experienced for the most part in April, but also in May to the north of 55°. The spring is exceptionally beautiful in central Russia; late as it usually is, it sets in with vigor, and vegetation develops with a rapidity which gives to this season in Russia a special charm unknown in warmer climates; the rapid melting of snow at the same time raises the rivers, and renders a great many minor streams navigable for a few weeks. But a return of cold weather, injurious to vegetation, is observed throughout central and eastern Russia between May 18 and 24, so that it is only in June that warm weather sets in definitely, reaching its maximum in the first half of July (or of August on the Black Sea coast). The summer is much warmer than might be supposed; in south-eastern Russia it is much warmer than in the corresponding latitudes of France, and really hot weather is experienced everywhere. It does not, however, prevail for long, and in the first half of September the first frosts begin to be experienced on the middle Urals; they reach western and southern Russia in the first days of October, and are felt on the Caucasus about the middle of November. The temperature descends so rapidly that a month later, about October 10 on the middle Urals and November 15 throughout Russia, the thermometer ceases to rise above the freezing point. The rivers rapidly freeze; towards November 20 all the streams of the White Sea basin are covered with ice, and so remain for an average of 167 days; those of the Baltic, Black Sea and Caspian basins freeze later, but about December 20 nearly all the rivers of the country are highways for sledges. The Volga remains frozen for a period varying between 150 days in the north and 90 days at Astrakhan, the Don for 100 to 110 days, and the Dnieper for 83 to 122 days. On the Düna ice prevents navigation for 125 days, and even the Vistula at Warsaw remains frozen for 77 days. The lowest temperatures are experienced in January, in which month the average is as low as 20° to 5° Fahr. throughout Russia; in the west only does it rise above 22°. On the whole February and March continue to be cold, and their average temperatures rise above zero only on the Black Sea coast. Even at Kieff and Lugañ the average of March is below 30°, while in central Russia it is 25° to 22°, and as low as 20° and 16° at Samara and Orenburg.

Isotherms.—All Russia is comprised between the isotherms of 32° and 54°. On the whole they are more remote from one another than even on the plains of North America, those of 46° to 32° being distributed over 20 degrees of latitude. They are on the whole inclined towards the south in eastern Russia; thus the isotherm of 39° runs from St. Petersburg to Orenberg, and that of 35° from Torneå to Uralsk. The inflection is still greater for the winter isotherms. Closely following one another, they run almost north and south; thus Odessa and Königsberg are situated on the same winter isotherm of 28°; so also St. Petersburg, Orel, and the mouth of the Ural river (about 20°); Mezen and Ufa (9°). The summer isotherms cross the above nearly at right angles, so that Kieff and Ufa, Warsaw and Tobolsk, Riga and the upper Kama have the same average summer temperatures of 64°, 62½°, and 61°.

Winds, Moisture, Rainfall.—The investigation of the cyclones and anticyclones in Russia cannot as yet be regarded as completed. It appears, however, that in January the cyclones mostly cross northwest Russia (north of 55° and west of 40° E. long.), following directions which vary between northeast and southeast. In July they are displaced towards the north, and cross the Gulf of Bothnia, while another series of cyclones crosses middle Russia, between 50° and 55° N. lat. The laws of the anticyclones are not yet established. The winds closely depend on the routes followed by both. Generally, however, it may be said that alike in January and in July west and southwest winds prevail in western Russia, while eastern ones are most common in southeastern Russia; northern winds are most common on the Black Sea coast. The strength of the wind is greater, on the whole, than in the continental parts of western Europe, and it attains its maximum in winter. Terrible gales blow from October to March, especially on the southern steppes and on the tundras. Gales with snow (*burans myatels*), lasting from two to three days, or northerly gales without snow, are especially dangerous to man and beast. The average relative moisture reaches 80 to 85 per cent. in the north, and only 70 to 81

TABLE III.

	North Latitude.	Height above Sea in Feet.	Average Temperatures.			Average.		Full Range of Thermometer.	First Frosts.	Last Frosts.	Number of Days per Year.		Average Rainfall in Inches.	
			Year.	Jan.	July.	Minimum.	Maximum.				Bright.	Cloudy.	Year.	November to March.
	° ′		°	°	°	°	°	°						
Archangel	64 34	30	32.7	7.6	60.6	—33	84	147	26 Sept.	20 May	23	199	16.2	4.3
Petrozavodsk	61 47	160	36.4	11.8	62.1	—24	86	135	...	...	...	...	...	...
Helsingfors	60 10	40	39.0	19.5	61.5	—17	80	112	...	...	...	...	19.6	7.3
St. Petersburg	59 57	20	38.4	15.0	64.0	—20	83	135	15 Oct.	8 May	35	148	18.3	5.3
Bogoslovsk	59 45	630?	29.4	—3.8	62.5	—47	87	150	20 Sept.	14 May	43	94	15.8	3.1
Dorpat	56 22	220	39.5	17.6	63.1	—14	85	124	7 Oct.	3 May	40	145	24.9	7.3
Kostroma	57 46	360	37.3	9.4	66.3	—27	88	140	...	...	...	...	19.4	5.2
Ekaterinburg	56 49	890	32.8	2.2	63.5	—33	87	142	21 Oct.	14 May	40	138	14.1	1.6
Kazañ	55 47	260	37.2	7.0	67.3	—25	89	129	1 Oct.	27 April	...	...	18.0	5.4
Moscow	55 45	520	39.0	12.1	66.0	—22	88	144	7 Oct.	26 April	35	142	23.0	7.3
Vilna	54 41	390	43.8	22.1	65.6	—10	85	110	17 Oct.	27 April	23	175	...	...
Warsaw	52 14	360	44.9	23.8	65.4	— 2	86	123	18 Oct.	7 April	40	154	22.8	6.7
Orenburg	51 45	360	37.9	4.7	70.9	—28	96	147	...	...	...	...	17.1	5.8
Kursk	51 44	690	41.0	13 7	67.2	—19	91	139	...	...	...	...	19.9	5.6
Kieff	50 27	590	44.2	21.0	66.3	—13	89	122	19 Oct.	17 April	34	132	20.1	6.0
Tsaritsyn	48 42	100	44.4	13.4	74.6	...	...	...	...	...	...	...	...	...
Lugañ	48 27	200	45.6	17.0	73.0	—18	95	146	11 Oct.	11 April	64	124	14.3	4.3
Odessa	46 29	270	49.0	24.8	72.3	— 3	89	108	10 Nov.	31 Mar.	67	112	15.6	5.4
Astrakhan	46 21	— 70	49.0	19.2	77.9	—14	97	135	27 Oct.	5 April	69	114	5.7	1.5
Sebastopol	44 37	130	53.7	35.2	73.8	+10	93	105	...	...	...	...	15.4	7.2
Poti	42 9	0	58.4	39.0	73.3	+25	93	88	12 Jan.	1 Mar.	...	...	64.9	23.4
Tiflis	41 42	1440	54.5	33.0	75.7	+10	96	100	18 Nov.	15 Mar.	...	...	19.3	4.3

per cent. in southern and eastern Russia. In the steppes it is only 60 per cent. during the summer, and still less (57) at Astrakhan. The average amount of cloud reaches 73 to 75 per cent. on the White Sea and in Lithuania, 68 to 64 in central Russia, and only 59 to 53 in the south and southeast. The amount of rainfall is shown in the preceding table (III.).[1]

Flora.

The flora of Russia, which represents an intermediate link between those of Germany and Siberia, is strikingly uniform over a very large area. Though not poor at any given place, it appears so if the space occupied by Russia be taken into account, only 3300 species of phanerogams and ferns being known. Four great regions may be distinguished: the Arctic, the Forest, the Steppe, and the Circum-Mediterranean.

The *Arctic Region* comprises the *tundras* of the Arctic littoral beyond the northern limit of forests, which last closely follows the coast-line, with bends towards the north in the river valleys (70° N. lat. in Finland, on the Arctic Circle, about Archangel, 68° N. lat. on the Urals, 71° on West Siberia). The shortness of the summer, the deficiency of drainage, and the thickness of the layer of soil which is frozen through in winter are the elements which go to the making of the characteristic features of the tundras. Their flora is far nearer those of northern Siberia and North America than that of central Europe. Mosses and lichens cover them, as also the birch, the dwarf willow, and a variety of shrubs; but where the soil is drier, and humus has been able to accumulate, a variety of herbaceous flowering plants, some of which are familiar also in western Europe, make their appearance. Only from 275 to 280 phanerogams are found within this region.

The *Forest Region* of the Russian botanists occupies the greater part of the country from the Arctic tundras to the Steppes, and it maintains over this immense surface a remarkable uniformity of character. M. Beketoff subdivides it into two portions—the forest region proper, and the "Ante-Steppe" (*predstepie*). The northern limit of the Ante-Steppe would be represented by a line drawn from the South Pruth through Zhitomir, Kursk, Tamboff, and Stavropol-on-Volga to the sources of the Ural. But the forest region proper itself presents a certain variety of aspect in its northern and southern parts, and must in turn be again subdivided into two parts—the coniferous region and that of the oak forests,—these being separated by a line drawn through Pskoff, Kostroma, Kazañ, and Ufa. Of course the oak occurs farther north than this, and conifer forests extend farther south, advancing even to the border-region of the Steppes; but this line must still be considered as important. To the north of it we have dense forests, covering very large areas, and interrupted oftener by marshes than by meadows or cultivated fields. Vast and impenetrable forests, unpassable marshes and thickets, frequent lakes, swampy meadows, with cleared and dry spaces here and there occupied by villages, are the leading features of the region. Fishing and hunting are the important sources of livelihood. The characteristics of what may be described as the oak region, which comprises all central Russia, are totally different. The surface is undulatory; marshy meadow lands no longer exist on the flat watersheds, and only a few shelter themselves in the much deeper and broader river valleys. Forests are still numerous where not destroyed by man, but their character has changed. Conifers are rare and the Scotch pine, which covers the sandy plains, has taken the place of the *Abies;* birch, oak, and other deciduous trees compose the forests, the soil of which is dry, and the extension of which is interrupted by green prairies. Viewed from a rising ground, the landscape presents a pleasing variety of cornfield and forest, while the horizon is broken by the belltowers of numerous villages along the banks of the streams.

Viewed as a whole, the flora of the forest region must be regarded as European-Siberian; and though certain species disappear towards the east, while new ones make their appearance, it maintains, on the whole, the same characters throughout from Poland to Kamchatka. Thus the beech (*Fagus sylvatica*), a characteristic tree of western Europe, is unable to face the continental climate of Russia, and does not penetrate beyond Poland and the southwestern provinces, reappearing again in the Crimea. The silver fir (*pichta*) does not extend over Russia, and the oak does not cross the Urals. On the other hand, several Asiatic species (Siberian pine, larch, cedar) grow freely in the northeast, while several shrubs and herbaceous plants, originally from the Asiatic steppes, have spread into the southeast. But all these do not greatly alter the general characters of the vegetation. The coniferous forests of the north contain, besides conifers, the birch (*Betula alba, B. pubescens, B. fruticosa*, and *B. verrucosa*, which extend from the Petchora to the Caucasus), the aspen, two species of alder, the mountain-ash (*Sorbus aucuparia*), the wild-cherry tree, and three species of willow. South of 62°—64° north latitude appears the lime-tree, which multiplies rapidly and, notwithstanding the rapidity with which it is being exterminated, constitutes entire forests in the east (central Volga, Ufa). Farther south the ash (*Fraxinus excelsior*) and the oak make their appearance, the latter (*Quercus pedunculata*) reaching in isolated groups and trees as far as to St. Petersburg and South Finland (*Q. Robur* appears only in the southwest). The hornbeam is prevalent in the Ukraine, and the maple begins to appear in the south part of the coniferous region. In the forest region no fewer than 772 flowering species are found, of which 568 dicotyledons occur in the Archangel government (only 436 to the east of the White Sea, which is a botanical limit for many species). In central Russia the species become still more numerous, and, though the local floras cannot yet be considered complete, they number from 850 to 1050 species in the separate governments, and about 1600 in the best explored parts of the southwest. Corn is cultivated throughout this region. Its northern limits—which are sure to advance still farther as the population increases—almost reach the Arctic coast at the Varanger Fiord; farther east they hardly extend to the north of Archangel, and the limit is still lower towards the Urals. The northern frontier of rye closely corresponds to that of barley. Wheat is cultivated in South Finland, but in western Russia it hardly passes 58° N. lat. Its true domains are the oak region and the Steppes. Fruit-trees are cultivated as far as 62° N. in Finland, and as far as 58° in the east. Apricots and walnuts flourish at Warsaw, but in Russia they do not extend beyond 50°. Apples, pears, and cherries are grown throughout the oak region.

The *Region of the Steppes*, which covers all southern Russia, may be subdivided into two zones—an intermediate zone and that of the Steppes proper. The Ante-Steppe of the preceding region and the intermediate zone of the Steppes include those tracts where the West-European climate struggles with the Asiatic, and where a struggle is being carried on between the forest and the Steppe. It is comprised between the summer isotherms of 59° and 63°, being bounded on the south by a line which runs through Ekaterinoslaff and Lugañ. South of this line begin the Steppes proper, which extend to the sea and penetrate to the foot of Mount Caucasus.

The Steppes proper are very fertile elevated plains, slightly undulated, and intersected by numerous ravines which are dry in summer. The undulations are scarcely apparent to the eye as it takes in a wide prospect under a blazing sun and with a deep-blue sky overhead. Not a tree is to be seen, the few woods and thickets being hidden in the depressions and deep valleys of the rivers. On the thick sheet of black earth by which the Steppe is covered a luxuriant vegetation develops in spring; after the old grass has been burned a bright green covers immense stretches, but this rapidly disappears under the burning rays of the sun and the hot easterly winds. The coloring of the Steppe changes as if by magic, and only the silvery plumes of the *koryl* (*Stipa pennata*) wave under the wind, giving the Steppe the aspect of a bright yellow sea. For days together the traveller sees no other vegetation; even this, however, disappears as he nears the regions recently left dry from the Caspian, where salted clays covered with a few *Salsolaceæ*, or mere sands, take the place of the black-earth. Here begins the Aral-Caspian desert. The Steppe, however, is not so devoid of trees as at first sight appears. Innumerable clusters of wild cherries (*Prunus Chamæcerasus*), wild apricots (*Amygdalus nana*), *tchilizhnik* (*Caragana frutescens*), and other deep-rooted shrubs grow in the depressions of the surface and on the slopes of the ravines, giving the Steppe that charm which manifests itself in the popular poetry. Unfortunately the spread of cultivation is fatal to these oases (they are often called "islands" by the inhabitants); the axe and the plow ruthlessly destroy them.

The vegetation of the *poimy* and *zaimischas* in the marshy bottoms of the ravines, and in the valleys of streams and rivers, is totally different. The moist soil gives free development to thickets of various willows (*Salicineæ*), bordered with dense walls of wormwood and needle-bearing

[1] *Bibliography.—Memoirs* of the Central Physical Observatory; *Repertorium für Meteorologie* and *Meteorological Sbornik*, published by the same body; Vesselovsky, *Climate of Russia* (Russian); Wild, *Temperatur-Verhältnisse des Russ. R.*, 1881; Woyeikoff, *The Climates of the Globe*, 1884 (Russ.), containing the best general information about the climate of Russia; Klossovsky, *Thunderstorms in Russia*, 1885 (Russ.); *Memoirs* and *Izvestia* of the Geographical Society; many papers in the *Memoirs* and *Bulletin* of the Academy of Sciences, in the *Trudy* of the Scientific Societies at the Universities, in the Moscow *Bulletin*, *etc.;* Woyeikoff and Leist in Appendix to Russian translation of Élisée Reclus's *Géogr. Univ.;* Woyeikoff, in *Russkiy Kalendar* and in *Mem. Russ. Geogr. Soc.*, 1885.

Compositæ, and interspersed with rich but not extensive prairies harboring a great variety of herbaceous plants; while in the deltas of the Black Sea rivers impenetrable masses of rush (*Arundo Phragmites*) shelter a forest fauna. But cultivation rapidly changes the physiognomy of the Steppe. The prairies are superseded by wheat-fields, and flocks of sheep destroy the true steppe-grass (*Stipa pennata*), which retires farther east.

A great many species unknown to the forest region make their appearance in the Steppes. The Scotch pine still covers sandy spaces, and maple (*Acer tatarica* and *A. campestre*), the hornbeam, and the white and black poplar become quite common. The number of species of herbaceous plants rapidly increases, while beyond the Volga a variety of Asiatic species join the West-European flora.

The *Circum-Mediterranean Region* is represented by a narrow strip of land on the south coast of the Crimea, where a climate similar to that of the Mediterranean coast has permitted the development of a flora closely resembling that of the valley of the Arno. Of course, human cultivation has not yet acclimatized there the same variety of plants as that imported into Italy since the Romans. It has even destroyed the rich forests which sixty years ago made deer-hunting possible at Kherson. The olive and the chestnut are rare; but the beech reappears, and the *Pinus Pinaster* recalls the Italian pines. At a few points, such as the Nikitsky garden and Alupka, where plants have been acclimatized by human agency, the Californian *Wellingtonia*, the Lebanon cedar, many evergreen trees, the laurel, the cypress, and even the Anatolian palm (*Chamærops excelsa*) flourish. The grass vegetation is very rich, and, according to lists still incomplete, no fewer than 1654 flowering plants are known. On the whole, the Crimean flora has little in common with that of the Caucasus, where only 244 Crimean species have as yet been found.[1]

Fauna.

The fauna of European Russia does not very materially differ from that of western Europe. In the forests not many animals which have disappeared from western Europe have held their ground; while in the Urals only a few—now Siberian, but formerly also European—are met with. On the whole, Russia belongs to the same zoo-geographical region as central Europe and northern Asia, the same fauna extending in Siberia as far as the Yenisei and Lena. In southeastern Russia, however, towards the Caspian, we find a notable admixture of Asiatic species, the deserts of that part of Russia belonging in reality rather to the Aral-Caspian depression than to Europe.

For the zoo-geographer only three separate sub-regions appear on the East-European plains—the tundras, including the Arctic islands, the forest region, especially the coniferous part of it, and the Ante-Steppe and Steppes of the black-earth region. The Ural mountains might be distinguished as a fourth sub-region, while the south coast of the Crimea and Caucasus, as well as the Caspian deserts, have their own individuality.

As for the adjoining seas, the fauna of the Arctic Ocean off the Norwegian coast corresponds, in its western parts at least, to that of the North Atlantic Gulf Stream. The White Sea and the Arctic Ocean to the east of Svyatoi Nos belong to a separate zoological region connected with, and hardly separable from, that part of the Arctic Ocean which extends along the Siberian coast as far as to about the Lena. The Black Sea, of which the fauna was formerly little known but now appears to be very rich, belongs to the Mediterranean region, slightly modified, while the Caspian partakes of the characteristic fauna inhabiting the lakes and seas of the Aral-Caspian depression.

In the region of the tundras life has to contend with such unfavorable conditions that it cannot be abundant. Still, the reindeer frequents it for its lichens, and on the drier slopes of the moraine deposits four species of lemming, hunted by the *Canis lagopus*, find quarters. Two species of the white partridge (*Lagopus albus*, *L. alpinus*), the lark, one *Plectrophanes*, two or three species of *Sylvia*, one *Phylloscopus*, and the *Motacilla* must be added. Numberless aquatic birds, however, visit it for breeding purposes. Ducks, divers, geese, gulls, all the Russian species of snipes and sandpipers (*Limicula*, *Tringa*), etc., cover the marshes of the tundras, or the crags of the Lapland coast.

The forest region, and especially its coniferous portion, though it has lost some of its representatives within historic times, is still rich. The reindeer, rapidly disappearing, is now met with only in Olonetz and Vologda; the *Cervus pygargus* is found everywhere, and reaches Novgorod. The weasel, the fox, and the hare are exceedingly common, as also the wolf and the bear in the north; but the glutton (*Gulo borealis*), the lynx, and even the elk (*C. alces*) are rapidly disappearing. The wild boar is confined to the basin of the Düna, and the *Bison europæus* to the Bielovyczha forests. The sable has quite disappeared, being found only on the Urals; the beaver is found at a few places in Minsk, and the otter is very rare. On the other hand, the hare (*roussak*), and also the gray partridge (*Perdix cinerea*), the hedgehog, the quail, the lark, the rook (*Trypanocorax frugilega*), and the stork find their way into the coniferous region as the forests are cleared (Bogdanoff). The avifauna of this region is very rich; it includes all the forest and garden birds which are known in western Europe, as well as a very great variety of aquatic birds. A list, still incomplete, of the birds of St. Petersburg shows 251 species. Hunting and shooting give occupation to a great number of persons. The reptiles are few. As for fishes, all those of western Europe, except the carp, are met with in the lakes and rivers in immense quantities, the characteristic feature of the region being its wealth in *Coregoni* and in *Salmonidæ* generally.

In the Ante-Steppe the forest species proper, such as *Pteromys volans* and *Tamias striatus*, disappear, but the common squirrel (*Sciurus vulgaris*), the weasel, and the bear are still met with in the forests. The hare is increasing rapidly, as well as the fox. The avifauna, of course, becomes poorer; nevertheless the woods of the Steppe, and still more the forests of the Ante-Steppe, give refuge to many birds, even to the hazel-hen (*Tetrao bonasia*), the woodcock, and the black grouse (*Tetrao tetrix*, *T. urogallus*). The fauna of the thickets at the bottom of the river valleys is decidedly rich, and includes aquatic birds. The destruction of the forests and the advance of wheat into the prairies are rapidly impoverishing the Steppe fauna. The various species of rapacious animals are disappearing, together with the colonies of marmots; the insectivores are also becoming scarce in consequence of the destruction of insects, while vermin, such as the suslik (*Spermophilus*, see MARMOT), become a real plague, as also the destructive insects which have been a scourge to agriculture during recent years.[2] The absence of *Coregoni* is a characteristic feature of the fish-fauna of the Steppes; the carp, on the contrary, reappears, and the rivers are rich in sturgeons (*Acipenserides*). On the Volga below Nijni Novgorod the sturgeon (*Acipenser ruthenus*), and others of the same family, as also a very great variety of ganoids and *Teleostei*, appear in such quantities that they give occupation to nearly 100,000 people. The mouths of the Caspian rivers are especially celebrated for their wealth of fish.[3]

Ethnography.

Prehistoric anthropology is a science of very recent growth in Russia; and, notwithstanding the energy displayed within that field during the last twenty years, the task of reconstructing the early history of man on the plains of eastern Europe is daily becoming more complicated as new data are brought to light. Remains of Palæolithic man, contemporary with the large Quaternary mammals, are few in Russia; they are known only in Poland, Poltava, and Voronezh, and perhaps also on the Oka. Those of the later portions of

[1] *Bibliography*—Beketoff, Appendix to Russian translation of Griesebach and Reclus's *Géogr. Univ.*; Ledebour, *Flora Rossica*; Trautvetter, *Rossiæ Arcticæ Plantæ*, 1880; Id., *Floræ Rossicæ Fontes*; for flora of the tundras, Beketoff's "Flora of Archangel," in *Mem. Soc. Natur.* at St. Petersburg university, xv., 1884; Regel, *Flora Rossica*, 1884; floras of separate governments in several scientific periodicals; Brown, *Forestry in the Mining Districts of the Urals*, 1885; *Reports* by Commissioners of Woods and Forests in Russia, 1884; Forestry Almanac (*Lyesnoi Kalendar*) for 1885.

[2] *The Year* 1884 *with regard to Agriculture*, St. Petersburg, 1885, gives nearly complete lists of them.

[3] *Bibliography.*—There being no general recent work published on the fauna of Russia, beyond a valuable sketch (for the general reader) by M. Bogdanoff in the Appendix to the Russian translation of Reclus's *Géogr. Univ.*, v., the classical work of Pallas, *Zoographia Rosso-Asiatica*, and the works dealing with different departments of the fauna in different parts of Russia, must be resorted to. These include the following: Syevertsoff, for the birds of southeastern Russia; Bogdanoff, *Birds and Mammals of the Black-Earth Region of the Volga Basin*; Karelin for the southern Urals; Kessler for fishes; Strauch, *Die Schlangen des Russ. R.*, for reptiles generally; Rodszkowski and the publications of the Entomological Society generally for insects; Czerniavsky for the marine fauna of the Black Sea; Kessler for that of Lakes Onega and Ladoga; Grimm for the Caspian; and the publications of the scientific societies for a very great number of monographs dealing with departments of the fauna of separate governments, seas, and lakes. The fauna of the Baltic provinces is described in full in the *Memoirs* of the scientific bodies of these provinces. Middendorff's *Sibirische Reise*, vol. iv., *Zoology*, though dealing more especially with Siberia, is an invaluable source of information for the Russian fauna generally. *Vega-expeditionens Vetenskapliga Jakttagelser* may be consulted for the mammals of the tundra region and marine fauna. For more detailed bibliographical information see *Aperçu des travaux zoo-géographiques*, published at St. Petersburg in connection with the Exhibition of 1878; and the index *Ukazatel Russkoi Literatury* for natural science, mathematics, and medicine, published since 1872 by the Society of the Kieff university.

the Lacustrine period, on the contrary, are so numerous that scarcely one old lacustrine basin in the regions of the Oka, the Kama, the Dnieper, not to speak of the lake-region itself, and even the White Sea coasts, can be mentioned where remains of Neolithic man have not been discovered, showing an unexpected variety of minor anthropological features, even at that remote period. The Russian plains have been, however, the scene of so many migrations of various races of mankind, the dwelling-places of prehistoric man and the routes followed during his migrations were so clearly indicated by natural conditions, and so often re-occupied, or again covered by new waves of colonization and migration, that at many places a series of deposits belonging to widely distant epochs are found superposed. Settlements belonging to the Stone age, and manufactories of stone implements, burial grounds (*kostishchas*) of the Bronze epoch, earthen forts (*gorodishchas*), and grave mounds (*kurgans*)—of which last four different types are known, the earliest belonging to the Bronze period—are superposed upon and obliterate one another, so that a long series of researches is necessary in order that sound generalizations may be reached.

Two different races—a brachycephalic and a dolichocephalic—can be distinguished among the remains of the earlier Stone period (Lacustrine period) as having inhabited the plains of eastern Europe. But they are separated by so many generations from the earliest historic times that sure conclusions regarding them are impossible; at all events, as yet Russian archæologists are not agreed as to whether the ancestors of the Slavonians were Sarmatians only or Scythians also (Samokvasoff, Lemière), whose skulls have nothing in common with those of the Mongolian race. The earliest points that can, comparatively speaking, be regarded as settled must thus be taken from the 1st century, when the Northern Finns migrated from the North Dwina region towards the west, and the Sarmatians were compelled to leave the region of the Don, and to cross the Russian steppes from east to west, under the pressure of the Aorzes (the Mordvinian Erzya?) and Siraks, who in their turn were soon followed by the Huns and the Ugur-Turkish stem of Avars.

It appears certain, moreover, that in the 7th century southern Russia was occupied by the empire of the KHAZARS (*q.v.*), who drove the Bulgarians, descendants of the Huns, from the Don, one section of them migrating up the Volga to found there the Bulgarian empire, and the remainder migrating towards the Danube. This migration compelled the Northern Finns to advance farther west, and a mixture of Tavasts and Karelians penetrated to the south of the Gulf of Finland.

Finally, it is certain that as early as the 8th century, and probably still earlier, a stream of Slavonian colonization, advancing eastward from the Danube, was thrown on the plains of southwestern Russia. It is also most probable that another similar stream—the northern, coming from the Elbe, through the basin of the Vistula—ought to be distinguished. In the 9th century the Slavonians already occupied the Upper Vistula, the southern part of the lake region, and the central plateau in its western parts. They had Lithuanians to the west; various Finnish stems, mixed towards the southeast with Turkish stems (the present Bashkirs); the Bulgars, whose origin still remains doubtful, on the middle Volga and Kama; and to the southeast the Turkish-Mongolian world of the Petchenegs, Polovtsi, Uzes, etc.; while in the south, along the Black Sea, extended the empire of the Khazars, who kept under their rule several Slavonian stems, and perhaps also some of Finnish origin. In the 9th century also the Ugrians are supposed to have left their Ural abodes and to have crossed southeastern and southern Russia on their way to the basin of the Danube.

If these numerous migrations on the plains of Russia be taken into account, and if we add to them the Mongolian invasion, the migration of South Slavonians towards the Oka, the North Slavonian colonization extending northeast towards the Urals and thence to Siberia, the slow advance of Slavonians into Finnish territory on the Volga, and at a later period their advance into the prairies on the Black Sea, driving back the Turkish stems which occupied them,—if we consider the manifold mutual influences of these three races on one another, we shall be able to form a faint idea of the present population of European Russia.

If the Slavonians be subdivided into three branches—the western (Poles, Czechs, and Wends), the southern (Serbs, Bulgarians, Croatians, etc.), and the eastern (Great, Little, and White Russians), it will be seen that, with the exception of some 3,000,000 Ukrainians or Little Russians, in East Galicia and in Poland, and a few on the south slope of the Carpathians, the whole of the East Slavonians occupy, as a compact body, western, central, and southern Russia.

Like other races of mankind, the Russian race is not a pure one. The Russians have taken in and assimilated in the course of their history a variety of Finnish and Turco-Finnish elements. Still, craniological researches show that, notwithstanding this fact, the Slavonian type has maintained itself with remarkable persistency—Slavonian skulls ten and thirteen centuries old exhibiting the same anthropological features as are seen in those of our own day. This may be explained by a variety of causes, of which the chief is the maintenance by the Slavonians down to a very late period of gentile organization and gentile marriages, a fact vouched for, not only in the pages of Nestor, but still more by deep traces still visible in the face of society, the *gens* later on passing into the village community, and the colonization being carried on by great compact bodies. This has all along maintained the same characters. The Russians do not emigrate as isolated individuals; they migrate in whole villages. The overwhelming numbers of the Slavonians, and the very great differences in ethnical type, belief, mythology, between the Aryans and Turanians, may have contributed in the same direction, and throughout the written history of the Slavonians we see that, while a Russian man, far away from his home among Siberians, readily marries a native, the Russian woman seldom does the like. All these causes, and especially the first-mentioned, have enabled the Slavonians to maintain their ethnical features in a relatively high degree of purity, so as to assimilate foreign elements and make them reinforce or improve the ethnical type, without giving rise to half-breed races. The maintenance of the very same North-Russian type from Novgorod to the Pacific, with but minor differentiations on the outskirts—and this notwithstanding the great variety of races with which the Russians came in contact—cannot but strike the observer. But a closer observation of what is going on even now on the recently colonized confines of the empire—where whole villages live, and will continue to live, without mixing with natives, but very slowly bringing them over to the Russian manner of life, and then very slowly taking in a few female elements from them—gives the key to this prominent feature of Russian life, which is a colonization on an immense scale, and assimilation of foreigners, without in turn losing the primary ethnical features.

Not so with the national customs. There are features—the wooden house, the oven, the bath—which the Russian never abandons though lost amidst alien populations. But when settled among these the Russian—the North-Russian—readily adapts himself to many other differences. He speaks Finnish with Finns, Mongolian with Buriats, Ostiak with Ostiaks; he shows remarkable facility in adapting his agricultural practices to new conditions, without, however, abandoning the village community; he becomes hunter, cattle-breeder, or fisherman, and carries on these occupations according to local usage; he modifies his dress and adapts his religious beliefs to the locality he inhabits. In consequence of all this, the Russian peasant (not, be it noted, the trader) must be recognized as the best colonizer among the Aryans; he lives on the best terms with Ostiaks, Tartars, Buriats, and even with Red Indians when lost in the prairies of the American Far-West.

Subdivisions of Russians.

Three different branches, which may become three separate nationalities, can be distinguished among the Russians since the dawn of their history: the Great Russians, the Little Russians (Malorusses or Ukrainians), and the White Russians (the Bielorusses). These correspond to the two currents of immigration mentioned above, the northern and southern, with perhaps an intermediate one, the proper place of the White Russians not having as yet been exactly determined. The primary distinctions between these branches have been increased during the last nine centuries by their contact with different nationalities,—the Great Russians taking in Finnish elements, the Little Russians undergoing an admixture of Turkish blood, and the White Russians submitting to Lithuanian influence. Moreover, notwithstanding the unity of language, it is easy to detect among the Great Russians themselves two separate branches, differing from one another by slight divergences of language and type and deep diversities of national character,—the Central Russians and the Novgorodians; the latter extend throughout northern Russia into Siberia. They correspond, perhaps, to subdivisions mentioned by Nestor. It is worthy of notice, moreover, that many minor anthropological features can be distinguished both among the Great and Little Russians, depending probably on the assimilation of various minor subdivisions of the Ural-Altaians.

The Great Russians number about 42,000,000, and occupy in one block the space enclosed by a line drawn from the White Sea to the sources of the western Düna, the Dnieper, and the Donetz, and thence, through the mouth of the

Sura, by the Vetluga, to Mezeñ. To the east of this boundary they are mixed with Turco-Finns, but in the Ural Mountains they reappear in a compact body, and extend thence through southern Siberia and along the courses of the Lena and Amur. Great Russian noncomformists are disseminated among the Little Russians in Tchernigoff and Moghileff, and they reappear in greater masses in Novorossia, as also in northern Caucasia.

The Little Russians, who number about 17,000,000, occupy the Steppes of southern Russia, the southwestern slopes of the central plateau and those of the Carpathian and Lublin mountains, and the Carpathian plateau. The Sitch of the Zaporog Cossacks colonized the Steppes farther east, towards the Don, where they met with a large population of Great Russian runaways, constituting the present Don Cossacks. The Zaporog Cossacks, sent by Catherine II. to colonize the east coast of the sea of Azoff, constituted there the Black Sea and later the Knbañ Cossacks (part of whom, the Nekrasovtsy, migrated to Turkey). They have also peopled large parts of Stavropol and northern Caucasia.

The White Russians, mixed to some extent with Great and Little Russians, Poles, and Lithnanians, now occupy the upper parts of the western slope of the central plateau. They number about 4,300,000.

The Finnish stems, which in prehistoric times extended from the Obi all over northern Russia, even then were subdivided into Ugrians, Permians, Bulgarians, and Finns proper, who drove back the previous Lapp population from what is now Finland, and about the 7th century penetrated to the south of the Gulf of Finland, in the region of the Lives and Kors, where they mixed to some extent with the Lithuanians and Letts.

At present the stems of Finnish origin are represented in Russia by the following: (*a*) the Western Finns; the Tavasts, in central Finland; the Kvänes, in northwestern Finland; the Karelians, in the east, who also occupy the lake-regions of Olonetz and Archangel, and have settlements in separate villages in Novgorod and Tver; the Izhora and Vod, which are local names for the Finns on the Neva and the southeastern coast of the Gulf of Finland; the Esthes in Esthonia and northern portion of Livonia; the Lives on the Gulf of Riga; and the Kors, mixed with the Letts; (*b*) the Northern Finns, or Lapps, in northern Finland and on the Kola peninsula, and the Samoyedes in Archangel; (*c*) the Volga Finns, or rather the old Bulgarian branch, to which belong the MORDVINIANS (*q. v.*) and perhaps the Tcheremisses in Kazañ, Kostroma, and Vyatka, who are also classified by some authors with the following: (*d*) the Permians, or Cis-Uralian Finns, including the Votiaks on the east of Vyatka, the Permians in Perm, the Zyrians in Vologda, Archangel, Vyatka, and Perm, and the Tcheremisses; (*e*) the Ugrians, or Trans-Uralian Finns, including the Voguls on both slopes of the Urals, the Ostiaks in Tobolsk and partly in Tomsk, and the Madjares, or Ugrians.

The Turco-Tartars in European Russia number about 3,600,000. The following are their chief subdivisions. (1) The Tartars, of whom three different stems must be distinguished: (*a*) the Kazañ Tartars on both banks of the Volga, below the mouth of the Oka, and on the lower Kama, penetrating also farther south in Ryazañ, Tamboff, Samara, Simbirsk, and Penza; (*b*) the Tartars of Astrakhan at the month of the Volga; and (*c*) those of the Crimea, a great many of whom have recently emigrated to Turkey. There are, besides, a certain number of Tartars from the southeast in Minsk, Grodno, and Vilna. (2) The Bashkirs, who inhabit the slopes of the southern Urals, that is, the Steppes of Ufa and Orenburg, extending also into Perm and Samara. (3) The Tchuvashes, on the right bank of the Volga, in Kazañ and Simbirsk. (4) The Mescheriaks, a tribe of Finnish origin which formerly inhabited the basin of the Oka, and, driven thence during the 15th century by the Russian colonizers, immigrated into Ufa and Perm, where they now live among Bashkirs, having adopted their religion and customs. (5) The Tepters, also of Finnish origin, settled among Tartars and Bashkirs, together with the Mescheriaks, also in Samara and Vyatka. They have adopted the religion and customs of the Bashkirs, from whom they can hardly be distinguished. The Bashkirs, Mescheriaks, and Tepters have rendered able service to the Russian Government against the Kirghizes, and until 1863 they constituted a separate Bashkir and Mescheriak Cossacks army, employed for service in the Kirghiz Steppe. (6) The Kirghizes, whose true abodes were in Asia, in the Ishim and Kirghiz Steppe; but one section of them crossed the Urals and occupied the Steppes between the Urals and the Volga. Only the Horde of Bukeeff inhabits European Russia, northeast of Astrakhan, the remainder belonging to Turkestan and Siberia.

The Mongolian race is represented in Russia by the Lamaite Kalmuks, who inhabit the Steppes of Astrakhan between the Volga, the Don, and the Kuma. They immigrated to the mouth of the Volga from Dzungaria, in the 17th century, driving out the Tartars and the Nogais, and after many wars with the Don Cossacks, followed by treaties of mutual assistance for military excursions, one part of them was taken in by the Don Cossacks, so that even now there are among these Cossacks several Kalmuk *sotnias* or squadrons. They live for the most part in tents, supporting themselves by cattle-breeding, and partly by agriculture.

The Semitic race is represented in Russia by upwards of 3,000,000 Jews and 3000 Karaites. The Jews first entered Poland from Germany during the crusades, and soon spread through Lithuania, Courland, the Ukraine, and, in the 18th century, Bessarabia. The rapidity with which they peopled certain towns and whole provinces was really prodigious. Thus, from having been but a few dozens at Odessa some eighty years since, they make now one-third of its population (73,400 out of 207,000). The law of Russia prohibits them from entering Great Russia, only the wealthiest and most educated enjoying this privilege; nevertheless they are met with everywhere, even on the Urals. Their chief abodes, however, continue to be Poland, the western provinces of Lithuania, White and Little Russia, and Bessarabia. In Russian Poland they are in proportion of 1 to 7 inhabitants. In Kovno, Vilna, Moghileff, Grodno, Volhynia, Podolia, and probably also in Bessarabia and Kherson, they constitute, on the average, 10 to 16 per cent. of the population, while in separate districts the proportion reaches 30 to 36 per cent. (50.5 in Tchanssy). Organized as they are into a kind of community for mutual protection and mutual help (the Kahal), they soon become masters of the trade wherever they penetrate. In the villages they are mostly innkeepers, intermediaries in trade, and pawnbrokers. In many towns most of the skilled laborers and a great many of the unskilled (for instance, the grain-porters at Odessa and elsewhere) are Jews. In the 16 western provinces of Russia they numbered 2,843,400 in 1883, and about 432,000 in five Polish provinces. Less than 600,000 of them inhabit villages, the remainder being concentrated in towns.

The Karaites differ entirely from the Jews both in worship and in mode of life. They, too, are inclined to trade, but also successfully carry on agriculture. Those inhabiting the Crimea speak Tartar, and the few who are settled in western Russia speak Polish. They are on good terms with the Russians.

Of West Europeans, only the Germans attain considerable numbers (upwards of a million) in European Russia. In the Baltic provinces they constitute the ennobled landlord class, and that of tradesmen and artisans in towns. Considerable numbers of Germans, also tradesmen and artisans, were scattered throughout many of the larger towns of Russia as early as the 16th century, and to a much greater extent in the 18th century, German artisans having been invited by the Government to settle in Russia, and their numbers having steadily increased since. Finally, numbers of Germans were invited in 1762 to settle in southern Russia, as separate agricultural colonies, which gradually extended in the Don region and in northern Caucasia. Protected as they were by the right of self-government, exempted from military service, and endowed with considerable allotments of good land, these colonies are much wealthier than the neighboring Russian peasants from whom they have adopted the slowly modified village community. They are chiefly Lutherans, but many of them belong to other religious sects,—Anabaptists, Moravians, Mennonites (about 40,000). In certain districts (Akkerman, Odessa, Berdiansk, Kamyshin, Novouzensk) they constitute from 10 to 40 per cent. of the total population. The Swedes, who number about 300,000 in Finland, hardly reach 12,000 in European Russia, mostly in the Baltic provinces.

The Roumanians (Moldavians) number not less than 800,000, and are still increasing. They inhabit the Governments of Bessarabia, Podolia, Kherson, and Ekaterinoslaff. In Bessarabia they constitute from one-fourth to three-fourths of the population of certain districts. On the whole, the Novorossian governments (Bessarabia, Kherson, Ekaterinoslaff, and Taurida) exhibit the greatest variety of population. Little and Great Russians, Roumanians, Bulgarians, Serbs, Germans, Greeks, Frenchmen, Poles, Tartars, and Jews are mixed together and scattered about in small colonies, especially in Bessarabia. Of course, the Greeks inhabit chiefly the towns, where they carry on trade, as also do the Armenians, scattered through the towns of Southern Russia, and appearing in larger numbers only in the district of Rostoff (10 per cent. of population).

Geographical distribution of races.

However great the variety of nationalities inhabiting European Russia, its ethnological composition is much simpler than might at first sight be supposed. The Russians—Great, Little, and White—largely prevail over all others, both numerically and as respects the territories they occupy in compact bodies. Central Russia is almost purely Great Russian, and represents a compact body of more than 30,000,000 inhabitants with but 1 to 5 per cent. of admixture of other nationalities. The governments on the Dnieper (Kieff, Volhynia, Tchernigoff, Podolia, and Poltava), as also the adjoining districts of Kharkoff, Voronezh, Kursk, and Don, are Little Russian, or Ukrainian, with but a slight admixture of White and Great Russian, and some 12 per cent. of Jews. The Poles there number only 3 to 6 per cent. of the population—chiefly landholders—and are hated by the Ukrainians.

Moghileff, Vitebsk, and Minsk are White Russian, the Poles constituting only 3 per cent. of the population (16 in Minsk). In other Bielorussian proviuces, the White Russians are mixed either with Lithuanians (Vilna), or Ukrainians (Grodno), or Great Russians (Smolensk), and their relations to Polish landlords are no better than in the Ukraine. The Lithuanians prevail in Kovno, where they are 80 per cent. of the population, the remainder being chiefly Jews (10 per cent.), Poles (3 per cent.), Great Russians (3 per cent.), Germans, etc.

In the Baltic provinces (Esthonia, Livonia, and Courland) the prevailing population is Esthonian, Curonian, or Lettish, the Germans (landlords, or tradesmen and artisans in towns) being respectively only 3.5, 6.8 and 7.6 per cent. of the population. In the three provinces, Riga included, they hardly reach 120,000 out of 1,800,000 inhabitants. The relations of the Esthes and Letts to their landlords are anything but friendly.

The northern governments of St. Petersburg (apart from the capital), Olonetz, and Archangel contain an admixture of from 12 to 28 per cent. of Karelians, Samoyedes, and Zyrians, the remainder being Great Russians. In the east and southeast provinces of the Volga (Nijui, Simbirsk, Samara, Penza, and Saratoff) the Great Russians again prevail (88 to 65 per cent.), the remainder being chiefly Mordvinians, rapidly Russifying, as also Tartars, Tchuvashes, and Bashkirs, Germans in Samara and Saratoff, and Little Russians in the last-named. Only in Kazañ and Astrakhan do the Great Russians number less than one-half of the aggregate population (42–43 per cent.). In the Ural provinces of Perm and Vyatka Great Russians are again in the majority (92 and 81 per cent.), the remainder being a variety of Finno-Tartars. It is only in the southern Ural governments (Uralsk, Orenburg, Ufa) that the admixture of a variety of Turco-Tartars—of Kirghizes in Uralsk (23 per cent.), Bashkirs in Orenburg and Ufa (22 and 23 per cent.), and less important stems—becomes considerable, reducing the number of Great Russians respectively to 72, 67, and 32 per cent. of the aggregate population of these three provinces.

Of the Turco-Tartars of eastern Russia, the Bashkirs often revolted against Russian rule, and the traffic in Bashkir lands, recently carried on by the Orenburg administration, certainly does not tend to reconcile them. The Tcheremisses have often joined the Bashkirs in their revolts, but are rapidly losing their nationality. As regards the other Turco- and Finno-Tartars, the Mordvinians really have been assimilated to the Russians; the Moslem Tartars of Kazañ lived till recently on excellent terms with their Russian neighbors and would have continued to do so had no attempts been made to interfere with their land-laws.

In western Russia, while an antipathy exists between Ukrainians and Poles, the Russian Government, by its harassing interference in religious, educational, and economical matters, has become antagonistic, not only to the Poles, but also to the Ukrainians; printing in Ukrainian is prohibited, and "Russification" is being carried on among Ukrainians by the same means as those employed in Poland. The same is true with the Esthes and Letts, whom the Government, while countenancing them to some extent in their antipathy to the German aristocracy, has not yet found means to conciliate.

Their relative strength.

The relative strength of the different ethnical elements of which the population of European Russia and Poland is composed may be seen from the following figures (Table IV.). They must be regarded, however, as rough estimates only. They were originally computed by M. Rittich for an aggregate population of 69,788,240, and in the following table they have merely been increased in proportion to the actual population of 84,495,000.

TABLE IV.

Great Russians	41,994,000	
Little Russians	17,241,000	
White Russians	4,330,000	
Russians	63,565,000	
Poles	5,750,000	
Bulgarians	110,000	
Czechs	9,500	
Serbs	9,500	
Total Slavonians		69,444,000
Lithuanians	987,000	
Zhmuds	771,000	
Letts	1,243,000	
Letto-Lithuanians		3,001,000
Greeks	84,000	
Roumanians, and French (about 2000)	795,000	
Græco-Romans		879,000
Germans and English	1,165,000	
Swedes	12,000	
Saxons		1,177,000
Armenians and Georgians		43,000
Tsigans		16,000
Total Aryans		74,560,000
Jews	3,120,000	
Karaites	3,000	
Total Semites		3,123,000
Karelians	235,000	
Esthes	891,000	
Lives	2,000	
Various	175,000	
Baltic Finns		1,303,000
Lapps	7,500	
Samoyedes	6,500	
Northern Fiuns		14,000
Mordvs	960,000	
Tcheremisses	311,000	
Votiaks	292,000	
Volga Finns		1,563,000
Zyrians	102,000	
Permians	80,000	
Voguls	2,000	
Ugrians		184,000
Total Ural-Altaians		3,064,000
Tchuvashes	697,000	
Tartars	1,500,000	
Bashkirs	903,000	
Mescheriaks	167,000	
Tepters	159,000	
Kirghizes	197,000	
Various	6,000	
Turco-Tartars		3,629,000
Kalmucks		119,000
Total Turanians		3,748,000
Grand Total		84,495,000[1]

[1] *Bibliography.*—Rittich, *Ethnographical Map of Russia*, and *Ethnogr. Composition* (*Plemennoi Sostav*) *of Russia*; Vennkoff, *Outskirts of Russia* (Russ.); *Works of the Expedition to the Western Provinces*; *Mem. of the Geogr. Society* (*Ethnography*); *Mem. of the Moscow Soc. of Friends of Nat. Science* (*Anthropology*); Pauli, *The Peoples of Russia*; *Narody Rossii*, popular edition by M. Iliin. For prehistoric anthropology, see Count Uvaroff, *Archæology*, i.; Inostrantseff, *Prehistoric Man on Lake Ladoga*; Budilovitch, *Primitive Slavonians*, 1879; A. Bogdanoff's extensive and most valuable researches in *Mem of Moscow Soc. of Friends of Nat. Sc.*; the researches of Polyakoff and many others in various scientific periodicals (St. Petersburg, Kazan universities); and *Reports of the Archæol. Congresses*. For subsequent periods, see numerous papers in *Memoirs of Archæol. Soc.*, *Mem. Ac. of Sciences*, etc., and the works of Russian historians. Mezhoff's *Bibliogr. Indexes*, published yearly by the Russian Geographical Society, contain complete information about works and papers published.

Part III. European Russia—Statistics.[1]

Density of population.

Russia is on the whole a thinly-peopled country, the average population being but 42 to the square mile. The density of population varies, however, very much in European Russia—from one inhabitant per square mile in the government of Archangel to 102 in that of Moscow (exclusive of the capital) and 138 in Podolia. Two-thirds of the whole population are concentrated upon less than one-third of the whole surface. The most thickly-peopled parts form a strip of territory which extends from Galicia through Kieff to Moscow, and comprises partly the most fertile governments of Russia and partly the manufacturing ones; next come a strip of fertile country to the south of the above and the manufacturing provinces of the upper Volga. The black-earth region has an average of 90 inhabitants per square mile; the central manufacturing region, 85; the western provinces, 79; the black-earth and clay region, 38; the black-earth Steppes, 33; the hilly tracts of the Crimea and Caucasus, 31; the forest-region proper, 26; the Steppes, 9; the far north, less than 2.

Births and deaths.

The rate at which the population is increasing throughout the empire is very considerable. It varies, however, very much in different parts, and even in European Russia, being almost twice as high in the fertile tracts of the south as it is in the north (1.8 to 1.0). The rapid increase is chiefly due to early marriages, the peasants for the most part marrying their sons at eighteen and their daughters at sixteen. The resulting high birth-rate compensates for the great mortality, and the Russian population is increasing more quickly than the Polish, Lithuanian, Finnish, or Tartar. In 1880 the marriages, births, and deaths were returned as follows (Table V.):

	Marriages.	Births.	Deaths.	Excess of Births over Deaths.
European Russia...	725,427	3,678,071	2,684,828	993,243
Poland.....	62,771	294,021	189,514	104,507
Finland (1881).....	14,283	74,469	53,777	20,692
Siberia.....	32,952	180,302	131,793	49,009
Total.....	835,433	4,227,363	3,059,912	1,167,451

These figures agree pretty nearly with those for a series of years (1871–78), which gave an annual surplus of 945,000 for European Russia alone. In 1882, throughout the empire—leaving out of account Caucasus and Turgai—the births numbered 4,403,555 and the deaths 3,464,404, for an estimated population of 95,565,100. But the birth-rate and death-rate were very different in Russia proper and in the Asiatic dominions; in the former they reached respectively 4.83 and 3.77, and in the latter only 3.75 and 2.84. The low birth-rate in Asia counterbalances the low mortality. So also within Russia proper: in the central provinces the high mortality (35 per thousand) is compensated by a high birth-rate (49), while in the western provinces, where the mortality is relatively small (27), the number of births is also the lowest (37).

On the whole, the mortality in Russia is greater than anywhere else in Europe. The lowest figures are found in Courland (20), the Baltic provinces (22), and Poland (30). Within Russia itself the rate varies between 29 and 49 (30 to 38 in towns). In 1882 the average mortality in the 13 central governments reached the exceptional figure of 62, so that there was a decrease of 1.7 per cent. in the aggregate population. The mortality is highest among children, only one-half of those born reaching their seventh year. From military registers it appears that of 1000 males born only 480 to 490 reach their twenty-first year, and of these only 375 are able-bodied; of the remainder, who are unfit for military service, 50 per cent. suffer from chronic diseases. Misery, insanitary dwellings, and want of food account for this high mortality, which is further increased by the want of medical help, there being in Russia with Poland only 15,348 male and 66 female surgeons, 7679 assistants, and one bed in hospital for every 1270 inhabitants. The hospitals are, however, so unequally distributed, that in 63 governments having an aggregate country population of about 76,000,000 there were only 657 hospitals with 8273 beds, and an average of two surgeons to 100,000 inhabitants.

Emigration.

The rate of emigration from the Russian empire is not high. In 1871–80 the average number was 280,700 yearly, and the immigration 245,500. But within the empire itself migration to South Ural, Siberia, and Caucasus goes on extensively; figures, however, even approximate, are wanting. During the ten years 1872–81 no less than 406,180 Germans and 235,600 Austrians immigrated into Russia, chiefly to Poland and the southwestern provinces.

Religion.

A very great diversity of religions, including (besides numerous varieties of Christianity) Mohammedanism, Shamanism, and Buddhism, are found in European Russia, corresponding for the most part with the separate ethnological subdivisions. All Russians, with the exception of a number of White Russians who belong to the Union, profess the Greek Orthodox faith or one or other of the numberless varieties of nonconformity. The Poles and most of the Lithuanians are Roman Catholics. The Esthes and all other Western Finns, the Germans, and the Swedes are Protestant. The Tartars, the Bashkirs, and Kirghizes are Mohammedans; but the last-named have to a great extent maintained along with Mohammedanism their old Shamanism. The same holds good of the Mescheriaks, both Moslem and Christian. The Mordvinians are nearly all Greek Orthodox, as also are the Votiaks, Voguls, Tcheremisses, and Tchuvashes, but their religions are, in reality, very interesting modifications of Shamanism, under the influence of some Christian and Moslem beliefs. The Voguls, though baptized, are in fact fetichists, as much as the unconverted Samoyedes. Finally, the Kalmucks are Buddhist Lamaites.

All these religions are met with in close proximity to one another, and their places of worship often stand side by side in the same town or village without giving rise to religious disturbances. The recent outbreaks against the Jews were directed, not against the Talmudist creed, but against the trading and exploiting community of the "Kahal." In his relations with Moslems, Buddhists, and even fetichists, the Russian peasant looks rather to conduct than to creed, the latter being in his view simply a matter of nationality. Indeed, towards paganism, at least, he is perhaps even more than tolerant, preferring on the whole to keep on good terms with pagan divinities, and in difficult circumstances—especially on travel and in hunting—not failing to present to them his offering. Any idea of proselytism is quite foreign to the ordinary Russian mind, and the outbursts of proselytizing zeal occasionally manifested by the clergy are really due to the desire for "Russification," and traceable to the influence of the higher clergy and of the Government.

The various creeds of European Russia were estimated in 1879 as follows: Greek Orthodox and Raskolniks, 63,835,000 (about 12,000,000 being Raskolniks); United Greeks and Armenio-Gregorians, 55,000; Roman Catholics, 8,300,000; Protestants, 2,950,000; Jews, 3,000,000; Moslems, 2,600,000; Pagans, 26,000. In 1881 the number of Greek Orthodox throughout the empire, excluding two foreign bishoprics, was estimated at 61,941,000.

Nonconformists.

Nonconformity (Raskol) is a most important feature of Russian popular life, and its influence and prevalence have rapidly grown during the last twenty-five years.

When, towards the beginning of the 17th century, the Moscow principality fell under the rule of the Moscow *boiars* (one of whom, Godunoff, reached the throne), they took advantage of the power thus acquired to increase their wealth by a series of measures affecting land-holding and trade; they sanctioned and enforced by law the serfdom which had already from economical causes found its way into Russian life. The great outbreak of 1608–12 weakened their power in favor of that of the czar, but without breaking it; and throughout the reigns of Michael and Alexis the *ukazes* were issued in the name of "the czar and boiars." Serfdom was reinforced by a series of laws, and the whole of the 17th century is characterized by a rapid accumulation of wealth in the hands of boiars, by the development of luxury, imported from Poland, and by the struggle of a number of families to acquire the political power already enjoyed by their Polish neighbors. The same tendency pervaded the church, which was also accused by the people of having introduced "Polish luxury," "Polish creed," and the tendencies towards supremacy of the Polish clergy. The patriarch Nikon was a perfect representative of these tendencies. Opposition resulted, and the revision of the sacred books, which was undertaken by Nikon, gave the opposition acute character. The *Raskol*

[1] For all statistics for European Russia, see "Recueil of Information" for European Russia in 1882 (*Sbornik Svedeniy*), published in 1884 by the Central Statistical Committee, and the publications mentioned below under different heads.

(*lit.* "splitting" or "schism") made its appearance, and gathered under its banner, not only those who accused Nikon of "Polish" and "Latin" tendencies, but also all those who were for the old customs, for federative and communist principles of social organization, and who revolted against serfdom, centralization, and the suppression of municipal life. A series of insurrections broke out under the banner of the "eight-ends" cross of the *Raskolniks*. Barbarous persecutions by Alexis, Peter I., and their followers did not kill out an opposition which inspired with fanatical enthusiasm the best elements among the Great Russians, and induced its supporters to submit to the fire by thousands at a time, while others rather than submit went to colonize the forests of the Arctic littoral, or betook themselves to Siberia. Profound modifications have taken place in Russian nonconformity since its first appearance. It would be impossible to enumerate them all here, but the following points of primary importance must be mentioned: (1) The mere protest against Nikon's "innovations" (*novshestvas*) led, in the course of two centuries, to a mere servile adherence to the letter of the vernacular Scriptures—even to obvious errors of earlier translators—and to interminable discussions about minor points of ritual and about unintelligible words. (2) Another current which now pervades the whole of Russian nonconformity is that proceeding from rationalist sects which had already spread in northwest Russia in the 16th century, and even in the 14th. These have given rise to several sects which deny the divinity of Christ or explain away various dogmas and prescriptions of orthodoxy. (3) Protestantism, with its more or less rationalistic tendencies, has made itself increasingly felt, especially during the present century and in southern Russia. (4) Hostile critics of the Government, and especially of the autocracy, with its army of officials and its system of conscriptions, passports, and various restrictions on religious liberty, are found more or less in all the nonconforming bodies, which see in these manifestations of authority the appearance of the Antichrist. Several of them refuse accordingly to have any dealings whatever with the official world. (5) Another tendency pervading the whole of Russian nonconformity is that which seeks a return to what are supposed to have been the old communist principles of Christianity in its earlier days. All new sects start with applying these principles to practical life; but in the course of their development they modify them more or less, though always maintaining the principle at least of mutual help. (6) Finally, all sects deal more or less with the question of marriage and the position of woman. A few of them solve it by encouraging,—at least during their "love-feasts,"—absolutely free relations between all "brethren and sisters," while others only admit the dissolubility of marriage or prohibit it altogether. On the whole, leaving the extremer views out of account, the position of woman is undoubtedly higher among the dissenters than among the Orthodox.

These various currents, combining with and counteracting one another in the most complicated ways, have played and continue to play a most important part in Russian history. The mutual assistance found in dissenting sects has preserved many millions of peasants from falling into abject misery, the nonconformists enjoying, as a rule, a greater degree of prosperity than their Orthodox neighbors. The leading feature of Russian history, the spread of the Great Russians over the immense territory they now occupy, cannot be rightly understood without taking into account the colonization of the most inaccessible wildernesses by Raskolniks, and the organization of this by their communities, who send delegates for the choice of land and sometimes clear it in common by the united labors of all the young men and cattle of the community. On the other hand, the nonconforming sects, while helping to preserve several advantageous features of Russian life, have had a powerful influence in maintaining, especially among the "Staroobryadtsy," the old system of the Moscovite family, subject to the despotic yoke of its chief, and hermetically sealed against instruction.

It is worthy of notice that since the emancipation of the serfs nonconformity has again made a sudden advance, the more radical sects preponderating over the scholastic ones, and the influence of Protestantism being increasingly felt. Nonconformity, which formerly had no hold upon Little Russia (though it had penetrated among Protestant Esthonians and Letts, and even among Moslem Tartars), has suddenly begun to make progress there in the shape of the "Stunda," a mixture of Protestant and rationalistic teaching, with tendencies towards a social but rarely socialistic reformation.

The Russian dissenting sects may be subdivided into (1) the "Popovtsy" (who have priests), (2) the "Bezpopovtsy" (who have none), and (3) numerous spiritualist sects, "Dukhovnyie Khristiane." The Popovtsy (5 to 6 millions) are again subdivided into two classes,—those who recognize the Austrian hierarchy, and those who have only Orthodox "runaway priests" ("Byeglopopovtsy"). The latter have recently received unexpected help in the accession of three Orthodox priests of great learning and energy. Moreover, there are among the Popovtsy about a million of "Edinovyertsy," who have received Orthodox priests on the condition of their keeping to the unrevised books. They are patronized by Government.

The Bezpopovtsy embody three large sects—the Pomory, Fedoseevtsy, and Filipovtsy—and a variety of minor ones. They recognize no priests, and repudiate the Orthodox ritual and the sacraments. They avoid all contact with the state, and do not allow prayer for the czar, who is regarded as the Antichrist. They may number about 5,000,000 in west, north, and northeast Russia, and represent, on the whole, an intellectually developed and wealthy population. Of the very numerous smaller sects of Bezpopovtsy, the "Stranniki" (Errants) are worthy of notice. They prefer to lead the life of hunted outcasts rather than hold any relation with the state.

The spiritualists, very numerous in central and southern Russia, are subdivided into a great variety of schools. The "Khlysty," who have their "love-feasts," their "Virgins," sometimes flagellation, and so on, represent a numerous and strong organization in central Russia. The "Skoptsy" ("Men of God," "Castrati") occur everywhere, even among the Finns, but chiefly in Orel and Kursk, and in towns as money-brokers. The "Dukhobortsy" communities (warriors of the Spirit), chiefly found in the southeast, are renowned as colonizers. They are spreading rapidly in Caucasia and Siberia. The "Molokany" (a kind of Baptists), numbering perhaps about one million, are spread also in the southeast, and are excellent gardeners and tradesmen. Both are quite open to instruction, and have come under the influence of Protestantism, like the "Stunda" in Little Russia and Bessarabia. The "Sabbathers" and the "Skakuny" (a kind of Shakers) are also worthy of notice; while a great variety of new sects, such as the "Nemolyaki" ("who do not pray"), the "Vozdykhateli" ("who sigh"), the "Neplatelshchiki" ("who do not pay taxes"), the "Ne-Nashi" (the "Not-ours"), and so on, spring up every year.

The aggregate number of Raskoluiks is officially stated at nearly one million, but this is quite misleading. The ministry of interior estimated them at 9,000,000 in 1850 and 9,500,000 in 1859. In reality the number is still higher. In Perm alone they were recently computed at a million, and there would be no exaggeration in estimating them at a total of from twelve to fifteen millions.[1]

The old subdivisions of the population into orders possessed of unequal rights is still maintained.

Class divisions.

The great mass of the people, 81.6 per cent., belong to the peasant order, the others being—nobility, 1.3 per cent.; clergy, 0.9; the "meschane" or burghers and merchants, 9.3; military, 6.1; foreigners, 0.2; unclassified, 0.5. Thus more than 63 millions of the Russians are peasants. Half of them were formerly serfs (10,447,149 males in 1858),—the remainder being "state peasants" (9,194,891 males in 1858, exclusive of the Archangel government) and "domain peasants" (842,740 males the same year).

The serfdom which had sprung up in Russia in the 16th century, and became consecrated by law in 1609, taking, however, nearly one hundred and fifty years to attain its full growth and assume the forms under which it appeared in the present century, was abolished by law in 1861. This law liberated the serfs from a yoke which was really terrible, even under the best landlords, and from this point of view it was obviously an immense benefit, the results of which are apparent now. But it was far from securing corresponding economic results. Along with the enrichment of the few, a general impoverishment of the great mass followed, and took proportions so alarming as to arouse public attention and to result in a great number of serious investigations conducted by the state, the provincial assemblies, scientific societies, and private statisticians. The general results of these inquiries may be summed up in the subjoined statement.

The former "dvorovyie," attached to the personal service of their masters, were merely set free; and they entirely went to reinforce the town proletariat. The peasants proper received their houses and orchards, and also allotments of arable land. These allotments were given over to the rural commune (*mir*), which was made responsible, as a whole,

[1] See Schapoff on *Russian Raskol: Sbornik of State Regulations against the Raskolniks;* and very many papers printed in reviews, chiefly in *Otetch. Zapiski, Dyelo, Vyestnik Evropi*, etc., by Schapoff, Yuzoff, Prugavin, Rozoff, etc.

for the payment of taxes for the allotments. The size of the allotments was determined by a maximum and by a minimum, which last, however, could be still further reduced if the amount of land remaining in the landlord's hands was less than one-half of what was allotted to the peasants. For these allotments the peasants had to pay, as before, either by personal labor (twenty to forty men's days and fifteen to thirty woman's days per year), or by a fixed rent ("obrok"), which varied from 8 to 12 roubles [$3.89 to $5.83] per allotment. As long as these relations subsisted, the peasants were considered as "temporarily obliged" (*vremenno obyazannyie*). On January 1, 1882, they still numbered 1,422,012 males; but this category is now disappearing in consequence of a recent law (December 28, 1881).

The allotments could be redeemed by the peasants with the help of the crown, and then the peasants were freed from all obligations to the landlord. The crown paid the landlord in obligations representing the capitalized "obrok," and the peasants had to pay the crown, for forty-nine years, 6 per cent. interest on this capital, that is, 9 to 12 roubles per allotment. If the redemption was made without the consent of the peasants—on a mere demand of the landlord, or in consequence of his being in arrear for the payment of his debts to the nobility hypothec bank—the value of the redemption was reduced by one-fifth. The redemption was not calculated on the value of the allotments, but was considered as a compensation for the loss of the compulsory labor of the serfs; so that throughout Russia, with the exception of a few provinces in the southeast, it was—and still remains notwithstanding a very great increase of the value of land—much higher than the market value of the allotment. Moreover, taking advantage of the maximum law, many proprietors cut away large parts of the allotments the peasants possessed under serfdom, and precisely the parts the peasants were most in need of, namely, pasture lands around their houses, and forests. On the whole, the tendency was to give the allotments so as to deprive the peasants of grazing land and thus to compel them to rent pasture lands from the landlord at any price.

The present condition of the peasants—according to official documents—appears to be as follows. In the twelve central governments the peasants, on the average, have their own rye-bread for only 200 days per year,—often for only 180 and 100 days. One-quarter of them have received allotments of only 2.9 acres per male, and one-half less than 8.5 to 11.4 acres,—the normal size of the allotment necessary to the subsistence of a family under the three-fields system being estimated at 28 to 42 acres. Land must be thus rented from the landlords at fabulous prices. Cattle-breeding is diminishing to an alarming degree. The average redemption is 8.56 roubles (about 17s. [$4.13]) for such allotments, and the smaller the allotment the heavier the payment, its first "dessiatina" (2.86 acres) costing twice as much as the second, and four times as much as the third. In all these governments, the state commission testifies, there are whole districts where one-third of the peasants have received allotments of only 2.9 to 5.8 acres. The aggregate value of the redemption and land-taxes often reaches from 185 to 275 per cent. of the normal rental value of the allotments, not to speak of taxes for recruiting purposes, the church, roads, local administration, and so on, chiefly levied from peasants. The arrears increase every year; one-fifth of the inhabitants have left their houses; cattle are disappearing. Every year more than half the adult males (in some districts three-fourths of the men and one-third of the women) leave their homes and wander throughout Russia in search of labor. The state peasants are only a little better off.

Such is the state of affairs in central Russia, and it would be useless to multiply figures, repeating nearly the same details. In the eight governments of the black-earth region the state of matters is hardly better. Many peasants took the "gratuitous allotments," whose amount was about one-eighth of the normal ones.

The average allotment in Kherson is now only 0.90 acre, and for allotments from 2.9 to 5.8 acres they pay from 5 to 10 roubles [$2.43 to $4.86] of redemption tax. The state peasants are better off, but still they are emigrating in masses. It is only in the Steppe governments that the situation is more hopeful. In Little Russia, where the allotments were personal (the *mir* existing only among state peasants), the state of affairs does not differ for the better on account of the high redemption taxes. In the western provinces, where the land was valued cheaper and the allotments somewhat increased after the Polish insurrection, the general situation might be better were it not for the former misery of peasants. Finally, in the Baltic provinces nearly all the land belongs to German landlords, who either carry on agriculture themselves, with hired laborers, or rent their land as small farms. Only one-fourth of the peasants are farmers, the remainder being mere laborers, who are emigrating in great numbers.

The situation of the former serf-proprietors is also unsatisfactory. Accustomed to the use of compulsory labor, they have failed to accommodate themselves to the new conditions. The 700,000,000 roubles [$340,200,000]; of redemption money received from the crown down to 1877 by 71,000 landed proprietors in Russia have been spent without accomplishing any agricultural improvement. The forests have been sold, and only those landlords are prospering who exact rack-rents for the land without which the peasants could not live upon their allotments.

As showing a better aspect of the situation it must be added that in eighty-five districts of Russia the peasants have bought 5,349,000 acres of land since 1861. But these are mostly village-traders and grain-lenders (kulaks). A real exception can be made only for Tver, where 53,474 householders united in communities have bought 633,240 acres of land. There has been an increase of wealth among the few, but along with this a general impoverishment of the mass of the people.[1]

The village community.

The ancient Scandinavians described Russia as Garðaríki, —the country of towns,—and until now Great Russia has maintained this character. The dwellings of the peasantry are not scattered over the face of the country, but aggregated in villages, where they are built in a street or streets. This grouping in villages has its origin in the bonds which unite the peasants in the village community—the *mir*, or the *obshchina*.

When Haxthausen first described the Great Russian mir, it was considered a peculiarity of the Slavonian race,—a view which is no longer tenable. The mir is the Great Russian equivalent for the German, Dutch, and Swiss "mark" or "allmeud," the English "township," the French "commune," the Polish "gmina," the South Slavonian "zadruga," the Finnish "pittäyä," etc.; and it very nearly approaches, though differing from them in some essential features, the forms of possession of land prevailing among the Moslem Turco-Tartars, while the same principle is found even among the Mongol Buriat shepherds and the Tungus hunters.

The following are the leading features of the organization of the mir among the Great Russians.

The whole of the land occupied by a village,—whoever be the landlord recognized by law—the state, a private person, or a juridical unity, such as the *voisko* of the Cossacks —is considered as belonging to the village community as a whole, the separate members of the community having only the right of temporary possession of such part of the common property as will be allowed to them by the mir in proportion to their working power. To this right corresponds the obligation of bearing an adequate part of the charges which may fall upon the community. If any produce results from the common work of the community, each member has a right to an equal part of it.

According to these general principles, the arable land is divided into as many lots as there are working units in the community, and each family receives as many lots as it has working units. The unit is usually one male adult; but, when the working power of a large family is increased by its containing a number of adult women, or boys approaching adult age, this circumstance is taken into account, as well as the diminution from any cause of working power in other households.

For dividing the arable land into lots, the whole is parted first into three "fields," according to the three-field rotation of crops. As each field, however, contains land of various qualities, it is in its turn subdivided into, say, three parts—of good, average, and poor quality; and each of these parts is subdivided into as many lots as there are working units. Each household receives its lots in each of the subdivisions of the "field," a carefully minute equalization as to the minor differences between the lots being aimed at;

[1] See Yanson's *Researches on Allotments and Payments* (2d ed., 1881) and *Comparative Statistics of Russia* (vol. ii.); *Statistics of Landed Property*, published by Central Statistical Committee; works of the Committee on Taxation, and those of the Committee of Inquiry into Petty Trades (12 vols.); *Reports of the Commission on Agriculture; Collection of Materials on the Village Community* (vol. i.); *Collection of Materials on Landholding*, and *Statistical Descriptions* of Separate Governments, published by several zemstvos (Moscow, Tver, Nijni, Tula, Ryazañ, Tamboff, Poltava, Saratoff, etc.); Kawelin, *The Peasant Question;* Vasiltchikoff, *Land Property and Agriculture* (2 vols.), and *Village Life and Agriculture;* Ivanukoff, *The Fall of Serfdom in Russia;* Shashkoff, "Peasantry in the Baltic Provinces," in *Russkaya Mysl*, 1883, iii. and ix.; V. V., *Agric. Sketches of Russia;* Golovatchoff, *Capital and Peasant Farming;* Engelhardt's *Letters from the Country;* many elaborate papers in reviews (all Russian); and Appendix to Russian translation of Reclus's *Géogr. Univ.*

and the partition is nearly always made so as to permit each householder to reach his allotmeut without passiug through that of another.

To facilitate this division, the community divides, first, into smaller groups (*vyt*, *zherebyevka*, a "ten," an "eight," etc.), each of which is composed, by free sclection, of a number of houscholders—the community only taking care that each shall not be composed of rich, of poor, or of "turbulents" exclusively. The division of the land is first made among snch groups, and the subdivision goes on within these. The division into groups facilitates also the distribution of such work as the community may have to accomplish—as when a bridge or a ditch has to be repaired, or a meadow mowed—aud the work cannot be done by the community as a whole.

As sickness, death, removal, and other incidents bring about changes in the distribution of working power among the different households, or when tho number of working units in the commuuity has increased or decreased, a redistribution of land (*peredyel*) follows. Whether the land be a burden (the taxes exceeding its rental value) or a benefit, its divisiou is equalized; the households whose working power has increased receive additional lots, and *vice versa*. The peredyel may be "partial" or "general." In most cases a mere equalization of lots among several families will serve, and a general redistribution is resorted to ouly when greater iuequalities have arisen. On the whole, these redistributions are rare, and the precariousness of landholding which has been supposed to be a consequeuce of the mir proves to have been exaggerated. More detailed inquiries have shown that no redistribution is made without urgent necessity. Thus, to quote but one instance, in 4442 village communities of Moscow, the average number of redistributions has been 2.1 in twenty years (1858–78), and in more than two-thirds of these communities the redistribution took place only once. On the other hand, a regular rotation of all households over all lots, in order to equalize the remaining minor inequalities, is very often practiced in the black-earth region, where no manure is needed.

Besides the arable mark, there is usually a *vygon* (or "common") for grazing, to which all householders send their cattle, whatever the number they possess. The meadows are either divided on the above principles, or mowed in common, and the hay divided according to the number of lots. The forests, when consisting of small wood in sufficient quantity, are laid under no regulations; when this is scarce, every trunk is counted, and valued according to its age, number of branches, etc., and the whole is divided according to the number of lots.

The houses and the orchards behind them belong also, in principle, to the community; but no peredyel is made, except after a fire or when the necessity arises of building the houses at greater distances apart. The orchards usually remain for years iu the same hands, with but slow equalizations of the lots in width.

All decisions in the village community are given by the mir, that is, by the general assembly of all householders,—women beiug admitted on an equal footing with men, when widows, or when their male guardians are absent. For the decisions unanimity is necessary; and, though in some difficult cases of a general peredyel the discussions may last for two or three days, no decision is reached until the minority has declared its agreement with the majority.

Each commune elects an elder (*starosta*); he is the executive, but has no authority apart from that of the mir whose decisions he carries out. All attempts on the part of the Government to make him a functionary have failed.

Opinion as to the advantages and disadvantages of the village community being much divided in Russia, it has been within the last twenty years the subject of extensive inquiry, both private and official, and of an ever-growing literature and polemic. The supporters of the mir are found chiefly among those who have made more or less extensive inquiries into its actual organization and consequences, while their opponents draw their arguments principally from theoretical considerations of political economy. The main reproach that it checks individual development and is a source of immobility has been shaken of late by a better knowledge of the institution, which has brought to light its remarkable plasticity and power of adaptation to new circumstances. The free settlers in Siberia have voluntarily introduced the same organization. In north and northeast Russia, where arable land is scattered in small patches among forests, communities of several villages, or "volost" communities, have arisen; and in the "voisko" of the Ural Cossacks we find community of the whole territory as regards both land and fisheries and work in common. Nay, the German colonists of southern Russia, who set out with the principle of personal property, have subsequently introduced that of the village community, adapted to their special needs (Clauss). In some localities, where there was no great scarcity of land and the authorities did not interfere, joint cultivation of a common area for filling the storehouses has recently been developed (in Peuza 974 communes have introduced this system and cultivate an aggregate of 26,910 acres). The renting of land in common, or even purchase of land by wealthy communes, has become quite usual, as also the purchase in common of agricultural implements.

Since the emancipation of the serfs, however, the mir has been undergoing profound modifications. The differences of wealth which ensued,—the impoverishment of the mass, the rapid increase of the rural proletariat, and the enrichment of a few "kulaks" and "miroyedes" ("mir-eaters"),—are certainly operating unfavorably for the mir. The miroyedes steadily strive to break up the organization of the commune as an obstacle to the extension of their power over the moderately well-to-do peasants; while the proletariat cares little about the mir. Fears on the one side and hopes on the other have been thus entertained as to the likelihood of the mir resisting these disintegratiug influences, favored, moreover, by those landowners and manufacturers who foresee iu the creation of a rural proletariat the certainty of cheap labor. But the village commuuity does not appear as yet to have lost the power of adaptation which it has exhibited throughout its history. If, iudeed, the impoverishmeut of the peasants continues to go on, and legislation also interferes with the mir, it must of course disappear, but not without a corresponding disturbance in Russian life.[1]

"Artels."

The coöperative spirit of the Great Russians shows itself further in another sphere in the *artels*, which have also been a prominent feature of Russian life since the dawn of history. The artel very much resembles the coöperative society of western Europe, with this difference that it makes its appearance without any impulse from theory, simply as a natural form of popular life. When workmen from any province come, for instance, to St. Petersburg to engage in the textile industries, or to work as carpenters, masons, etc., they immediately uuite in groups of from ten to fifty persons, settle in a house together, keep a common table, and pay each his part of the expense to the elected elder of the artel. All Rnssia is covered with such artels,—in the cities, in the forests, on the banks of rivers, on journeys, and even in the prisons.

The industrial artel is almost as frequent as the preceding, in all those trades which admit of it. A social history of the most fundamental state of Russian society would be a history of their hunting, fishing, shipping, trading, building, exploring artels. Artels of one or two hundred carpenters, bricklayers, etc., are common wherever new buildings have to be erected, or railways or bridges made; the contractors always prefer to deal with an artel, rather than with separate workmen. The same principles are often put into practice in the domestic trades. It is needless to add that the wages divided by the artels are higher than those earned by isolated workmen.

Finally, a great number of artels on the stock exchange, in the seaports, in the great cities (commissionaires), during the great fairs, and on railways have grown up of late, and have acquired the confidence of tradespeople to such an extent that considerable sums of money and complicated banking operations are frequently handed over to an artelshik (member of an artel) without any receipt, his number or his name being accepted as sufficient guarantee. These artels are recruited only on personal acquaintance with the candidates for membership, and security reaching £80 to £100 [$388.80 to $486] is exacted in the exchange artels. These last have a tendency to become mere joint-stock companies employing salaried servants. Coöperative societies have lately been organized by several zemstvos. They have achieved good results, but do not exhibit, on the whole, the same unity of organization as those which have arisen in a natural way among peasants and artisans.[2]

The chief occupation of the population of Russia is agriculture. Only in a few parts of Moscow, Vladimir, and

[1] See *Collection of Materials on Village Communities*, published by the Geographical and Economical Societies, vol. i. (containing a complete bibliography up to 1880). Of more recent works the following are worthy of notice: Lutchitsky, *Collection of Materials for the History of the Village Community in the Ukraine*, Kieff, 1884; Efimenko, *Researches into Popular Life*, 1884; Hantower, *On the Origin of the Czinsz Possession*, 1884; Samokvasoff, *History of Russian Law*, 1884; Keussler, *Zur Geschichte und Kritik des bäuerlichen Gemeinde-Besitzes in Russland*, 2 vols., 1884; and papers in publications of Geographical Society.

[2] See Isaeff on *Artels in Russia*, and in Appendix to Russian translation of Reclus; Kalatchoff, *The Artels of Old and New Russia*; *Recueil of Materials on Artels* (2 vols.); Scherbina, *South Russian Artels*; Nemiroff, *Stock Exchange Artels* (all Russian).

Nijni has it been abandoned for manufacturing pursuits.

Agriculture.

Cattle-breeding is the leading industry in the Steppe region, the timber trade in the northeast, and fishing on the White and Caspian Seas. Of the total surface of Russia, 1,237,360,000 acres (excluding Finland), 1,018,737,000 acres are registered, and it appears that 39.9 per cent. of these belongs to the crown, 1.9 to the domains (*udel*), 31.2 to peasants, 24.7 to landed proprietors or to private companies, and 2.3 to the towns and monasteries. Of the acres registered only 592,650,000 can be considered as "good," that is, capable of paying the land tax; and of these 248,630,000 acres were under crops in 1884.[1] The crops of 1883 were those of an average year, that is, 2.9 to 1 in Central Russia, and 4 to 1 in South Russia, and were estimated as follows (seed corn being left out of account): Rye 49,185,000 quarters; wheat, 21,605,000; oats, 50,403,000; barley, 13,476,000; other grains, 18,808,000. Those of 1884 (a very good year) reached an average of 18 per cent. higher, except oats. The crops are, however, very unequally distributed. In an average year there are 8 governments which are some 6,930,000 quarters short of their requirements, 35 which have an excess of 33,770,000 quarters, and 17 which have neither excess nor deficiency. The export of corn from Russia is steadily increasing, having risen from 6,560,000 quarters in 1856–60 to an average of 23,700,000 quarters in 1876–83 and 26,623,700 quarters in 1884. This increase does not prove, however, an excess of corn, for even when one-third of Russia was famine-stricken, during the last years of scarcity, the export trade did not decline; even Samara exported during the last famine there, the peasants being compelled to sell their corn in autumn to pay their taxes. Scarcity is quite usual, the food supply of some ten provinces being exhausted every year by the end of the spring. Orach, and even bark, are then mixed with flour for making bread.

Flax, both for yarn and seed, is extensively grown in the northwest and west, and the annual production is estimated at 6,400,000 cwts. of fibre and 2,900,000 quarters of linseed. Hemp is largely cultivated in the central governments, the yearly production being 1,800,000 cwts. of fibre and 1,800,000 quarters of seed. The export of both (which along with other oil-bearing plants reached the value of 136,816,000 roubles [$66,492,576] in 1882) holds the second place in the foreign trade of Russia.

The culture of the beet is increasing, and in 1884, 785,700 acres were under this root, chiefly in Little Russia and the neighboring governments; 68,900,000 cwts. of beetroot were worked up, yielding 5,119,000 cwts. of sugar, while fifty-five refineries (twenty-six of them in Poland) showed a production valued at 118,888,530 roubles [$57,779,825.58] in 1882. Tobacco is cultivated everywhere, but good qualities are obtained only in the south. In 1876–80 an average area of 101,600 acres was under this steadily increasing culture, and the crop of 1884 yielded 86,400,000 cwts. The vine, which might be grown much farther north than at present, is cultivated only on Mount Caucasus, in Bessarabia, in the Crimea, and on the lower Don for wine, and in Ekaterinoslaff, Podolia, and Astrakhan for raisins. The yearly produce is 10.8 million gallons in Russia, 10.0 in the Caucasus, and 24 in Transcaucasia.

Market gardening is extensively carried on in Yaroslavl for a variety of vegetables for exportation, in Moscow and Ryazañ for hops, and in the south for sunflowers, poppies, melons, etc. Gardening is also widely spread in Little Russia and in the more fertile central governments. Madder and indigo are cultivated on Caucasus, and the silk-worm in Taurida, Kherson, and Caucasia. Bee-keeping is widely spread.

The breeding of live stock is largely carried on in the east and south, but the breeds are usually inferior. Good breeds of cattle are met with only in the Baltic provinces, and excellent breeds of horses on the Don, in Tamboff, and in Voronezh. Since the emancipation, the peasants have been compelled to reduce the number of their cattle, so that the increase in this department does not correspond to the increase of population, as is shown by the following figures:

Live stock.

	1851.	1882.
Cattle	20,962,000	23,845,100
Sheep	37,527,000	47,508,970
Swine	8,886,000	9,207,670

A more thorough registration of horses for military purposes gives a return of 21,203,900 horses in Russia and Poland, that is, 255 horses per 1000 inhabitants—a proportion which is elsewhere approached only in the United States. They are kept in largest numbers in the three Steppe governments and on the Urals (550 and 384 per 1000 inhabitants), while the smallest proportion occurs in the manufacturing region (155 per 1000 inhabitants). 90 per cent. of the total number of horses belong to peasants; these are mostly of a very poor description. Infectious diseases make great ravages every year. In 1882 no less than 121,500 cattle and 14,110 horses perished from that cause.[2]

Fishing.

Fishing is a most important source of income for whole communities in Russia. No less than 2000 to 3000 inhabitants of Archangel are engaged in fishing on the Norwegian coast and in the White Sea, the aggregate yield of this industry being estimated at 200,000 cwts., including 150 million herrings. These fisheries are, however, declining. Fishing in the Baltic is not of much importance. In the estuaries of the Dnieper, Dniester, and Bug it gives occupation to about 4000 men, and may be valued at less than 1,000,000 roubles [$486,000]. The fisheries in the Sea of Azoff, which occupy about 15,000 men, are much more important, as are also those of the lower Don, which last alone are valued at over 1,000,000 roubles [$486,000] a year. The chief fisheries of Russia are, however, on the Caspian and in its feeders: those of the Volga cover no less than 6000 square miles, and those of the Ural extend for over 100 miles on the sea-coast and 400 miles up the river. The lowest estimates give no less than 4 million cwts., valued at 15 million roubles, [$7,290,000] of fish taken every year in the Caspian and its affluents. The fisheries on the lakes of the lake region are also worthy of notice.

Hunting.

Hunting is an important source of income in north and northeast Russia, no less than 400,000 squirrels and 800,000 grouse, to mention no other game, being killed in different governments, while seal-hunting is still productive on the shores of the Arctic Ocean.[3]

Mining and related industries.

Notwithstanding the wealth of the country in minerals and metals of all kinds, and the endeavors made by Government to encourage mining, including the impositions of protective tariffs, even against Finland (in 1885), this and the related industries are still at a low stage of development. The remoteness of the mining from the industrial centres, the want of technical instruction and also of capital, and the existence of a variety of vexatious regulations may be given as the chief reasons for this state of matters. The imports of foreign metals in the rough and of coal are steadily increasing, while the exports, never otherwise than insignificant, show no advance. The chief mining districts of Russia are the Ural Mountains and Olonetz for all kinds of metals; the Moscow and Donetz basins for coal and iron; Poland and Finland; Caucasus; and the Altai, the Nertchinsk, and the Amur mountains.

Gold is obtained from gold-washings in Siberia (63,194 lb in 1882), the Urals (16,850 lb), Central Asia (325 lb in 1881), and Finland (42 lb); silver in Siberia (16,128 lb), and partly on Caucasus (1232 lb), the quantity steadily decreasing; platinum in the Urals (3600 to 4600 lb every year). Lead is extracted along with silver (19,416 cwts. in 1881; 357,260 cwts. imported); zinc only in Poland (89,650 cwts.; half as much is imported); tin in Finland (194 cwts.; 40,000 cwts. imported). Copper is worked in several governments

[1] The division of the registered land is as follows, the figures being percentages of the whole:

	Arable Land.	Forests.	Meadows, Pasture.	Unproductive.
Peasants' holdings...	53.8	10.1	26.6	9.5
Private holdings	27.2	37.6	23.1	11.9
Crown and domains..	1.7	64.3	1.6	32.4
Total.....	26.3	38.7	15.9	19.1

[2] See *The Year* 1884 *with regard to Agriculture*, published by the Ministry of Interior (so also preceding years); the publications of the Minister of Finance; Yanson's *Comparative Statistics of Russia*, 1880; Appendix to Russian translation of Reclus; and Suvorin's *Russkiy Kalendar*.

[3] *Bibliography.*—Baer and Danilevskiy, *Fishery Researches in Russia*, published by Minister of Domains, 9 vols.; Veniaminoff, *Fishing in Russia*, 1876; Sidoroff, *Northern Russia*, and *Contributions to the Knowledge of Northern Russia*, 1882; Grimm, *The Work of the Aral-Caspian Expedition*.

of the Ural region, in Kazañ, Vyatka, Caucasus, Siberia, and Finland, but the industry is a languishing one, and the crown mines show a deficit (65,000 cwts.; double this amount is imported). Iron-ores are found at many places. Excellent mines are worked on the Urals; and iron mines occur also in large numbers throughout the Moscow and Donetz basins, as also in the western provinces, not to speak of those of the Asiatic dominions, of Poland, and of Finland (bog-iron). In 1881 the annual production of pig-iron (which covers only two-thirds of the consumption) was stated as follows (in thousands of cwts.): Urals, 6153; central Russia, 1092; Olouetz, 42; south and southwest Russia, 501; Poland, 951; Finland, 413; Siberia, 85. The iron and steel throughout the empire amounted to 10,720,000 cwts. in 1882. European Russia alone produced in 1882, 31,520 cwts. of copper, 7,703,000 cwts. of pig-iron, 4,981,300 cwts. of iron, and 3,799,600 cwts. of steel.

The production of coal is rapidly increasing and in 1882 reached 46,270,000 cwts., three-fourths being produced by the Donetz basin, and one-fifth by that of Moscow. Poland, moreover, yielded 27,950,000 cwts. of coal in 1882, and the Asiatic dominions about 800,000 cwts. Nearly 34,000,000 cwts. are imported annually. The extraction of naphtha on the Apsheron peninsula of the Caspian has been greatly stimulated of late, reaching about 20,000,000 cwts. in 1883 (4,600,000 cwts. of kerosene, 1,000,000 cwts. of lubricating oils, and 300,000 cwts. of asphalt).

Russia and Siberia are very rich in rock-salt, salt springs, and salt lakes (16,360,000 cwts. extracted; 3,746,000 imported). Excellent graphite is found in the deserts of the Sayan Mountains and Turukhansk. Sulphur is obtained in Caucasia, Kazañ, and Poland (2000 to 5000 cwts. extracted; 70,000 to 170,000 cwts. imported). The mining and related industries occupy altogether about an aggregate motive force (steam and water) of 73,500 horse-power and 305,000 hand.[1]

Manufactures and petty industries.

Since the time of Peter I. the Russian Government has been unceasing in its efforts for the creation and development of home manufactures. Important monopolies in last century, and heavy protective, or rather prohibitive, import duties, as well as large money bounties, in the present, have contributed towards the accumulation of immense private fortunes, but manufactures have developed but slowly. A great upward movement has, however, been observable since 1863. About that time a thorough reform of the machinery in use was effected, whereby the number of hands employed was reduced, but the yearly production doubled or trebled. In some branches the production suddenly rose at a yet higher rate (cottons from 12 million roubles [$5.832,000] in 1865 to 209 million [$101,574,000] in 1882). The following figures for European Russia, without Poland and Finland, will give some idea of this progress:

	Number of Establishments.	Workmen Employed.	Yearly Production in Roubles.	Production per Workman.
1851.....	9,256	456,596	157,372,000	317
1861.....	14,060	559,533	295,560,000	528
1870.....	18,892	463,093	452,660,000	977
1882.....	56,905	954,971	1,126,033,000	1,187

These figures lose, however, some of their significance if the corresponding rate of progress in manufacturing productivity in western Europe be taken into account. Besides, since the great improvements of 1861–70 the industrial progress of Russia has been but slow. The manufactories of rails and railway plant, and even the Ural iron-works, are in a precarious condition. The textile industries, though undoubtedly they have made great advances, are subject to great fluctuations in connection with those of the home crops, and are thus in an abnormal state. The artisans labor for twelve, fourteen, and sometimes sixteen hours a day, and their condition, as revealed by recent inquiries, is very unsatisfactory. Many causes contribute to this,—the want of technical instruction, the want of capital, and above all the want of markets. Russia has not, and cannot have, such foreign markets as the countries which first attained an industrial development. Her colonies are deserts, and in the home markets the manufacturer only finds 80 millions of poverty-stricken people, whose wants are nearly all supplied by their petty domestic industries.

These, that is, the domestic industries which are carried on by the peasants in conjunction with their agricultural pursuits during the long days of idleness imposed by the climate and by the reduced allotments of land, continue, not only to hold their ground side by side with the large manufactures, but to develop and to compete with these by the cheapness of their products. Extensive inquiries are now being made into these domestic industries (*kustarnoyie proizvodstvo*). 855,000 persons engaged in them along with agriculture (*kustari*) have already been registered, and an unexpected variety of industries, and a still more unexpected technical development in several of them, have been disclosed by these researches. The yearly production of the 855,000 kustari who have been registered reaches 218,444,000 roubles [$106,163,784]; while the total number of peasants engaged in the industries, mostly in Great Russia and northern Caucasia, is estimated at a minimum of 7,500,000 persons, with a yearly production of at least 1,800,000,000 roubles [$874,800,000], or more than double the aggregate production of the manufactures proper.

Of course the machinery they use is very primitive, and the wages for a day of twelve to sixteen hours exceedingly low. But the industries are capable of being improved, and it has been brought out that "Paris" silk hats and "Vienna" house furniture sold by substantial foreign firms at Moscow are really manufactured in the neighborhood of the capital by peasants who still continue to till their fields. All these industries suffer very much from want of credit, and the producers become the prey of intermediaries. But their continued existence and their progress under most unfavorable conditions show that they meet a real want, which is itself the consequence of the peculiar conditions under which Russia, the last to come into the international market, has to develop.

In those very governments where two-thirds of the textile manufactories of Russia are concentrated domestic weaving (for the market, not for domestic use) employs about 200,000 hands, whose yearly production is valued at 45,000,000 roubles [$21,870,000]. In Stavropol on Caucasus it has so rapidly developed that 42,400 looms are now at work, with a yearly production of 2,007,700 roubles [$975,742.20]. But no adequate idea could be given of the petty industries of Russia without entering into greater detail than the scope of the present article permits. Suffice it to say that there is no branch of the industries in textiles, leather, woodwork, or metal work, provided it needs no heavy machinery, which is not successfully carried on in the villages. Nearly all the requirements of nine-tenths of the population of Russia are met in this way.

The aggregate production of industries within the empire, inclusive of mining, was stated in 1882 as follows: European Russia, 1,126,033,000 roubles [$547,252,038]; Poland, 147,309,000 [$71,592,174]; Finland, 15,130,000 [$7,353,180]. The chief manufactures in European Russia (apart from Poland and Finland), and their yearly production in 1882 in millions of roubles, were as follows: cotton yarn and cottons, 208.6; other textile industries, 103.5; metal wares and machinery, 107.9; chemicals, 6.6; candles, soap, glue, leather, and other animal products, 61.4; distillery products, 156.0; other liquors, 39.0; sugar, 140.0; flour, 74.0. The remainder are of minor importance. It must be observed, however, that these figures are much below those given for 1879, when the aggregate production of Russian manufactures was computed at 1,102,949,000 roubles [$536,033,214], without the mining and related industries, the distillery products, and the flour.

The geographical distribution of manufacturers in Russia is very unequal. The governments of Moscow and St. Petersburg, with a yearly production of 173 [$84,078,000] and 134 million roubles [$65,124,000] respectively, represent together two-fifths of the aggregate production of Russia. If we add Vladimir (91,766,000 roubles [$44,598,276]), Kieff (73,300,000 [$35,623,800]), Perm (50,500,000 [$24,543,000]), Livonia, Esthonia, Kharkoff, and Kherson (from 30 to 35 millions [$14,580,000 to $17,010,000] each), we have all the principal manufacturing centres. In fact, Moscow, with portions of the neighboring governments, contains half the Russian manufactures exempted from excise duties, while the southwest governments of Kieff, Podolia, and Kherson contain two-thirds of those not so exempted.[2]

[1] See the yearly accounts in *Mining Journal*; Dobronizskiy, *Mining in the Russian Exhibition* of 1883 (detailed account); publications of the Minister of Finance; Köppen's "Mining Industry of Russia," in *Mining Journal*, 1880, and *Izvestia Geog. Soc.*, 1880; Marvin's *Petroleum Industry of Russia*, 1885.

[2] See Orloff's *Index of Russian Manufactures*, 1881; Timiryazeff's *Development of Industry in Russia*, and *Industrial Atlas of Russia; Materials for Statistics of Steam-Engines*, published by Central Statistical Committee, 1882; *Historical and Statistical Sketch of Russian Industry*, vol. ii., 1883; *Annuaire of the Ministry of Finance; Russische Revue*, published monthly at St. Petersburg by Roettger. On the petty trades, see *Memoirs of the Committee for Investigation*

Inland trade.

The main wealth of Russia consisting in raw produce, the trade of the country turns chiefly on the purchase of this for export, and the sale of manufactured and imported goods in exchauge. This traffic is in the hands of a great number of middlemen,—in the west Jews, aud elsewhere Russians,—to whom the peasants are for the most part in debt, as they purchase in advauce on security of subsequent payments in corn, tar, wooden wares, etc. A good deal of the internal trade is carried on by travelling merchants (*ofeni*).

The fairs are very numerous; the minor ones numbered 6500 iu 1878, and showed sales amounting to an aggregate of 305 milliou roubles [$148,230,000]. Those of Nijni-Novgorod, with a return of 400 million roubles [$194,400,000], of Irbit and Kharkoff (above 100 million roubles [$48,600,000] each), of Romny, Krestovskoye in Perm, aud Menzelinsk in Ufa (55 to 12 million roubles [$26,730,000 to $5,832,000]), have considerable importauce both for trade and for home manufactures. The total value of the iuterual trade, which is in the hands of 681,116 licensed dealers, is roughly estimated at more thau seven milliards of roubles [$3,402,000,000].

The developmeut of the external trade of Russia is seen from the following figures (millions of roubles):

	1861–65.	1866–70.	1871–75.	1876–80.	1881.	1882.
Exports.						
Articles of food	66.1	116.9	200.1	326.2	261.9	350.6
Raw and half-manufactured produce	102.8	130.1	164.6	197.4	219.5	232.2
Manufactured wares	12.7	15.6	10.1	11.0	13.2	15.8
Cattle	...	...	...	...	11.8	19.1
Total	181.6	262.7	374.9	534.6	506.4	617.7
" in metallic roubles[1]	158.4	214.4	319.2	342.3	336.8	370.6
Imports.						
Articles of food	60.4	68.5	109.3	122.0	125.7	148.2
Raw and half-manufactured produce	66.4	116.9	208.4	259.7	278.5	284.7
Manufactured wares	36.1	96.4	132.2	139.2	113.6	135.1
Total	162.9	281.8	449.9	520.9	517.8	568.0
" in metallic roubles	142.5	229.3	390.3	359.4	344.3	340.8

The chief article of export is grain—wheat, oats, and rye—(24,870,000 quarters, 321,042,000 roubles [$156,026,412] in 1882), to which the increase of exports is mainly due. This increase, however, does not correspond to an iucrease of crops, only 10 per cent. of which were exported in 1870 and about 20 per cent. in 1882. Next to grain come flax, hemp, linseed, and hempseed (129,370,000 roubles [$62,873,820] in 1882); oil-yielding grains (441,000 quarters); wool, tallow, hides, bristles, and bone (31,120,000 roubles [$15,124,320]). If we add to these timber (35,044,000 roubles [$17,031,384]) and furs (4,147,000 roubles [$2,015,442]), 95 per ceut. of all Russian exports are accounted for, the remainder consisting of linen, ropes, and some woollen stuffs and metallic wares (7,172,000 roubles [$3,485,592] to western Europe, 2,888,000 [$1,403,568] to Finland, and 5,763,000 [$2,800,818] to Asia).

The chief imports from Europe were iu 1882 as follows: Tea (48,091,000 roubles [$23,372,226]), liquors (16,124,000 roubles [$7,836,264]), salt, fish, rice, fruits, and colonial wares (38,446,000 roubles [$18,684,756]), various raw textile wares (127,986,000 roubles [$62,201,196]—cotton 72,417,000 [$35,194,662]), raw metals (32,630,000 roubles [$15,858,180]), chemicals (57,894,000 roubles [$28,136,484], and stuffs (22,428,000 roubles [$10,900,008]). The imports from Asia —chiefly tea—in the same year reached 32,853,000 roubles [$15,966,558]. The chief imports were from Germany (214,000,000 roubles [$104,004,000]) and Great Britain (124,700,000 [$60,604,200]), the chief exports to Great Britain (210,000,000 [$102,060,000]), Germany (178,000,000 [$86,508,000]), and France (54,000,000 [$26,244,000]). Even iu her trade with Finland Russia imports more than she exports,—the chief imports being paper, cotton, iron, and butter; prohibitory tariffs were imposed on Finnish wares in 1885.

During 1882 the ports of the empire were visited by 13,638 foreign ships (5,337,000 tons), of which number 1436 were to Asiatic ports (391,200 tons). Of the above total only 2489 vessels (628,000 tons) were under the Russian flag (mostly Finnish), while the British alone showed a tonnage of 2,258,000 and the German 639,000. The coasting trade was represented by 35,083 vessels (6,040,000 tons) entering the ports, chiefly those of the Black Sea. The mercantile marine of Russia in 1882 uumbered 6383 vessels (727,000 tons), including 604 steamers; of the total number 1593 (254,000 tons) were Finnish. The chief ports are St. Petersburg, Odessa, Riga, Taganrog, Libau, and Reval. Baku has recently acquired some importance iu consequence of the naphtha trade.[2]

Communication.

The rivers of the empire, mostly connected by canals, play a very important part in the inland traffic. The aggregate length of navigable waters reaches 21,510 miles (453 miles of canals), and 12,600 miles more are available for floating rafts. In 1882 51,407 boats with cargoes amounting to 153,250,000 cwts., valued at 186,480,000 roubles [$90,629,280], left the ports on Russiau rivers aud canals. Corn, firewood, and timber constitute two-thirds of the whole cargoes carried. Within Russia proper, from 5740 to 7400 boats, larger and smaller, worth from four to seven millions of roubles, have been built annually during the last five years (7415 boats, valued at 6,758,000 roubles [$3,284,388], in 1882,—18 of them being steamers); most of them are light flat-bottomed structures, which are broken up as soon as they have reached their destination. The number of steamers plying on iuland waters, chiefly on the Volga, was estimated in 1879 at 1056 (80,890 horse-power).

Twenty-five years ago Russia had only 993 miles of railways; on January 1, 1883, the totals were 13,428 miles for Russia and Caucasia, 888 for Poland, 734 for Finland, and 141 for the Transcaspiau region, and two years later they had reached an aggregate length of 16,155 miles. The railways chiefly connect the Baltic ports with the granaries of Russia in the southeast, and the western frontier with Moscow, whence six truuk lines radiate in all directions. Several military lines run along the western frontier, while two trunk lines, starting from St. Petersburg, follow the two shores of the Gulf of Finland. Of the projected Siberian railway one main line (444 miles), connectiug Perm and Berezniki on the Kama with Ekaterinburg and the chief iron-works of the Urals, has been constructed. It has been extended east to Kamyshkoff, and is to be continued to Tiumen, 100 miles farther east, whence steamers ply to Tomsk.

Only 738 miles of the railways of Russia belong to the state, but most of them have been constructed under Government guarantees, involving payment of from 11 to 21 million roubles yearly. On the other hand, the yearly increasing debt of the railways to the state amounted to 781,888,800 roubles [$379,997,956.80] in 1883. Of the aggregate value of the Russian railways, estimated at 2210 million roubles [$1,074,060,000], no less than 1971 million roubles [$957,906,000] were held by Government in shares and bonds. The cost of construction has been altogether out of proportion to what it ought to be; for, whereas the average rate per verst (0.663 mile) in Finland was only 20,000 silver roubles [$15,400], in Russia it reached 60,000 [$26,160], 75,000 [$36,450], 90,000 [$43,740], and even 100,000 roubles [$48,600]. In 1882 21,322 versts (14,136 miles) represented an expenditure of 2,210,047,632 roubles [$1,074,083,149.52], and their net revenue was only 3.18 per cent. on the capital invested (4982 roubles [$2421.25] per English mile in 1882). In 1884 34,674,853 passengers, 2,287,955 military, and 834,500,000 cwts. of merchandise were conveyed by 5808 locomotives and 120,940 carriages and wagons. Fully one-half of the merchandise carried consisted of corn (24 per cent.), coal (13 per ceut.), firewood (12 per ceut.), and timber (8 per cent.).[3]

For the conveyance of correspondence and travellers along ordinary routes the state maintains an extensive organiza-

of Petty Trades, vols. i. to xii., 1879–84; *Recueil of Statistical Information for Moscow Government*, published by the Zemstvo, vols. vi. and vii.; Isaeff's *Trades of Moscow;* several papers in reviews; and an appendix to the Russian translation of Reclus's *Géographie Universelle; Resumé of Materials on Russian Petty Trades*, 1874 (all Russian); also Thun, *Russlands Gewerbe*. For the position of workmen in manufactories see the extensive inquiries of the Moscow Zemstvo in its *Recueil*, and the reports of the recently nominated inspectors of manufactures, especially Yanjul, *Sketches and Researches*, 2 vols., 1884.

[1] See note 1, p. 78.

[2] See *Obzor of the Foreign Trade of Russia* in 1882, published by the Minister of Finance, and the same for trade with Europe in 1883 and 1884.

[3] See the *Statistical Sbornik of the Ministry of Roads and Communications*, vols. viii., ix., and x. (roads, canals, railways, and traffic thereon, with maps and graphic representation of traffic); Golovatchoff, "Russian Railways," in Bezobrazoff's *Sbornik Gosudarstvennykh Znanij*, vols. iv., v., vii., viii.; Rybakoff and Bieloff, *Our Ways of Communication*, 1884; Tchuproff, *Tovarnyie Sklady*, etc. (trade in corn), 1884.

tion of post-horses between all towns of the empire—that is, over an aggregate length of 110,170 miles. Posts and telegraphs. In 1882 4355 stations, with a staff of 15,560 men and 446,460 horses, were kept up for that purpose. In 1883 242,193,470 letters, newspapers (93,520,000), registered letters, and parcels were carried, of which 29,808,100 belonged to international correspondence. The telegraph system had in the same year an aggregate length of 65,394 miles, with 2957 telegraph-offices, and 10,222,139 telegrams were transmitted.[1] (P. A. K.)

Part IV. Russian History.

The Russians, properly so called, belong to the Slavonic race, itself a division of the great Aryan family. Plate III. It cannot be denied that in the northern and eastern parts of Russia large Finnish elements have become mixed with the Slavs, and Mongolian in the south, but this is far from justifying the prejudiced attempts of Duchinski and others to challenge the right of the Russians to be called an Aryan people. The derivation of the words Russia, Russians (*Rous*, *Rossia*, *Rossiane*), has been much disputed. The old-fashioned view was to identify them with the *Rhoxolani*, who are now generally believed to have been a Medish tribe. The later and probably correct one is to derive the name from the Finnish Ruotsi applied to the Swedes, and considered by Professor Thomsen of Copenhagen to be itself a corruption of the Swedish word *rothsmenn*, rowers or seafarers. They are Scandinavian vikings with whom we first become acquainted in northern Russia, and who in a way founded the empire, although from Arabian and Jewish writers we have dim records of a Slavonic race inhabiting the basin of the Dneiper about the close of the 9th century. In recent times Ilovaiski and Gedeonoff have again attacked the view of the Swedish origin of the invaders. They see in them only Slavs, but they are not considered to have shaken the theory which derives the name from Ruotsi. As the story goes, three brothers, Rurik, Sineus, and Truvor, were invited to Russia from the north and settled at Novgorod in 862. Rurik and his brothers. Nestor calls them Varangians, a name in which most people are willing to see Norsemen. For a long time the Russians and Scandinavians are considered, as we shall find, to be separate races, but at length they are fused, as the Saxons and Normans in England under Henry I. Concerning the origin of the town of Novgorod, which bears a purely Slavonic name, nothing is known; it has been supposed that at first a Finnish settlement existed on its site. According to the legend the three brothers were invited over by a leading citizen named Gostomîsl. There is, however, no mention of such a person in the *Chronicle* of Nestor. There is another story that Rurik was the son of the Swedish king, Ludbrat, a person met with in Scandinavian legend, and his queen Umila, the daughter of Gostomîsl, and was born at Upsala in 830. Whatever the variants of the legend may be, we seem to learn one thing,—that a successful Scandinavian invasion occurred in the north of Russia. The three brothers finally settled in the country,—Rurik at Ladoga, where the river Volkhoff flows into the lake, Sineus at Bielo-ozero, and Truvor at Izborsk on Lake Peipus. On the death of his two brothers without heirs, we are told that Rurik annexed their dominions to his own, and took the title of *veliki kniaz*, or grand-prince. These three brothers are said to have brought two other adventurers with them, Askold and Dir, who, having had a quarrel with Rurik, set out with some companions to Constantinople to try their fortune. On their way they saw Kieff, situated on a rich and grassy plain, in the occupation of the Khazars. Of this city they made themselves masters, and permanently established themselves on the Dnieper. The origin of Kieff itself is involved in mystery. It is first mentioned about the 9th century. Constantine Porphyrogenitus speaks of τὸ καστρὸν τὸ Κιοάβα τὸ ἐπονομαζόμενον Σαμβατάς. This last word has given much labor to scholars; some are disposed to see in it the Norse *sandbakki*, the bank of sand. It is at Kieff that, according to the legend, St. Andrew preached the Gospel to the Russians. From this place Askold and Dir sallied forth two years afterwards, with an armament of two hundred vessels, sailed up the Bosphorus, and plundered the capital of the Byzantine empire. The Greek writers give 851 as the date of this enterprise, thus making it precede the arrival of Rurik by eleven years. The emperor at the time of their invasion was Michael III.

Having greatly extended his dominions by subduing the surrounding Slavonic tribes, Rurik died at an advanced age in 879, leaving the regency of the principality and the guardianship of his son Igor to the renowned Oleg.[2] Igor and Oleg. This chief subdued Smolensk, a city of the Krivitchi, in 882. Allured by its wealth and advantageous situation, Oleg now resolved to attempt Kieff, which was held by Askold and Dir. The story goes that he took young Igor with him, and disguised himself and his companions as Slavonic merchants. The unsuspecting Askold and Dir were invited to a conference and slain on the spot. Thus was Kieff added to the dominion of Igor, who was recognized as the lord of the town.[3] In 903 Oleg chose a wife for Igor, named Olga,[4] said to have been a native of Pskoff, the origin of which place, now mentioned for the first time, is unknown. We are told that it was a city of importance before the arrival of Rurik. The derivation of the name is disputed, some deriving it from a Finnish, others from a Slavonic root. Oleg next resolved to make an attack upon Byzantium, and his preparations were great both by sea and land. Leo the Philosopher, then emperor, was ill able to resist these barbarians. He attempted to block the passage of the Bosphorus, but Oleg dragged his ships across the land and arrived before the gates of Constantinople. The Greeks begged for peace and offered tribute. Oleg is said to have hung his shield in derision on the gates of the city. We may believe this without going so far as to give credence to Stryikowski, the Polish writer, who says it was to be seen there in his time (16th century). The atrocities committed by Oleg and his followers are described by Karamzin, the Russian historian; they are just such as the other Norsemen of their race were committing at the same time in northern and western Europe. The Byzantines paid a large sum of money that their city might be exempted from injury, and soon after Oleg sent ambassadors[5] to the emperor to arrange the terms. The treaty was ratified by oaths; the Byzantines swore by the Gospels, and the Russians by their gods Perun and Volos. In 911 Oleg made another treaty with the Byzantines, the terms of which, as of the preceding one, are preserved in Nestor. The authenticity of these two treaties has been called in question by some writers, but Miklosich truly observes that it would have been impossible at the time Nestor wrote to forge the Scandinavian names. Soon after this Oleg died; he had exercised supreme power till the time of his death to the exclusion of Igor, and seems to have been regarded by the people as a wizard. He is said to have been killed by the bite of a serpent, which had coiled itself in the skull of his horse, as he was gazing at the animal's unburied bones. The story is in reality a Scandinavian saga, as has been shown by Bielowski and Rafn. It is also found in other countries. In the reign of Igor the Petchenegs first make

[1] See *Postal Statistics for* 1883 (St. Petersburg, 1885), and the *Russkiy Kalendar*.

[2] Both these names are Scandinavian, the original forms being Ingvar and Helgi.

[3] This story is considered by the historian Bestuzheff Riumin to be a mere legend invented to explain the connection between Novgorod and Kieff.

[4] Here again we have a Norse name. Olga is equivalent Helga, which in its older form is Holga.

[5] It has been observed that the names of the ambassadors this treaty are purely Scandinavian.

RUSSIA from 1462 to 1689

The Principality of Moscow in 1462
Acquisitions of Ivan III., 1462-1505
" " Basil III., 1505-1533
" " Ivan IV., 1533-1584
" " Michael, 1613-1645
" " Alexis, 1645-1676
Territory lost by the Treaty of Stolbovo, 1617
" " Deulino, 1618, and re-gained by Alexis
Boundaries of Malorussia according to the Treaty of Zboroff, 1649

Campaigns

Akhmet, 1480 — False Dmitri II., 1608
Khan of Crimea, 1591 — Pozharski, 1612
False Dmitri I., 1605 — Razan, 1670

ACCESSIONS TO RUSSIA from 1689 to 1825

Acquisitions

Peter the Great, 1689-1725
Anna, 1730-1740
Elizabeth, 1741-1762
Catherine II., 1762-1796
Alexander I., 1801-1825
Territory lost by the Treaty of Paris, 1856
Territory restored by the Treaty of Berlin, 1878

Expedition of Charles XII. in 1708-9
Peter the Great to the Pruth, 1711
Expeditions of Munich in 1736-7
Invasion of Napoleon, 1812
Persian Campaign of Paskewitch, 1827
Turkish Campaign of Wittgenstein & Diebitsch, 1828-9
" of Paskewitch in Asia, 1828-9
Polish Campaign of Diebitsch, 1831
" of Paskewitch, 1831

ACQUISITIONS IN CAUCASIA & ARMENIA 1762 to 1878

Catherine II.
Paul
Alexander I.
Nicholas
Alexander II.

English Miles
50 0 50 100 150 200 250 300

their appearance in Russian history. In 941 he undertook an expedition against Constantinople and entered the Bosphorus after devastating the provinces of Pontus, Paphlagonia, and Bithynia. Nestor has not concealed the atrocities committed by the Russians on this occasion; he tells us of the churches and monasteries which they burned, and of their cruelty to the captives. They were, however, attacked by the Byzantine fleet, and overpowered by the aid of Greek fire; many were drowned, and many of those who swam to land were slaughtered by the infuriated peasants; only one of their number escaped. Thirsting to avenge his loss, Igor fitted out another expedition in the spring of the following year. The Greeks were unwilling to run a risk again; they renewed the treaty which had been signed with Oleg, and were only too glad to purchase deliverance from their adversaries. The Russian at first demanded too much, but was finally persuaded by his more prudent attendants: "If Cæsar speaks thus," said they, "what more do we want than to have gold and silver and silks without fighting? Who knows which will survive, we or they? Who has ever been able to conclude a treaty with the sea? We do not go on the dry land, but on the waves of the sea; death is common to all."

A treaty of peace was accordingly concluded, which is given at full length by Nestor; of the fifty names attached to it we find three were Slavonic and the rest Norse. The two races are beginning to be fused. From this expedition Igor returned triumphant. He was, however, unfortunate in a subsequent attack on the Drevlians, a Slavonic tribe whose territory is now partly occupied by the government of Tchernigoff. The Drevlians had long suffered from his exactions. They resolved to encounter him under the command of their prince Male; for they saw, as a chronicler says, that it was necessary to kill the wolf, or the whole flock would become his prey. They accordingly laid an ambuscade near their town Kerosten, now called Iskorost, in the government of Volhynia, and slew him and all his company. According to Leo the Deacon, he was tied to two trees bent together, and when they were let go the unhappy chief was torn to pieces.

Igor was succeeded by his son Sviatoslaff, the first Russian prince with a Slavonic name. Olga, however, the spirited wife of Igor, was now regent, owing to her son's minority. Fearful was the punishment she inflicted upon the Drevlians for the death of her husband, and the story lacks no dramatic interest as it has been handed down by the old chronicler. Some of the Drevlians were buried alive in pits which she had caused to be dug for the purpose previously; some were burned alive; and others murdered at a *trizna*, or funeral feast, which she had appointed to be held in her husband's honor. The town Iskorost was afterwards set on fire by tying lighted matches to the tails of sparrows and pigeons, and letting them fly on the roofs of the houses. Here we certainly have a piece of a *bîlina*, as the old Russian legendary poems are called. Geoffrey of Monmouth and Layamon give the same account of the capture of the city of Cirencester by Gurmund at the head of the Saxons, and something similar is also told about Harold Hardrada in Sicily. Finally at the close of her life, Olga became a Christian. She herself visited the capital of the Greek empire, and was instructed in the mysteries of her new faith by the patriarch. There she was baptized by him in 955, and the emperor Constantine Porphyrogenitus became her god-father. She did not, however, succeed in persuading her son Sviatoslaff to embrace the same faith, although he took no measures to impede its progress among his subjects. This son was as celebrated a warrior as Oleg; his victories were chiefly over the Petchenegs previously mentioned, a people of Mongol origin inhabiting the basin of the Don. He began, however, the fatal custom of breaking up Russia into apanages, which he distributed among his sons.

Regency of Olga.

Sviatoslaff.

The effects of this injudicious policy, subsequently pursued by other grand princes, were soon felt. Thus was paved the way for the invasion of Russia by the Mongols, who held it for two hundred years, and communicated that semi-Asiatic character to the dress and customs of the country which the *ukazes* of Peter the Great could hardly eradicate, and which perhaps have not entirely disappeared even in our own times. In his division of the country, Sviatoslaff gave Kieff to his son Yaropolk; to another son, Oleg, the conquered land of the Drevlians; to another, Vladimir, he assigned Novgorod. It would be impossible to interest the reader in the petty wars of these princes. After having gained several victories over the Petchenegs, Sviatoslaff set out on an expedition against the Bulgarians, a Ugro-Finnish tribe, dwelling on the banks of the Volga, the remains of whose ancient capital can still be seen. He made himself master of their country, but his victorious career was cut short at the cataracts of the Dnieper, where he and his soldiers were slain by the Petchenegs. According to the barbarous custom of the times, their prince Kurya made his skull into a drinking-cup. Vladimir, the son of Sviatoslaff, was for some time a monster of cruelty and debauchery. He killed his brother Yaropolk, and seized his dominions; and, Yaropolk having some time before murdered his brother Oleg, Vladimir now became sole ruler. To his hereditary dominions he added Galicia or Red Russia, and subjugated some Lithuanian and Livonian tribes. Suddenly he seems to have been troubled with religious difficulties. According to the chronicler, he sent ambassadors to bring him reports of the different religions—Catholic, Jewish, Mussulman, and Greek. The last of these beliefs seemed the most satisfactory. Vladimir marched south, took the city of Chersonesus in the Crimea, which at that time belonged to the Byzantine emperors, and then sent to demand the hand of the daughter of that potentate. After some deliberation his request was granted on condition that he was baptized. Accordingly he went to Constantinople in 988, and was admitted into the church, and at the same time received the hand of Anne, the Byzantine princess, although he seems to have already had a great number of wives. On his return to Kieff, he caused the image of Perun, the Slavonic god of thunder, which had been erected on an eminence, to be cast into the river, after having been belabored by the cudgels of his soldiers. After this Vladimir issued a proclamation ordering all the inhabitants to proceed on the following day to the banks of the river to receive baptism. This extraordinary command met with universal obedience, and Russia was Christianized. As Vladimir introduced Christianity into Russia, so Yaroslaff his son was the first legislator. He was prince of Novgorod, and died in 1054. Vladimir on his death divided his dominions among his sons:—to Yaroslaff, Novgorod; to Iziaslaff, Polotsk; to Boris, Rostoff; to Gleb, Murom; to Sviatoslaff, the Drevlians; and a few other provinces to others of his sons. Kieff, his capital, was seized by his nephew Sviatopolk, who murdered Boris and Gleb, now canonized among the martyrs of the Russian Church. Yaroslaff at length drove Sviatopolk from Kieff, and was temporarily restored by the Poles, but only to be driven out again, and he ended his life as an exile. Yaroslaff was successful against the Petchenegs, but failed in an attack on Constantinople. His great claim to be remembered lies in his publishing the first recension of the *Russkaia Pravda*, the earliest Russian code, which was handed down in the chronicles of Novgorod.

Vladimir.

Yaroslaff.

We now leave the earliest period of Russian history, with its romantic stories and embedded sagas, telling us of heroic men, for the second division of our subject. The death of Yaroslaff was followed by the dreariest portion of the Russian annals—the period of apanages (*udieli*), lasting from 1054 to 1238. The country was now broken

Period of the apanages.

up into petty principalities, and we shall understand its condition more clearly if we remember that the chief divisions of Russia from the 11th century to the 13th were as follows :[1]

(1) The principality of Smolensk, formerly of great importance, as including in its territories the sources of three of the great Russian rivers—the Volga, the Dnieper, and the Düna.

(2) The principality of Russia, in the early and restricted sense, the original element of the country. The first form of the name is Rous. The word appears to have been a collective appellation of the people ; it was under the influence of the Byzantine writers that in the 17th century the form Rossia sprang up, which in time spread over the whole land. We must not forget, however, that to the majority of Englishmen, till the beginning of the 18th century, its name was Muscovy. Its situation on the Dnieper was very advantageous; and the soil was fertile, the black-earth region being at the present time the great wheat-growing district of Russia. Besides, the Byzantine territory was not far off. On the principality of Kieff depended that of Pereiaslavl ; and Vishgorod, Bielgorod, and Tortchesk were made apanages for princes of the same dynasty.

(3) On the affluents of the right bank of the Dnieper, especially the Sozha, the Desna, and the Seim, stretched the principalities of Tchernigoff with Starodub and Lubech, and Novgorod Severski with Putivl, Kursk, and Briansk.

(4) The double principality of Ryazan and Murom.

(5) The principality of Suzdal.

(6) The republics of Novgorod and Pskoff, and the daughter-city of the latter, Vyatka.

Iziaslaff, the son of Yaroslaff, seems to have had a troubled reign of twenty-four years, constantly disturbed by civil wars. On his death in 1078, although he had two sons, he left the principality of Kieff to his brother Vsevolod, apparently on a principle common among the Slavs to bequeath the crown to the oldest male of the family ; but, on the death of Vsevolod, Sviatopolk, the son of Iziaslaff, succeeded in 1093. At his death Vladimir Monomakh came to the throne, and ruled from 1113 to 1125. He was the son of Vsevolod, and was called after his maternal grandfather, the Byzantine emperor Constantine Monomachus. The reign of this prince was a very prosperous one. He left a curious treatise called "Instruction" (*Pouchenie*), addressd to his sons, in which we get a picture of the simple life in Russia at that period (see below, p. 112). He also founded on the river Kliazma a town which bears his name. There were continual quarrels among his descendants, but it is impossible to go into these minutely here. George Dolgoruki, one of the sons of Vladimir Monomakh, gained possession of Kieff in 1157, but the city soon began to pale before the growing power of Suzdal, and ceased to be the capital. He died the same year, just while a league was being formed to drive him out of it. The confederates entered the city, and their chief made himself prince. In 1169 Andrew Bogolioubski, son of George Dolgoruki, formed a coalition against Mstislaff, who was reigning in Kieff, and a large army was sent against the city. It was taken and pillaged ; and the sacred pictures, sacerdotal ornaments, and even bells were carried off. It is on this occasion that the head of St. Clement, the Slavonic apostle, which is known to have been preserved at Kieff, was lost.

After the fall of this city Russia ceased for some time to have any political centre. During the fifty-four years previous to the arrival of the Mongols, our chief interest is drawn to Suzdal and Galicia, and the republics of Novgorod and Pskoff. George Dolgoruki had founded the principality of Suzdal ; his great anxiety, however, was to make himself master of Kieff. The chief aim of his son Andrew Bogoliubski was to extend his authority in another direction, and to cause it to be recognized at Novgorod the Great, where he had established his nephew as a kind of lieutenant. He attacked the city in 1170, but was completely repulsed from its walls, a panic having seized his army. The Novgorodians put to death many of their prisoners, and sold others as slaves, so that, to quote the words of their chronicler, "six Suzdalians could be bought for a grivna," an old piece of money. In 1173 Andrew was also defeated by Mstislaff the Brave at Smolensk, and in 1174 he was assassinated by his own nobles. The reign of Andrew was in all respects an important one. From his refusing to divide his dominions among his brothers and nephews, it is plain that he saw the evil effect of the system of apanages and could conceive the idea of a united state. He was a man of iron will, and an astute diplomatist rather than a great soldier. He thus had something of the spirit of the Ivans, and anticipated their policy. He may be said with truth to have been the last of the conspicuous rulers of Russia before the Mongol invasions. As yet we have had but few worthy of the attention of the historian. They are Rurik, the founder of the empire, Oleg the warrior, and Olga the first Christian sovereign. To these succeed the warlike Sviatoslaff, slain by the Petchenegs ; Vladimir, who caused the country to be Christianized ; and Yaroslaff his son, the legislator. During the second period, in which we find Russia weakened and divided into apanages, we have only two noteworthy princes among a score of unimportant persons, —Vladimir Monomakh and Andrew.

The death of Andrew, whose murderers were not brought to justice, was followed by many petty wars. The only event, however, of any importance for a considerable time is the battle of Lipetsk (near Pereiaslavl Zaliesski) in 1215, in which George, son of Vsevolod, brother of Andrew, was defeated by the combined troops of Novgorod, Pskoff, and Smolensk. In 1220 we hear of Nijni-Novgorod being founded. A prince of considerable importance was Roman of Volhynia, to whom the inhabitants of Galicia offered the government of their principality, but he was superseded by another Vladimir, and did not get the crown till after a great deal of hard fighting. He is said by Kadlubek, the Polish historian, to have acted with ferocious cruelty. In 1205 he was killed in a battle with the Poles. In 1224 we have the first invasion of Russia by the Mongols. Daniel of Galicia was one of the last of the Russian princes to make his submission to Batu (1238). He died in 1264. In the 14th century the principality of Galicia was lost in the Polish republic, having been annexed to Lithuania. It joined the fortunes of that state in its union with Poland at the time of the marriage of Jagiello with Jadwiga.

The Mongol supremacy.

We now come to the third division of our subject—Russia under the yoke of the Mongols, viz., from 1238 to 1462. This is indeed a dreary period, in which the political and material development of the country was delayed by its complete enslavement. The first occasion on which the Russians came in contact with their Mongolian invaders was in 1224, when, in company with their allies, the Polovtzes, they suffered a complete defeat on the banks of the Kalka, near where it flows into the sea of Azoff, and adjoining the site of the present town of Mariupol. On this occasion, however, the Mongols only marched a little way up the river Dnieper, and retired after devastating the country. In 1238 they reappeared, and after destroying Bolgarî, the capital of the Finnish Bulgarians on the Volga, advanced against Ryazan, which was plundered and burned, with adjoining cities. They then defeated the army of Suzdal, at Kolomna, on the Oka ; after which they burned Moscow, Suzdal, Yaroslavl, and other important towns. The grand-duke Yuri of Suzdal had encamped on the river Sit, almost on the frontiers of the territory of Novgorod. He was there defeated and was decapitated on the field of battle, while his nephew Vasilko had his throat cut for refusing to serve Batu. After taking Tver and advancing within fifty leagues of Novgorod, the Mongols turned south and occupied the two following years (1239–1240) in ravaging southern Russia. They then burned Pereiaslavl and Tchernigoff, and Mangu, the grandson of Jenghiz Khan, directed his march against

[1] See Rambaud, *Histoire de la Russie*, p. 76.

Kieff. The noise of the great host proceeding to the capture of the fated city is graphically described by the chronicler. The city was taken and given up to pillage, not even the graves being respected. Volhynia and Galicia followed the fate of the other principalities, and all Russia was now under the yoke of the Mongols, except the territory of Novgorod.

The subsequent movements of these barbarians in Hungary and Moravia cannot be described here. It will suffice to say that soon afterwards Batu turned eastwards. He next founded on the Volga the city of Sarai (the Palace), which became the capital of the powerful Mongolian empire, the Golden Horde. Here also congregated the remains of the Petchenegs, the Polovtzes, and other tribes, and to these barbarians Russia was for a long time tributary. In 1272 the Mongolian hordes embraced Islam. Yaroslaff, who entered into his territory of Suzdal after the death of his brother Yuri, found his hereditary domains completely devastated. He had commenced rebuilding the ruined town, when he was summoned by Batu to do him homage in his new capital of Sarai. This, however, was not considered sufficient, and the poor prince was obliged to betake himself to the court of the great khan, which was at the further end of Asia, on the banks of the river Amur. His title was confirmed, but on his return he died of the fatigues of the journey. He was succeeded in Suzdal by his son Andrew (1246–1252). His other son Alexander reigned at Novgorod the Great, and gained the surname of Nevski from his celebrated victory over the Swedes in 1240. He and Dmitri Donskoi are the only great figures of this period of national abasement. Alexander Nevski has become consecrated in the memories of the people, and is now one of the leading Russian saints. In spite, however, of his services to the people of Novgorod, he afterwards quarrelled with them and retired to Pereiaslavl Zaliesski. But the citizens were soon glad to betake themselves to his help. On being invaded by the German Sword-bearing Knights, who had established themselves in Livonia in the year 1201, and an army of Finns, Alexander was summoned, like another Camillus, and defeated the enemy on Lake Peipus in what was called the "Battle of the Ice" in 1242. He entered Novgorod in triumph with his prisoners. In spite of all this brilliant success, Alexander was unable to resist the power of the Golden Horde, and was obliged to go to Sarai to do homage to the khan. He was accompanied by his brother Andrew. The ceremony was always attended by many degrading acts of submission on the part of the tributary prince. In 1260 the Novgorodians, who had so long preserved the liberty of their republic uninjured, consented to submit to the khan and pay tribute; Alexander died before reaching Vladimir on his return from one of these humiliating journeys. A great part of western Russia was now consolidated by the Lithuanian princes into a state, the capital of which was Vilna and the language White Russian. To this many of the western provinces of Russia gravitated, and by the marriage of the Polish heiress Jadwiga with Jagiello of Lithuania these provinces went to Poland and were not reannexed to Russia till a much later period. The eastern portion of Russia grouped itself round Moscow, which is first heard of in the chronicles in 1147. We find four considerable eastern states—Ryazan, Suzdal, Tver, and Moscow. For a century after its foundation we hear nothing of this city, the name of which is certainly Finnish. We are told that it was burned by the Mongols in 1237, and that a brother of Alexander Nevski was killed there in 1248, in a battle against the Lithuanians. We have seen that the political centre of the country has constantly changed. From Novgorod it went to Kieff, from Kieff to Vladimir, the capital of Suzdal, and from Vladimir to Moscow; we shall soon find that owing to the vigorous policy of its rulers this principality became the nucleus of the great Russian empire, and gathered round it the adjacent states. Its true founder was Daniel, a son of Alexander Nevski, who added to it the cities of Pereiaslavl Zaliesski and Kolomna. At his death in 1303 he was the first to be buried in the church of St. Michael the Archangel, where all the Russian sovereigns were laid till the days of Peter the Great. Since that time, with the exception of Peter II., they have been interred in the church of the Petropavlovski fortress at St. Petersburg. Daniel was followed on the throne by his sons Yuri and Ivan in succession. Yuri Danilovich (1303–1326) took possession of Mozhaisk. The reign of Ivan Kalita, or the Purse (1328–1340), still further strengthened the new principality. Tver was added, and the preëminence of Moscow was assured by the metropolitan coming to reside there. After Kalita came in succession his two sons, Simeon the Proud (1340–1353) and Ivan II. (1353–1359). Simeon first took the title of grand-duke of all the Russias. He died of the Black Death, which was then devastating Europe. In spite of the efforts of these princes to maintain the supremacy of Moscow, on their death the hegemony of the Russian states went again for a time to Suzdal. It was Dmitri, surnamed Donskoi, the son of Ivan II., who won the battle of Kulikovo (lit. "the field of woodcocks") over Mamai, the Mongolian chief, in 1380. In spite of this, however, Toktamish their general invaded Russia, burned Moscow to the ground, and put to death a great number of the inhabitants. To Dmitri succeeded his son Vasilii or Basil (1389–1425), who was prince both of Moscow and Vladimir. He in turn was followed by Vasilii the Blind (1425–1462).

We begin to touch firmer ground when we approach the reign of Ivan III., the son of Vasilii, who may be considered the founder of the autocracy. We may take, therefore, as our fourth division the period from 1462 to 1613, which will include the consolidation of the empire under the vigorous rule of Ivan III., Basil V., and Ivan IV., the usurpation of Boris Godunoff, the reign of the false Demetrius, and the troubles following upon it till the accession of the house of Romanoff in the person of Michael in the year 1613. Ivan III. reigned forty-three years, and had as much influence in the consolidation of Russia as Louis XI. had in that of France. It was the great age when throughout Europe absolute monarchies were being created on the ruins of feudalism. On his accession Ivan found himself surrounded by powerful neighbors—to the east the great principality of Lithuania, to the south the Mongols; Ryazan and Tver had not been annexed to the territory of Muscovy; Novgorod and Pskoff were still republics. It was against Novgorod, a wealthy city and a member of the Hanseatic league, that his efforts were first directed. In consequence of its situation, and by its paying the tribute demanded, it had escaped from the ravages which other parts of Russia had undergone. Taking advantage of the factions which harassed this city, he succeeded in creating a party subservient to his own interests, and as early as 1470 had got the control of the government of the city, which a rival faction was anxious to transfer to the Poles. In 1478 the republic of Novgorod ceased to exist; the chief opponents of Ivan were transported to Moscow, and their goods confiscated. The *veche*, as the public assembly was called, was terminated forever, and the bell which had summoned the mutinous citizens carried off triumphantly to Moscow. In 1495 the tyrant was so foolish as to confiscate the goods of many of the German merchants who traded at Novgorod. In consequence of this nearly all the foreigners left the city, and its prosperity rapidly declined. It is now a decayed provincial town, interesting only to the antiquary. In 1489 Vyatka, a daughter city of Pskoff, was annexed and lost thereby its republican constitution. In 1464 by giving the hand of his sister to the prince of Ryazan Ivan made sure of the proximate annexation of that apanage. He seized Tver and joined it to his dominions, when the grand-prince

Ivan III.

Michael had allied himself with Lithuania. The system of apanages in Russia had now to come to an end. But Ivan, who had married the niece of the Byzantine emperor, and assumed as his cognizance the two-headed eagle, was also to come into collision with the hereditary enemies of Russia, the Mongols. The great power of the Golden Horde had been broken up; on its ruins had arisen the empires of Kazan and of Sarai or Astrakhan, the horde of the Nogais, and the khanate of the Crimea. In 1478, when Ahmed, the khan of the Great Horde, whose capital was Sarai, sent his ambassadors with his portrait, to which the Russian was to do homage, Ivan trampled it under foot, and put to death all the envoys, except one, who was deputed to take back the news to the khan. The reply of Ahmed to this outrage was a declaration of war; and the two armies met on the banks of the Oka. Ivan, who, like Louis XI., was much more of a diplomatist than a soldier, according to the accounts of the chroniclers, was in great terror, and could not be induced to fight by the persuasions of his soldiers or the benedictions of his ecclesiastics. He had already, after the armies had been for some time encamped opposite to each other, given the signal of retreat, when, in consequence of a sudden panic the Mongols also retreated, and the armies fled from each other in mutual fear. This invasion, which occurred in the year 1480, was the last great inroad of the Asiatic enemies of Russia, but we shall find some even later than the days of Ivan the Terrible, in whose time Moscow was burned by these barbarians. Meanwhile Ivan went on in his career of annexation. In 1472 he conquered Permia, in 1489 Vyatka. Ten years afterwards he had extended his authority as far north as the Petchora. His good fortune seemed ever on the increase; by a war with Alexander, king of Poland, he gained an accession of territory to the west as far as the river Desna. Upon peace being concluded, Alexander married Helen, the daughter of Ivan, but that monarch, on pretence that no regard had been paid to his daughter's religious scruples, declared war against his new son-in-law. The Polish monarch could not rely upon the fidelity of many of his vassals, as we find so often the case in Polish history, and suffered a complete defeat at the battle of the Vedrosha. On the other hand, in 1501 the Russians were routed at the battle of the Siritza, near Isborsk, by the grand-master of the Teutonic order, Hermann von Plettenberg. The order had been established in Lithuania as early as 1225; the Sword-bearers amalgamated with them in 1237.

In 1472 Ivan had married a Byzantine princess, Sophia, daughter of Thomas, brother of the emperor Constantine Palæologus. This Thomas had fled to Rome after the fall of Constantinople in 1453. In consequence of this marriage, a great many Greeks came to Moscow, bringing Byzantine culture, such as it was, to Russia, and among other things a quantity of valuable manuscripts, which formed the nucleus of the synodal library. Italians also made their appearance in Russia, among others the celebrated Aristotle Fioraventi of Bologna, the architect of so many buildings at Moscow. Ivan not only welcomed foreigners in his dominions, but entered into relations with many European powers, among others the Germans, the Venetians, and the Pope. His reign is remarkable, not only for the consolidation of the Russian autocracy, but also for legislation. In 1497 he issued his *Sudebnik*, or Book of Laws, the second Russian code after the *Russkaia Pravda* of Yaroslaff. Comparison of the two codes will show how much had been done by the Mongols to lower the Russian character. It is in the reign of Ivan that we first hear of the use of the knout: an archimandrite and some noblemen were publicly knouted for being concerned in forging a will.

Basil. At his death Ivan bequeathed his throne to his second son Vasilii or Basil, passing over his grandson, the child of his eldest son Ivan, who had predeceased him; he was evidently unwilling to commit his growing empire to the perils of a minority. Vasilii Ivanovich (1505–1533) fully carried out the programme of his father. He destroyed the independence of Pskoff in 1510, put an end to the *veche* or popular assembly, and carried off the bell which summoned the citizens. Thus fell the last of the Slavonic republics. Ryazan was next added to the Muscovite territory. The prince, being accused of having contracted an alliance with the khan of the Crimea, fled to Lithuania, where he died in obscurity. Novgorod Severski was annexed soon after, and by a war with Sigismund I. Basil got back Smolensk. He was doomed, however, to suffer from an invasion of the Mongols of the Crimea, and is said to have signed a humiliating treaty to save his capital, whereby he acknowledged himself the tributary of the khan.

Meanwhile at home Basil exercised absolute authority; Russia now exhibited the spectacle of an Asiatic despotism. He entered into negotiations with many foreign princes. Herberstein, the German ambassador, who has left us such an interesting account of the Russia of this time, has told us of the great splendor of his court. We now come to the reign of the terrible Ivan, who has left his name written in blood upon the annals of Russia, and ruled for the long period of fifty-one years (1533–1584). It was a fortunate thing for the aggrandizement of the empire that, instead of having a succession of weak sovereigns, who only ruled a short time, it had three such vigorous potentates as Ivan III., Basil, and Ivan IV., whose united reigns extended over a hundred and twenty-two years. The grand-duke Basil at his death left two sons, Ivan and Yuri, under the guardianship of his second wife Helen Glinska. She had come into Russia from Lithuania, her family having been proscribed by the Polish king Alexander on the accusation of having plotted against his life. The grand-duchess ruled with great ability, but died in 1538, having been, as is supposed, poisoned. The two young princes then became the victims of the intrigues of the chief families, especially those of Shuiski and Belski. Ivan early gave proof of a vigorous understanding, whereas his younger brother Yuri appears to have been half-witted. In 1543, when only in his thirteenth year, Ivan determined to emancipate himself from the galling yoke of the boiars, and by a kind of *coup d'état* threw off their tutelage, and caused Shuiski to be torn to pieces by dogs. After this, for some time, he was under the influence of his maternal relations. In January, 1547, Ivan was crowned by the metropolitan Macarius, and took the title of czar, or tsar, a Slavonic form of the Latin Cæsar. He soon afterwards celebrated his marriage with Anastasia Romanova. The same year a great conflagration took place at Moscow. The mob affected to believe that this had been caused by the Glinskis, who were very unpopular, and massacred a member of that family.

Ivan IV. (the Terrible).

After this time Ivan seems to have committed himself very much to the guidance of the priest Silvester and Alexis Adasheff. This was the happiest portion of his reign, for he was also greatly under the influence of his amiable wife. To this period also belongs a recension of the *Sudebnik* of his grandfather Ivan III. (1550), and the *Stoglaff*, or Book of the Hundred Chapters, by which the affairs of the church were regulated (1551). In the following year Ivan became master of Kazan, and two years later of Astrakhan. The power of the Mongols was now almost broken. Triumphant in the south and the east, he then turned his attention to the north, being anxious to open up a means of communication with the west. He anticipated the plans which Peter the Great was destined to carry out long afterwards. He was thus brought into collision with the Swedes and the Teutonic Knights. When Ivan sent a German named Schlitt to procure the assistance of some foreign artisans, they were

stopped by the Germans and prevented from entering Russian territory. In consequence of this, war afterwards broke out between Ivan and the Order. In 1558 the Russian army invaded Livonia, and took several towns, whereupon the Order made an alliance with Sigismund Augustus of Poland. But, while Russia was busy with this war, a great change was taking place in the home policy of Ivan. He threw off the influence of Silvester and Adasheff, who were both banished. From this time may be said to date the commencement of the atrocities of this czar which have earned him the epithet constantly added to his name. He was especially moved by the treason of Prince Andrew Kurbski, who, having lost a battle with the Poles, was too much afraid of the wrath of his imperial master to venture again into his clutches. He accordingly fled to the king of Poland, by whom he was well received, and from his safe retreat he commenced an angry correspondence with the czar, reproaching him with his cruelties (see below, p. 113). The answer of Ivan has been preserved. In it he dwells upon the degrading subjection in which he had been kept by his early advisers, and attempts to justify his cruelties by saying that they were only his slaves whom he had killed, over whom God had given him power of life and death.

In December, 1564, Ivan retired with a few personal friends to his retreat at Alexandrovskoe, near Moscow, where he passed his time pretty much as Louis XI. did at Plessy-les-Tours, for he resembled the French monarch both in his cruelty and his superstition. The boiars, afraid that the monarch was about to quit them for ever, went in crowds to Alexandrovskoe to supplicate him to return to Moscow. This he finally consented to do, and on his return established his bodyguard of *oprichniks*, who were the chief agents of his cruelty. In the year in which he retired to Alexandrovskoe we have the establishment of a printing-press at Moscow. Ivan now commenced a long series of cruelties. To this period belong the deposition and perhaps murder of Philip, the archbishop of Moscow; the execution of Alexandra, the widow of his brother Yuri; the atrocities committed at Novgorod, which seems to have fallen under the tyrant's vengeance for having meditated opening its gates to the king of Poland; and, lastly, the terrible butcheries on the Red Square (*Krasnaia Plostchad*).

It was in the reign of Ivan that the English first had dealings with Russia. In 1553, while Edward VI. was on the throne, three ships were sent out under Willoughby and Chancellor to look for a northeast passage to China and India. Willoughby and the crews of two of the ships were frozen to death, but Chancellor arrived safely in the White Sea, and thence proceeded to the court of Ivan, by whom he was favorably received. The English secured great trading privileges from Ivan, and established factories in the country. In one of his mad sallies, Ivan actually wrote to Queen Elizabeth (1570) asking for a safe retreat in her dominions if he should be driven out by his own subjects.

Ivan was continually waging war in the Baltic territory with the Teutonic Knights, in which, although on the whole unsuccessful, he committed great cruelties. But in 1571 he was obliged to suffer another invasion of the Mongols of the Crimea, who, to quote the quaint language of an English resident, burned "the Mosco every stick" (Hakluyt's *Voyages*, i. 402). On the death of Sigismund Augustus, of Poland, in 1572, when the crown of that country had become elective, the family of the Jagiellos being now extinct, Ivan declared himself one of the competitors. The successful candidate was the French prince Henry of Valois, but he soon fled from his new kingdom, and, on the throne again becoming vacant, the redoubtable Stephen Batory was chosen, who proved a formidable foe to the tyrant now growing old. In consequence of the successes of Stephen, Ivan was obliged to abandon all his conquests in Livonia; and the attempt to open up a passage for Russia into the Baltic failed till carried out by the efforts of Peter the Great.

One of the chief events of this reign was the conquest of Siberia by a Cossack named Yermak, who had formerly been a robber, but was pardoned by the czar on laying his conquests at the imperial feet. Among many points in which Ivan resembled Henry VIII. was the number of his wives. On the death of the seventh, he was anxious to procure an eighth from the court of his friend Elizabeth of England, and the daughter of the Earl of Huntingdon was offered to the inspection of the Russian ambassador, Feodor Pisemski, at her own desire and the queen's. She was presented to him in the gardens of York House. The ambassador prostrated himself before her, and professed to be dazzled by her beauty. Before, however, the negotiations for the marriage were concluded, the young lady, of whom a very favorable account had been transmitted to the court of Moscow, became alarmed. Rumors had reached her about the former wives of the czar and his habits. She therefore declined the brilliant prospect of an alliance associated with so many dangers. Full details of the adventures of the Englishmen who resided at Ivan's court will be found in Hakluyt's *Voyages*. In 1567 Anthony Jenkinson was commissioned by the czar to convey a special message to Queen Elizabeth, "that the Queen's Majestie and he might be to all their enemyes joyned as one, and that England and Russland might be in all manners as one." In fact Ivan wanted the assistance of the English in his wars against the Swedes and the Poles; he could appreciate the superiority of their weapons and military tactics; but Elizabeth only cared to secure a monopoly of trade, which the English for a long time enjoyed, and, according to the historian Ustrialoff, the Russians were but little benefited by it.

The declining days of Ivan were embittered by the death of his eldest son, whom he had stricken in a fit of passion with his iron staff. When the paroxysm of his anger was over, his grief was boundless. Full of remorse and continually afraid of conspiracies which might be concocted by his subjects, and harassed by superstitious dread, in which he betook himself to the divination of witches,[1] he expired in the year 1584.

Feodor.

Ivan was succeeded by his eldest surviving son Feodor (Theodore), at that time twenty-seven years of age. He was feeble both in mind and body, and very superstitious. Fletcher calls him "very simple, and almost a natural," and Solomon Henning, author of a *Chronicle of Livonia*, says that he was so weak-minded that he could find no greater amusement than tolling the church bells before service. In consequence, the chief power in the empire fell into the hands of Boris Godunoff,[2] the brother-in-law of Feodor, a man of boundless ambition and great capacity. His inordinate lust of rule he concealed under the guise of piety; his commanding presence extorted respect wherever he went. Between him and the throne were only the sickly Feodor and his brother Dmitri, still a child, who had been previously removed to the town of Uglich in the government of Yaroslavl. For a while Boris had nourished the idea of proclaiming Dmitri illegitimate, on the ground that he was the son of Ivan's seventh wife, a marriage forbidden by the canons of the church. Finally, as there seems every reason to believe, he caused the child to be assassinated at Uglich on the 15th of May, 1591. The circumstances of the death of the young prince are involved in mystery; so much, however, is certain: Dmitri was playing in a court-yard; his governess Vasilissa Volokhova, his nurse, and a servant-maid were in attendance. Whether from accident or design they all for a time lost sight of him. According to

[1] Horsey's *Diary*, edited for the Hakluyt Society, 1856, p. 199.
[2] He was of Mongol descent,—his ancestor being a certain Murza Tchet.

their testimony while under examination, the young prince had a knife in his hand when last seen; he amused himself with sticking it into the ground and cutting pieces of wood. Suddenly the nurse, on looking round, saw him prostrate and covered with blood. He died almost immediately from a large wound in his throat. The account of how the news was brought to Moscow is described in a highly dramatic manner by Horsey.[1] We have no direct evidence of the complicity of Godunoff in this murder; but there seems little doubt of it. A secret inquiry was conducted; the body, however, was not examined, and the commissioners reported that Dmitri had died of a wound accidentally inflicted by himself in a fit of epilepsy. On account of the riot which had taken place at Uglich, Boris proceeded to punish the town. More than two hundred of the inhabitants were put to death and many sent to Siberia. The church bell of Uglich was banished with them and placed in the capital of Siberia; it was not brought back till the earlier part of the present century. The remains of Dmitri, who was afterwards canonized, were deposited in the cathedral of St. Michael, the burial place of the czars. Soon afterwards a great fire broke out in Moscow, and Boris caused many streets to be rebuilt at his own expense, distributed aid, and exempted the sufferers from taxes; but still the people murmured secretly; they felt that the stain of blood was upon him, and ungratefully accused him of having caused the city to be set on fire. In the same year (1591) the khan of the Crimea made one of his periodical raids against Moscow. He set out from Perekop, and marched in a straight line, everywhere plundering and devastating. In these circumstances, Feodor displayed nothing but imbecility. He merely remarked that the saints who protected Russia would fight for her, and again betook himself to his favorite amusement of bell-ringing. Boris, however, showed vigor. In a few days he caused Moscow to be surrounded with palisades, redoubts, and artillery. The Mongols were repulsed with great slaughter; but although Boris saved his country, he could not secure the goodwill of the people. Indeed, they accused him of having invited the Mongols that the general danger might make them forget the death of Dmitri. The czarina, Irene, wife of Feodor and sister of Boris, about this time gave birth to a female child, which lived but a few days, and Boris was of course accused of having poisoned it. In reality the princess suffered from continual ill-health, and on one occasion we find Elizabeth of England sending her a physician. Boris, however, still persevered in his energetic measures for strengthening the empire. Smolensk was fortified, Archangel built; and a strong cordon was drawn round the territories occupied by the Mongols. The Swedes were driven into Narva, and diplomatic relations were opened with the European powers.

About this time the imbecile Feodor died, and with him became extinct the dynasty of Scandinavian Rurik.

Boris. This event occurred in 1598, and Boris was elected to succeed him. Godunoff, however, who felt sure of the crown, at first affected to be unwilling to receive it. He retired to a monastery and was followed by the people, supplicating him to be their emperor. He kept Russia in this state of suspense for six weeks, and then relented. As soon as he ascended the throne, the traces of his vigorous hand could be found everywhere. One of his first plans was the abridgment of the power of the nobility, which had been begun by Ivan III. and continued by Ivan IV. By this a benefit was conferred upon Russia; but Boris also served his own ambition. He was particularly severe to all members of the Romanoff family, because they were allied to the house of Rurik, and troubled his dreams of sovereignty. The head of this house was compelled to become a monk; his son, however, was destined to ascend the throne. A famine broke out in 1601, which Boris was unsparing in his efforts to allay. In the midst of all this suffering a rumor spread that Dmitri, the youngest son of Ivan the Terrible, was not dead.

The "false" Dmitri. One day in the year 1603 Prince Adam Wisniowiecki, of Bragin in Lithuania, happening to be very angry with a servant, struck him and used an insulting epithet. The young man, with tears in his eyes, said, "If you knew who I am, you would not treat me so nor call me by that name." "Who then are you, and whence do you come?" replied the astonished prince. "I am the prince Dmitri, son of Ivan Vasilievich." He then recounted a well-concocted tale of his miraculous escape from the assassin whom Boris had employed. This was his physician, who feigned compliance with the usurper's designs, but only to frustrate them. On the night appointed for the murder, the man, whose name was Simon, put the son of a serf into his young master's bed (who was accordingly killed), and immediately fled with Dmitri from Uglich. He was then committed to the care of a loyal gentleman, who thought it better for the sake of protection that he should enter a monastery. This gentleman and the physician were dead, but in confirmation of his story the false Dmitri exhibited a seal, bearing the arms and name of the prince, and a golden cross set with jewels which he said was the baptismal gift of his godfather, Prince Ivan Mstislavski. Wisniowiecki believed his tale. There were also other supposed signs.[2] The Polish nobles thronged around the young man, whose manners, as we read in the case of Perkin Warbeck, seemed to bear out his pretensions. Meanwhile Dmitri remained in Poland, enjoying all the lavished attentions of the Polish nobility. Boris was soon made acquainted with his appearance on the scene, and offered the brothers Wisniowiecki money and lands if they would surrender the impostor to him. Without, however, replying to these overtures, they removed him into the interior of Poland, and he was received with royal honors by George Mniszek, the palatine of Sandomir. Here he is said to have entered into a secret understanding with the Jesuits to bring over Russia to the Latin faith, on condition of being supported by the papal nuncio.[3] The pretender privately abjured the Greek faith, and signed a contract of marriage with Marina, the youngest daughter of Mniszek, by which he settled upon her the towns of Novgorod and Pskoff, and engaged to pay her father a million of florins as soon as he had ascended the throne. Afterwards he executed another treaty ceding Smolensk and the surrounding territory to Mniszek and the king of Poland. These proceedings were not likely to recommend him to his Russian subjects. For the present they were concealed, and Dmitri publicly professed the Greek ritual. Soon after this Sigismund of Poland saluted him as czar of Moscow, and assigned him a pension of 40,000 florins [*c.* $5000]. All this time Boris affected to regard the pretender with contempt, and issued a manifesto setting forth that his real name

1 *Diary*, ed. Bond, p. 254.

2 The present writer doubts the genuineness of this claimant; many authors, however, some of them contemporaries, were convinced that he was the real son of Ivan, and among these the first place must be assigned to the French mercenary captain Margeret, whose intimate relations with the man point him out as a valuable authority. This clever adventurer had entered the Russian service in the time of Boris Godunoff, and was a witness of the whole struggle. At first he led the troops of the latter against Dmitri, but when the pretender had established his authority he accepted a post in his service. He has given us an interesting portrait of Dmitri, of whom he speaks very favorably, in his work on Russia published at Paris in 1669.

3 According to some authors, the whole plot had been concocted by the Jesuits for this purpose. For the contrary view, however, see *Rome et Demétrius d'après des documents nouveaux avec pièces justificatives et facsimile*, by Père Pierling, S. J., Paris, 1878. Gerard Müller tells us that the pretender "conversed in Latin and Polish with fluency;" if this had been the case his knowledge of the former would be easily explained by his Jesuitical training. Margeret, however, denies it altogether. "Il est très certain qu'il ne parloit nullement Latin, j'en puis temoigner, moins le sçavoit-il lire et écrire" (p. 163).

was Grishka (or Gregory) Otrepieff, a renegade monk. Whether this individual was really the man who personated Dmitri, the son of Ivan, cannot be known for certain; but it seems very probable. Karamzin has adopted this view. Boris soon issued a proclamation against him, calling him an apostate monk, who wished to introduce the Latin heresy into Russia, and to build Romish churches in the Orthodox land. Dmitri entered that country on the 31st of October, 1604, and marched on Moravsk in Tchernigoff. He met with uninterrupted success, large numbers joining his expedition, and the authorities of the chief towns on his route offering him bread and salt till he came to Novgorod Severski on the 23d of November. This well-fortified place was defended by Basmanoff, a veteran captain, with five hundred streltzî. On the arrival of the pretender he was summoned to capitulate, but, standing on the ramparts with a lighted match, he replied: "The grand-prince and czar is at Moscow; as for your Dmitri he is a robber, who shall be impaled along with his accomplices." After three months the invaders abandoned the seige, but they had the good fortune soon afterwards to seize a large sum of money which Boris was sending to some of the towns. Shortly after this the important fortresses of Putivl, Sievsk, and Voronezh surrendered to Dmitri. Boris was too ill to go in person against the impostor; he, however, raised an army of fifty thousand men. A great battle took place near Novgorod, and the supporters of the czar would have suffered a most ignominious defeat had it not been for Basmanoff. This captain was recalled to Moscow and loaded with honors by Boris, who, from motives not very evident, unless he had begun to have suspicions of his fidelity, detained him in the city, and committed the care of the new army which he had formed to Shuiski, who was probably only half-hearted in his cause. A great battle took place on the 2d of January, 1605, on the plain of Dobrînichi, not far from Orel; here Dmitri was defeated, chiefly through the bravery of the foreign legion. He would have been captured had it not been for the fidelity of his Cossack infantry—for at this time the Cossacks were subject to Poland—who were killed to a man, and probably not a fugitive would have reached Sievsk had not Shuiski acted with duplicity. Meanwhile the pretender rode as fast as his horse would carry him to Putivl, a strong town on the frontier, from which he could easily beat a retreat into Poland. The followers of Boris remained at Dobrînichi, putting to death their prisoners. The conduct of Shuiski showed with what apathy he viewed the cause of his master; he soon drew off his troops into winter quarters, alleging that nothing more could be done that season, and also wasted time before Kromî, an insignificant place. Meanwhile Dmitri corrupted some of the chief generals of Boris. An attempt to poison him soon afterwards failed, and the pretender sent a message to Boris, recommending him to descend from the throne which he had usurped. But the days of the latter were numbered. On the 13th of April, 1605, he presided as usual at the council-board, and received some distinguished foreigners. A grand banquet was given, but suddenly after dinner he was seized with illness; blood burst from his nose, ears, and mouth, and in the brief period before his death, according to the Russian custom, the dress of a monk was thrust upon him, and he was consecrated under the name of *Bogolep* ("acceptable to God"). He expired in the fifty-third year of his age, after a reign of six years. Whether he committed suicide or was poisoned cannot now be ascertained; his death could hardly have been natural. Boris was a man of great energy of character, with views singularly in advance of his age. In some respects he anticipated the plans of Peter the Great; thus he caused several young Russians to be sent abroad to be educated, some of whom came to England. By a ukaze, however, binding the peasant to the soil, he began the system which reduced him by degrees to a condition of abject serfdom.

Boris had left a sufficient number of partisans at Moscow to proclaim his son Feodor, a youth of sixteen, and all classes took the oath of allegiance to him. Shuiski and Mstislavski returned to Moscow to assist the young czar in the government. Basmanoff was sent to take the command of the army, but, probably feeling the cause of Feodor to be desperate, on the 7th of May he proclaimed Dmitri. He was now ordered to march on the capital. Feodor, however, and his adherents still held the Kremlin with a large garrison. Accordingly it was resolved to make an attempt on Krasnoe Selo, a large town near Moscow, where many wealthy merchants resided. This was easily taken, whereupon many of its citizens marched to Moscow, and convoking the people called upon them to acknowledge Dmitri as their sovereign. Feodor and his mother were murdered, and buried in a cemetery outside of the city walls, whither also the remains of Boris were carried, for they were not allowed sepulture among the tombs of the czars. Petreius, the Swedish envoy, who has left us an interesting account of these times, tells us that the rumor was circulated that these unhappy people had poisoned themselves, but he himself saw their bodies, and the marks on their necks of the cords with which they had been strangled. According to some authorities, Xenia, the daughter of Boris, described as beautiful by the old Russian chronicler Kubasoff, was forced to retire into a convent, but Petreius declares that she was compelled to become the mistress of the conqueror. The usurper now hearing that every obstacle was removed, marched upon the capital, which he entered on June 20, 1605. We have not space to detail the splendors of his retinue, nor the ceremonies and feastings which attended his arrival. He acted at first with prudence and conciliation towards his new subjects, and even promised to pay the debts of his father Ivan. He received his mother with transports of joy; she professed to identify him, although she afterwards denied that he was her son. She was probably, however, glad enough to get out of the convent into which she had been thrust by Boris. But Dmitri soon gave offence on account of his neglect of Russian etiquette and superstitious observances. It was plain that he held the Greek Orthodox religion very cheap, and his subjects could see that he had a propensity for the Latin heresy. In the following year Marina Mniszek, his bride, made her appearance in Moscow, and the marriage took place on the 18th of May. It was followed by continued banquets. But a rebellion broke out on the 29th, at the head of which was Vasilii Shuiski, whom Dmitri had spared when about to be executed. The czar, hearing a noise in the night, and finding himself surrounded by enemies, opened a window 30 feet from the ground, leapt down, and broke his leg. He was soon afterwards found and killed. Basmanoff was slain while attempting to defend his master. The corpse of the impostor was afterwards burned. Marina was not killed, although there was a great massacre of the Poles in every quarter of Moscow; she and the ladies of her suite were kept as prisoners. Thus ended this remarkable episode of Russian history. The whole period has been aptly termed by the national historians "the Period of Troubles" (*Smutnoye Vremya*).

Feodor II.

Dmitri acknowledged.

The boiars, on being convoked after the murder of Dmitri, elected Vasilii Ivanovich Shuiski for their sovereign, but he found himself in every way disadvantageously situated, without an army, and without money. He was, moreover, troubled by an announcement which gained credence among the people that Dmitri was not really dead. To put an end to these rumors, Shuiski, entirely changing his policy, and contradicting his previous assertions, sent to Uglich for the body of the unfortunate prince, and caused him to be canonized. Two subse-

Basil Shuiski.

quent impostors, who gave themselves out to be Dmitri, were taken and executed. To complete the misfortunes of Russia, the country was invaded by the Poles in 1609, who laid siege to Smolensk. Shuiski was defeated at Klushino (a village situated to the northeast of Moscow), was taken prisoner, and was set free, to become a monk,—a favorite way of treating troublesome persons in Russia. He was afterwards delivered over to Sigismund, who kept him in prison during the rest of his life. The crown was finally offered to Ladislaus, the son of Sigismund, who in reality for two years was sovereign of Russia, and caused money to be coined in his name at Moscow. Everything seemed to portend the ruin of the country, when it was saved by the bravery of Minin, the butcher of Nijni-Novgorod, who roused the citizens to arms by his patriotic appeal, and was joined by Prince Pozharski. The latter took the command of the army; the administrative department was handed over to the former. The brave prince succeeded in driving the Poles from Russia. In 1612 the boiars resolved to elect a new czar, but they did not actually meet till 1613, and many debates ensued. The sufferings of the country had been great; a considerable part of the city of Moscow (with the exception of the Kremlin and the churches built of stone) was laid in ashes. The treasury was plundered, and its contents sent to Poland. Among other things Olearius, the traveller of the 17th century, quaintly adds, "the Russians lost the horn of a unicorn of great value, set with precious stones," which was also carried off to Poland; and he tells us that even up to his time the Muscovites bitterly regretted that they had been robbed of it. Princes Mstislavski and Pozharski refused the crown, and finally the name of Michael Romanoff, a youth of sixteen, was put forward as a candidate, chiefly on account of the virtues of his father Philarete. The Romanoffs were connected on the female side with the house of Rurik, Anastasia Romanova having been the first wife of Ivan the Terrible. Before being allowed to ascend the throne, the youthful sovereign, according to some authors, took a constitutional oath. The condition of the country all this time was most critical; large portions of its territory were in the hands of the Swedes and Poles, and the villages were plundered by wandering bands of Cossacks. Ladislaus the son of Sigismund had not yet renounced the title of czar; in 1617 he appeared with an invading army under the walls of Moscow, but was repulsed, and on December 1, 1618, consented to abandon his claims, and conclude an armistice for fourteen years. In 1617 a treaty had been made at Stolbovo, a town near Lake Ladoga, by which the Russians had been compelled to give up a large portion of their territory to the Swedes. Philarete, the father of Michael, who had been for some time imprisoned at Warsaw, was now allowed to return; he entered Moscow in 1619, and was elected patriarch, an office which had been vacant since the death of Hermogenes. Michael associated his father with himself in his power; all ukazes were published in their joint names; the patriarch held a separate court, and always sat at the right hand of the sovereign. The patriarchate was suppressed in 1721 by Peter the Great, who had formed the idea of making himself head of the church from what he saw in England and other Protestant countries. The reign of Michael was not very eventful; he employed it wisely in ameliorating the condition of the country, which had recently suffered so much, and in improving the condition of his army. Foreigners began to visit the country in great numbers, and Russia was gradually opening itself to Western civilization. Gustavus Adolphus of Sweden induced the czar to sign a treaty offensive and defensive, and a Swedish ambassador appeared at the Russian court. The sufferings which had been inflicted upon them by the Poles made the Russians eager to join an alliance which was directed against the Roman Catholic religion. In 1629 a French ambassador appeared at Moscow. Dutch and German artisans were taken into the Russian service to assist in the iron-foundries, with special view to the manufacture of cannon. The country swarmed with English merchants who had obtained valuable privileges. Scottish adventurers were to be met with in the Russian army in great numbers. We find them as early as the reign of Ivan the Terrible, to judge from Horsey's *Diary*. The false Demetrius, like Louis XI., had a Scottish guard. In Russian documents we find the names of Carmichaels, Hamiltons (frequently in the corrupted Russified form of Khomutoff), Bruces, Gordons, and Dalziels. From Scottish settlers in Russia sprang the celebrated poet Lermontoff, the first two syllables of whose name fully show his Caledonian origin.

Ladislaus.

Michael Romanoff.

The following are the leading events of the reign of Alexis, who succeeded to the throne on the death of his father Michael in 1645. (1) First comes his codification of the Russian laws (called *Ulozhenie*), which was based on the preceding codes of Ivans III. and IV. By the order of the czar, a commission of ecclesiastical and lay members was appointed to examine the existing laws, and make any necessary additions, or to adapt to present needs any which had become obsolete. The work was chiefly carried on by Princes Odoievski and Volkonski, with the assistance of two secretaries. They were engaged over it two months and a half, and the original code is still preserved in the Oruzhennaia Palata at Moscow. Ustrialoff boasts that, by recognizing the equality of all men in the eyes of the law, it anticipated a principle which was not generally acknowledged in western Europe till the 18th century. This doctrine, however, may be considered as only a natural consequence of autocracy. We are told that Alexis allowed access to all petitioners, and at his favorite village of Kolomenskoe, opposite his bed-room window, was placed a tin box; as soon as the czar rose and appeared at the window the suppliants came forward with their complaints, and, making an obeisance, placed them in the box, which was afterwards taken to him. (2) The second great event of his reign was the incorporation of the Ukraine and country of the Cossacks with Russia. For a description of the causes of this war, see POLAND. (3) By the treaty of Andruszowo the Russians gained Smolensk, Tchernigoff, and finally Kieff, the Dnieper being the new boundary, and thus the towns which had been taken by the Lithuanians and annexed to Poland by the treaty of Lublin (1569) became Russian again. The only other events of the reign of Alexis of any importance are the great riot at Moscow, on account of the depreciation of the coinage in 1648, and the rebellion of Stenka Razin, a Cossack. The riot is fully described in the interesting letter of an eyewitness which is preserved in the Ashmolean Collection at Oxford. Razin devastated the country round the Volga, and continued his depredations for three years. Alexis, however, captured him, and pardoned him on condition of his taking the oath of allegiance. He soon, however, broke out into rebellion again, and proclaimed himself the enemy of the nobles, and the restorer of the liberty of the people. By various artifices he succeeded in alluring two hundred thousand men to his standard. Astrakhan was surrendered to him, and he ruled from Nijni-Novgorod to Kazan. He was, however, like Pugatcheff in the reign of Catherine II., a vulgar robber and nothing more. His atrocities disgusted the more respectable of his adherents; his forces were gradually dispersed, and in 1671 he was taken to Moscow and executed. The czar Alexis died in 1676, in his forty-eighth year. One of the most eminent men of his reign was Ordin-Nastchokin, who negotiated the peace of Andruszowo. Alexis was a man of broad views, and made many efforts to raise Russia to the level of a European power, by sending competent men as ambassadors to foreign

Alexis.

parts, and developing the trade of the country. In these respects he resembled Boris Godunoff. Altogether his reign was one of distinct progress for Russia.

He was succeeded by his eldest son Feodor, by his first wife Maria Miloslavskaia. Feodor (1676–1682) was a prince of weak health, and his reign was uneventful. A notable occurrence was the destruction of the *rozriadnîe knigi*, or books of pedigrees. According to the *miestnichestvo* no man could take any office which was inferior to any which his ancestors had held, nor could be subordinate to any man who reckoned fewer ancestors than himself. Feodor, however, finding to what interminable quarrels these pedigrees gave rise, both at court and in the camp, hit upon a bold plan, said to have been suggested by his minister Vasilii Golitzin. He caused all the families to deliver their pedigrees into court that they might be examined, under pretext of ridding them of any errors which might have crept in. The nobles were convoked; and the czar, assisted by the clergy, caused their books to be burned before their eyes.

Feodor III.

On the death of Feodor, there seemed every probability that the empire would fall into a complete state of anarchy. The czar Alexis had been twice married: his first wife Maria Miloslavskaia bore him two sons, Feodor and Ivan, and several daughters; his second, Natalia Narîshkina, was the mother of Peter and a daughter Natalia. The court was rent by the rival factions of the Miloslavskis and the Narîshkins. Ivan was even more infirm than Feodor, and the Narîshkins strove to bring it about that he should be set aside and Peter should be elected. Sophia, however, the daughter of Alexis by his first wife, was a woman of singular energy of character, the more remarkable on account of the little attention paid to the education of women in Russia and the cloistered and spiritless lives they were compelled to lead. According to some accounts she was a woman altogether wanting in personal attractions. Perry, however, the engineer employed by Peter the Great, speaks of her as good-looking. But the position of the women of the imperial family was even worse than that of the generality; they were not allowed to marry subjects, and in consequence the majority of them led a life of enforced celibacy. Sophia was the favorite daughter of her father, and was assiduous in her attentions to him during his last illness. One of her brothers being an imbecile and the other a child, she hoped to wield the sceptre. She fomented a revolt of the streltzî, and, instigated by her harangues, they murdered some of the family and partisans of the Narîshkins. Not content with slaying one of the czarina's brothers at the beginning of the rebellion, they afterwards dragged another from his hiding-place and cut him to pieces.

Sophia.

The result of all these disturbances was that Ivan and Peter were declared joint-sovereigns, and Sophia was to be regent during their minority. She appointed Vasilii Golitzin to be commander-in-chief of the forces. He marched against the Mongols of the Crimea, but owing to the length of the journey and sufferings of the troops was able to effect but little. In 1689 Peter married Eudokia Lopukhina; but the union was by no means a happy one. Two sons were born to Peter, Alexander and Alexis; the first lived six months only, the latter survived to make a sad figure in Russian history. Next we have another revolt of the streltzî, said to have been instigated by Sophia and Golitzin. It is even alleged that the object of this conspiracy was to put Peter to death. His cause, however, prevailed, and the rebels were punished with great severity. Golitzin's life was spared, but all his property was taken from him. Sophia was now permanently incarcerated in a convent under the name of Susanna, where she remained till her death fifteen years afterwards, at the age of forty-six. Thus from 1689 dates the actual rule of Peter. His brother Ivan, infirm both in body and in mind, had but little share in the government; his faculties both of sight and speech are said to have been very imperfect. He took a wife, however, and had three daughters, concerning one of whom, at least, we have much more to hear. Ivan led a retired life, and died in 1696 at the age of thirty.

Ivan and Peter.

Peter the Great.

Want of space compels us to deal here only with the leading facts of the reign of Peter the Great (1689–1725); for more minute details the reader must consult the special article (vol. xviii. p. 712). The great object of the new czar was to give Russia ports in some other direction than the White Sea, constantly blocked with ice. He had already trained an army which was officered by foreigners in his pay. The Turks were the first objects of his attack. At first he was unsuccessful in his attempts to get possession of Azoff at the mouth of the Don,—partly on account of the treason of the Dutch engineer Jansen, who, in consequence of some slight put upon him, went over to the enemy. In 1696, however, he took the fort and soon afterwards made his triumphant entry into Moscow. In the following year Peter, accompanied by Lefort and Generals Golovin and Vosnîtzîn, set out on his travels. For some time he worked at the docks of Saardam in Holland, and then he went to England, where he remained three months. The story of his stay at Deptford is too well known to need description here. He left England, taking with him a great number of ingenious men, who were appointed to teach the arts to the barbarous Russians. He was getting ready to go to Venice when he heard of the great revolt of the streltzî. Before his arrival their insurrection had been quelled by Gordon and others, and many of them lay in prison awaiting the sentences to be given by Peter. When he reached Moscow, a series of terrible executions took place, which have been described with only too much accuracy by some eyewitnesses, the chief being Korb, the secretary of the German embassy. In 1706 broke out the revolt of the Cossacks of the Don, and in 1709 that of Mazeppa, the hetman of the Little-Russian Cossacks, who eagerly joined Charles XII. in his struggle with Peter. As early as 1700 the Russian czar had carried on war with this last of the vikings, as he had been called. In that year Charles defeated Peter at the battle of Narva, but the latter, although humbled, was not disheartened. He gathered all his strength for another encounter. In the following year Sheremetreff defeated the Swedish general Schlippenbach in Livonia, and again in 1702. The great object of Peter was to gain possession of the Neva; this he attained, but the Russian arms were disgraced by many cruelties and robberies in the unfortunate Baltic provinces, which had already suffered so much in the wars of Ivan the Terrible. Charles XII. now abandoned his attacks on the Polish king and invaded Russia. "I will treat with the czar at Moscow," he said. Peter replied, "My brother Charles wishes to play the part of Alexander, but he will not find me Darius." At Lesna the Swedish general Löwenhaupt fought a desperate battle with the Russians, in which, although nominally victorious, his losses were terrible. On June 15 (N.S.) was fought the battle of Poltava, which resulted in the complete defeat of Charles. He had brought it on by his recklessness, and, it may be added, complete ignorance of his duties as a general.

With the fall of Mazeppa and the coalition of the Little Russians in aid of Charles fell also the independence of the Cossacks and their *sech* or republic. They now became entirely dependent upon the Muscovite czar. The hetmanship, which had long been a mere empty title, lasted till the year 1789. In 1712 Peter married Martha Skavronska, a Livonian or Lithuanian peasant who had been taken prisoner at the siege of Marienburg in 1702. But little is known of her previous history; she received the name of Catherine on being baptized as a member of the Greek Church. Peter had previously divorced his wife Eudokia, who was distasteful to him on account of her sympathies

with the conservative party in Russia. He now set about his great plan of civilizing the country on the model of the nations of the West. In this he was assisted by many foreigners in his pay. He abolished the patriarchate, probably from dislike of its great power, based nobility entirely upon service either civil or military, and divided the merchants into guilds, but left serfdom still existing in Russia, or perhaps we may say with truth even augmented it, by doing away with the privileges which the *odnodvortzi* and *polovniki* had and confounding all in a common category of serfdom. His attempt to introduce primogeniture into Russia did not succeed. He put an end to the Oriental seclusion of women and the Oriental dress of men; for the beard and long caftan were substituted the cleanly-shaved face and the dress in vogue in the West. He abolished also the *pravezhe* or public flagellation of defaulting debtors. The army was completely remodelled on the European system. During the exile of Charles XII. at Bender Peter drove Stanislaus Leszczynski out of Poland, and Augustus II. reëntered Warsaw. Peter conquered Esthonia and Livonia. He was not able to annex Courland, which was a feudatory of Poland, but he negotiated a marriage between the duke and his niece Anna, daughter of the late czar Ivan, who was afterwards empress. A foolish expedition undertaken against Turkey was not successful. Peter found himself but ill-supported by the inhabitants through whose territory he marched, and was compelled to sign the treaty of the Pruth in 1711, whereby he gave back Azoff, one of his most valuable conquests, to the Turks. The story of his having been rescued by the dexterity of Catherine seems to lack confirmation; under any circumstances, he shortly afterwards acknowledged her as his wife. In May, 1713, Peter gained some fresh victories over the Swedes. In 1717 he made another European tour, visiting, among other places, Paris. On this occasion he was accompanied by his wife; concerning both strange stories were told, but perhaps we must be cautious how we receive too credulously, as Carlyle has done, the malicious gossip of the margravine of Baireuth. In 1721, by the treaty of Nystad with Sweden, Peter was left master of Livonia, Esthonia, Ingria, and part of Finland. He had begun building St. Petersburg, "the window by which Russia looks" at Europe, as early as 1703.

In 1722 we find Peter descending the Volga from Nijni to Astrakhan, and gaining some important points on that river. Previous to this had occurred the sad death of his son Alexis, in which it must be said with sorrow Peter seemed lost to all the feelings of a father. Alexis had undoubtedly given him great cause for dislike by identifying himself in every way with the retrogressive party. The unfortunate young man probably died under the infliction of torture. In 1721 Peter promulgated the celebrated ukaze (afterwards abrogated by Paul) that the sovereign had the right of naming his successor. On January 28, 1725, the great reformer was dead. An attempt to estimate his character has been made in the separate article assigned to him.

On the death of Peter the country was divided into two factions. The old reactionary party, the Golitzins, Dolgorukis, and others, were eager to proclaim Peter the son of Alexis, but those who had identified themselves with the reforms of the late sovereign were anxious that Catherine his widow, who had been crowned empress, should succeed. Menshikoff, the favorite of the late czar, who is said when a boy to have sold cakes in the streets of Moscow, became all powerful at this period, and the reforms of Peter continued to be carried out. Catherine died in 1727; she appears to have been an indolent, good-natured woman, with but little capacity for government, and accordingly, throughout her short reign, was entirely controlled by others. She designated as her successor Peter the son of Alexis, and, in default of Peter and his issue, Anna, who had married the duke of Holstein, and Elizabeth, her daughters. The regency was exercised by a council consisting of the two daughters, the duke of Holstein, Menshikoff, and seven or eight of the chief dignitaries of the empire. Menshikoff was still all-important; he had obtained from Catherine her consent to a marriage between his daughter and the youthful czar. But his authority was gradually undermined by the Dolgorukis. The favorite of Peter the Great was first banished to his estates, and afterwards to Berezoff in Siberia, where he died in 1729. The Dolgorukis were now in the ascendency, and the czar was betrothed to Natalia, one of that family. He showed every inclination to undo his grandfather's work, and the court was removed to Moscow. Soon afterwards, however, in January, 1730, the young prince died of smallpox. His last words as he lay on his death-bed were, "Get ready the sledge; I want to go to my sister,"—alluding to the Princess Natalia, the other child of Alexis, who had died three years previously. The only foreign event of importance in this reign was the attempt of Maurice of Saxony to get possession of Courland, by marrying the duchess Anna, then a widow. She consented to the union, and the states of the province elected him, but Menshikoff sent a body of troops who forced him to quit it. On the death of Peter at the age of fifteen, various claimants of the throne were put forward. The great czar had left two daughters, Elizabeth and Anna, duchess of Holstein, who had a son, afterwards Peter III. Two daughters were also surviving of his eldest brother Ivan, Anna, the duchess of Courland, and Catherine, duchess of Mecklenburg. Alexis Dolgoruki even had an idea of claiming the crown for his daughter, because she had been betrothed to the young emperor. This proposal, however, was treated with derision, and the High Secret Council resolved to call to the throne Anna of Courland, thinking that, as she was so much more remote by birth than the daughters of Peter, she would more willingly submit to their terms. In fact, they had prepared for her signature something like the *pacta conventa* of Poland. The following were the terms: (1) the High Council was always to be composed of eight members, to be renewed by coöption, and the czarina must consult it on state affairs; (2) without its consent she could neither make peace nor declare war, could not impose any tax, alienate any crown lands, or appoint to any office above that of a colonel; (3) she could not cause to be condemned or executed any member of the nobility, nor confiscate the goods of any noble before he had a regular trial; (4) she could not marry nor choose a successor without the consent of the council. In case she broke any of these stipulations she was to forfeit the crown (see Rambaud, p. 425). Anna assented to these terms and made her entry into Moscow, which was now to be the capital. But the empress was soon informed how universally unpopular these *pacta conventa* were, which in reality put Russia into the hands of a few powerful families, chiefly the Dolgorukis and Golitzins. She accordingly convened her supporters, and publicly tore the document to pieces, and thus ended the last attempt to give Russia a constitution. The new empress was a cold, repulsive woman, whose temper had been soured by indignities endured in her youth; she took vengeance upon her opponents, and threw herself almost entirely into the hands of German advisers, especially Biren, a Courlander of low origin. This is the period called by the Russians the *Bironovstchina*. The country was now thoroughly exploited by the Germans; some of the leading Russians were executed, and others banished to Siberia. Among the former was the able minister Volînski, beheaded with two others in 1740. He had fallen under the wrath of the implacable Biren. One of the most important enactments of this reign was the abolition of the right of primogeniture introduced by

Catherine I.

Peter II.

Anna.

Peter the Great, which had never been popular in the country. On the crown of Poland falling vacant in 1733, an attempt was again made to place Stanislaus Leszczynski on the throne, but it failed through the opposition of Russia, and Stanislaus escaped with difficulty from Dantzic. Upon this followed a war with Turkey, which lasted four years (1735–1739), in conjunction with Austria. This was not very successful, but the Russian generals gained possession of a few towns, and were indignant when the Austrians signed the treaty of Belgrade with the Turks (1739), and the campaign came to an end. In 1740 the empress Anna died; she had reigned exactly ten years. She left the crown to Ivan, the son of her niece Anna, daughter of her sister Catherine, duchess of Mecklenburg. During the minority of this child Biren was to be regent. By a *revolution de palais*, however, the German adventurer was hurled from power and sent to Pelîm in Siberia. But matters did not rest here; taking advantage of the general unpopularity of the German faction, the partisans of Elizabeth, the daughter of Peter the Great, were resolved to work their overthrow, and place her upon the throne. They consisted of Alexander and Peter Shuvaloff, Michael Vorontzoff, Razumovski, Schwarz, and a French surgeon named Lestocq. Elizabeth ingratiated herself into the favor of the soldiers, by whom the name of Peter the Great was still so much cherished. Anna Leopoldovna, as she was called, her husband Anthony Ulrich, the infant emperor, Munich, Ostermann, and the whole German faction were arrested in the night, and Elizabeth ascended the throne. Ivan VI. was imprisoned in the fortress of Schlüsselburg; Anna, with her husband and children, was banished to Kholmogorî near Archangel, where she died in 1746. Ostermann was banished to Berezoff, and Munich to Pelîm; they had both been previously sentenced to death. Biren and his family were now recalled and allowed to live at Yaroslavl.

Elizabeth.

Elizabeth Petrovna (1741–1762) inaugurated the return of Russian influence in opposition to the Germans, from whom the country had suffered so much during the reign of Anna. The people were weary of them, yet they were, as we shall see, to have one German emperor more. On ascending the throne she summoned to her court the son of her sister Anna and the duke of Holstein, who took the name of Peter Feodorovich on assuming the Greek religion, and was declared heir to the throne. In 1744 he married the Princess Sophia of Anhalt-Zerbst, who by her baptism in the Orthodox Church became Catherine. Thus the line of descent was secured to the direct heirs of Peter the Great. In 1743, the armies of Elizabeth having gained some victories over the Swedes, the treaty of Åbo was signed, by which Russia acquired the southern part of Finland, as far as the river Kiumen. The next event of importance is the war between Russia and Frederick the Great (1756–1762). In 1757 Apraksin crossed the frontier with 85,000 Russians, occupied Eastern Prussia, and defeated Lewald at Gross-Jägersdorf; but instead of taking advantage of the victory, he soon afterwards retired behind the Niemen, having been tampered with by the grand-duchess Catherine and the chancellor Bestuzheff-Riumin. In 1758 Fermor, the Russian general, was completely defeated by Frederick at Zorndorf, but he was allowed to retreat without molestation. In 1759 Saltîkoff beat the Prussians at Paltzig, and in the same year Frederick was obliged to submit to a greater defeat at Künersdorf, where he lost eight thousand men and one hundred and seventy-two cannon. It was on the loss of this battle that he meditated committing suicide. In 1760 the Russians entered Berlin, where they committed great havoc and destruction. "We have to do," said Frederick, "with barbarians, who are digging the grave of humanity." In the following year they took Pomerania. The cause of Frederick seemed on the verge of ruin; he was saved by the death of Elizabeth in December, 1761. The empress was an idle, superstitious woman of lax morals, who was greatly under the influence of favorites. Since the reign of Peter I. no successor had appeared worthy of him. Still Russia made more progress under Elizabeth than it had made under Anna. In 1755 the university of Moscow, the oldest in the country, was founded through the influence of Ivan Shuvaloff. Literature made great advances, as will be seen below.

Elizabeth was succeeded by her nephew Peter, son of her sister Anna and Charles Frederick, duke of Holstein-Gottorp. He was suspected of German leanings, but his first measures made him very popular. In February, 1762, he published an ukaze by which the nobility were freed from the necessity of entering upon any state employment, and he abolished the secret chancery. On the other hand he acted in some matters injudiciously, and offended the prejudices of the Russians, as the false Demetrius had done a century and a half previously. He ridiculed some of the ceremonies of the Orthodox Church, and showed a fondness for the Lutheran. He introduced many German tactics into the army, and evinced a great preference for his German corps of Holsteiners. His personal habits were very coarse: he was constantly seen drunk. Moreover he sent out of the country many of the talented Frenchmen who had during the reign of Elizabeth been helping Russia to get rid of her barbarism. Frederick II. of Prussia, who was at his lowest depths after the battle of Künersdorf, now saw to his delight a complete change in the Russian policy. Peter was an ardent admirer of the Prussian sovereign; in order to ensure peace, Frederick would have ceded Eastern Prussia; but Peter dreamed of nothing of the kind; he restored all the Russian conquests and formed an alliance with him, offensive and defensive. He lived very unhappily with his wife Catherine, and meditated divorcing her and imprisoning her for the rest of her life in a convent. The condition in which she passed her time may be seen from her memoirs, first published by Herzen, the authenticity of which there seems to be no reason to doubt. She, however, quietly waited her time, and a conspiracy was concocted in which she was assisted by the Orloffs, Potemkin, the princess Dashkoff, and others (see PETER III.). Leaving her residence at Peterhof, Catherine boldly put herself at the head of twenty thousand men. The miserable emperor abdicated without a struggle, and was soon afterwards secretly assassinated at Ropcha, near St. Petersburg. Many of the details of this catastrophe are given in the interesting memoirs of the Princess Dashkoff, which were published by an English lady, Mrs. W. Bradford, in 1840, having been taken down from her dictation. Thus had a German woman, by adroitly flattering the prejudices of the Russians, succeeded in making herself head of this vast empire. Two years afterwards Ivan VI., who is said to have become an idiot from his long confinement at Schüsselburg, was murdered by his guards on account of the attempt of a certain Lieutenant Mirovich to set him free. Whether Mirovich was incited to this adventure by secret promises of the Government, so that there might be an excuse for the murder of Ivan, has never been clearly shown. He expiated his crime by public execution, and is said to have expected a reprieve till the last moment.

Peter III.

Catherine II.

The Seven Years' War was now over, and the next great European complications were to be concerned with the partition of Poland, throughout the struggles of which country the Russians were constantly interfering; but for a fuller discussion of this subject the reader must be referred to the article POLAND. In 1767 Turkey, urged on by France, declared war against Russia; the object was to aid the Poles by creating a diversion. The Russian general Golitzin attacked the grand vizier, took the town of Khotin (1769), and in

the following year Rumantzoff defeated the khan of the Crimea, the Turkish feudatory and ally, and in 1770 won the great victory of Kagul. In 1771 Dolgoruki overran the Crimea, and Alexis Orloff defeated the Turks in a naval engagement at Chesme, on the coast of Asia Minor. In their naval expeditions the Russians were at this time greatly assisted by the number of Englishmen in their service. In 1774 was signed the peace of Kutchuk-Kainardji, whereby the sultan acknowledged the independence of the Mongols of the Crimea. The Russians thus detached this province from the sultan's dominions, and after exercising a kind of protectorate over it added it to their own. He also ceded Azoff on the Don, Kinburn at the mouth of the Dniester, and all the fortified places of the Crimea. The Greeks, who had been induced to rise, were abandoned to the vengeance of the Turks.

In 1771 the plague broke out at Moscow, and many of the inhabitants perished. The archbishop Ambrose was massacred in a popular tumult, while endeavoring to carry out some measures which were necessary for the preservation of the public health. Soon afterwards occurred the rebellion of Pugatcheff, a Cossack of the Don, who declared himself to be the emperor Peter III. The czar, he alleged, had escaped from the hands of his would-be murderers, and would soon regain his throne. A large band of disaffected peasants and Raskolniks gathered round him, and he was joined by many of the Mongol races, who were inimical to the Russian rule. At first the generals sent against him were defeated. The rebel's path was everywhere marked with bloodshed and pillage; he even got possession of several towns, including Kazan. Had he been something more than a vulgar assassin he might have made Catherine tremble on her throne, but his cruelties estranged his more moderate followers. He was afterwards beaten by Bibikoff and others, and finally surrendered by his accomplices to Suwaroff. He was taken to Moscow in an iron cage and there publicly executed in 1775, together with four of his principal followers. In the same year the empress put an end to the republic, as it was called, of the Zaporogian Cossacks. A great codification of the laws took place under Catherine, which may be styled the sixth great period of Russian legislation. The serfs, however, were not benefited by these changes. In 1767 an ukaze forbade them to bring any complaints against their masters. The latter had the power of sending their serfs to Siberia as a punishment, or handing them over to be enlisted in the army. The public sale of serfs was not put an end to till the reign of Alexander I. The country was now divided into governments for the better administration of justice, each government being subdivided into *uiezdi* or districts. Catherine also took away from the monasteries their lands and serfs, and allotted them payments according to their importance from the state revenues. The plans of Peter I. were thus fully carried out, and the church became entirely dependent upon the state. In 1783 the Crimea was annexed to Russia. A second war with Turkey broke out in 1787; the Ottoman power had many grounds of complaint, but its suspicions were particularly aroused by the tour of Catherine through the southern provinces of Russia and her interviews with the emperor Joseph II. Turkey declared war that same year; and, to increase the embarrassed position of the empress, Sweden did the same, requiring from Russia the cession of the southern part of Finland which had been taken from her. But King Gustavus III., in spite of some petty successes, was unable to carry on the war, and soon signed the peace of Verela on the footing of *status quo ante bellum*. The empress met with equal good fortune in the south; Potemkin took Otchakoff and Suwaroff Khotin. In 1789 the latter general won the battles of Fokshani and Rîmnik; and in 1790 after a sanguinary engagement he took Ismail. By the treaty of Jassy in 1792 Catherine kept possession of Otchakoff, and the shore between the Bug and Dniester. She was next occupied with the affairs of Poland, which have been described under that heading. In consequence of the demands of the confederates of Targovica,—men who were prepared to ruin their country for their own private ends,—eighty thousand Russians and twenty thousand Cossacks entered the Ukraine to undo the work of the confederates of Bar. In 1794 Suwaroff stormed Warsaw, and the inhabitants were massacred. In the following year Stanislaus Poniatowski laid down his crown, the third division of Poland took place, and the independence of that country was at an end. In spite of her correspondence and affected sympathies with Voltaire, Diderot, and many of the advanced French thinkers, Catherine showed great opposition to the principles of the French Revolution, and the policy of the latter part of her reign was reactionary. She died suddenly on November 17, 1796. Her character has been amply discussed by foreign writers. It may suffice to say here that, whatever her private vices may have been, she was unquestionably a woman of great genius, and the only sovereign worthy of Russia who had appeared since the days of Peter the Great. Hence the veneration with which her memory is regarded by the Russians to this day.

Paul. Paul, who had lived in retirement during the life of his mother, was an object of aversion to her. We are told that she had prepared a will by which he would be disinherited, and the succession conferred upon his son Alexander, but his friend Kurakin got hold of it immediately upon the death of the empress and destroyed it. The events of the reign of PAUL (*q.v.*) can be only briefly discussed here. He concluded an alliance with Turkey, and entered into a coalition against the French republic, which he regarded with horror. Suwaroff took the command of the united Russian and Austrian troops at Verona. In 1799 he defeated the French general Moreau on the banks of the Adda, and made a triumphant entry into Milan. After this he won another victory over Macdonald on the Trebbia, and later the same year that of Novi over Joubert. He then crossed the Alps for the purpose of driving the French out of Switzerland, but he was everywhere hampered by the Austrians, and, after fighting his way over the Alps and suffering great losses, he reached his winter quarters between the Iller and the Lech, and soon afterwards he was recalled in disgrace. Paul now completely changed his tactics. Accusing England and Austria of having acted treacherously towards him, he threw himself into the arms of Bonaparte, who had won him over by skilful diplomacy, and, among other pieces of flattery, sent back the Russian prisoners newly clothed and armed. Paul then meditated joining him in a plan for conquering India; but in the night between the 23d and 24th of March, 1801, he was assassinated. The chief agents in this catastrophe were Plato Zuboff, Benningsen, and Pahlen. The rule of Paul had become intolerable, and he was fast bringing on a national bankruptcy.

Alexander I. He was succeeded by his eldest son, Alexander I. (1801–1825). One of the first acts of the new emperor was to make peace with England and France. He, however, soon changed his policy, and in 1805 joined the third coalition against France, to which Austria and England were parties. Events which belong to general European history, and are well known, need only be described briefly here. On December 2d of that year took place the battle of Austerlitz, in which the Russians lost 21,000 men, 133 guns, and 30 flags. They accused their Austrian allies of treachery. The war was soon ended by the treaty of Pressburg. We now come to the fourth coalition against France (1806–7). In 1807 Napoleon engaged the Russian general Benningsen at Eylau. The battle was protracted and sanguinary, but not decisive; both parties abandoned the field and retired into winter

quarters. A defeat at Friedland in the same year was followed by the peace of Tilsit. By this treaty the Prussian King, Frederick William III., lost half his dominions. Nearly all his Polish possessions were to go to the King of Saxony under the name of the grand-duchy of Warsaw. By a secret treaty it seemed as if Alexander and Napoleon almost aspired to divide the world, or at least Europe, between them. The terms, however, were received by a large party in Russia with disgust. The next important event in the reign of Alexander was the conquest of Finland. By the treaty of Frederikshamn, September 17, 1809, Sweden surrendered Finland, with the whole of East Bothnia, and a part of West Bothnia lying eastward of the river Torneå. The Finns were allowed a kind of autonomy, which they have preserved to this day. The annexation of Georgia to Russia was consolidated at the beginning of this reign, having been long in preparation. It led to a war with Persia, which resulted in the incorporation of the province of Shirvan with the Russian empire in 1806.

In 1809 commenced the fifth coalition against Napoleon. Alexander, who was obliged by treaty to furnish assistance to the French emperor, did all that he could to prevent the war. A quarrel with Turkey led to its invasion by a Russian army under Michelsen. This war was terminated by a congress held at Bucharest in 1812. Russia gave up Moldavia and Wallachia, which she had occupied, but kept Bessarabia, with the fortresses of Khotin and Bender. Gradually an estrangement took place between Alexander and Napoleon, not only on account of the creation of the grand-duchy of Warsaw, but because Russia was suffering greatly from the Continental blockade, to which Alexander had been forced to give his adhesion. This led to the great invasion of Russia by Napoleon in 1812.[1]

On May 9, 1812, Napoleon left Paris for Dresden, and the Russian and French ambassadors received their passports. The grand army comprised 678,000 men,[2] 356,000 of them being French; and, to oppose them, the Russians assembled 372,000 men. Napoleon crossed the Niemen and advanced by forced marches to Smolensk. Here he defeated the Russians, and again at the terrible battle of Borodino, and then entered Moscow, which had been abandoned by most of the inhabitants; soon afterwards a fire broke out (probably caused by the order of Rostopchin the governor), which raged six days and destroyed the greater part of the city. Notwithstanding this disaster, Napoleon lingered five weeks among the ruins, endeavoring to negotiate a peace, which he seemed to think Alexander would be sure to grant; but he had mistaken the spirit of the emperor and his people. On the 18th of October Napoleon reluctantly commenced his backward march. The weather was unusually severe, and the country all round had been devastated by the French on their march. With their ranks continually thinned by cold, hunger, and the skirmishes of the Cossacks who hung upon their rear, the French reached the Beresina, which they crossed near Studianka on the 26th–29th of November with great loss. The struggle on the banks of this river forms one of the most terrible pictures in history. At Smorgoni, between Vilna and Minsk, Napoleon left the army and hurried to Paris. Finally the wreck of the *grande armée* under Ney crossed the Niemen. Not more than eighty thousand[3] of the whole army are said to have returned.

Frederick William III. of Prussia now issued a manifesto, and concluded an alliance with Russia for the re-establishment of the Prussian monarchy. In 1813 took place the battle of Dresden, and the so-called Battle of the Nations at Leipsic on October 16 and the two following days. In 1814 the Russians invaded France with the allies, and lost many men in the assault upon Paris. After the battle of Waterloo, and the conveyance of Napoleon to the island of St. Helena, it fell to the Russian forces to occupy Champagne and Lorraine. In the same year Poland was re-established in a mutilated form, with a constitution which Alexander, who was crowned king, swore to observe. In 1825 the emperor died suddenly at Taganrog at the mouth of the Don, while visiting the southern provinces of his empire. He had added to the Russian dominions Finland, Poland, Bessarabia, and that part of the Caucasus which includes Daghestan, Shirvan, Mingrelia, and Imeretia. Much was done in this reign to improve the condition of the serfs. The Raskolniks were better treated; many efforts were made to improve public education, and the universities of Kazan, Kharkoff, and St. Petersburg were founded. One of the chief agents of these reforms was the minister Speranski, who for some time enjoyed the favor of the emperor, but he attacked so many interests by his measures that a coalition was formed against him. He was denounced as a traitor, and his enemies succeeded in getting him removed and sent as governor to Nijni-Novgorod. In 1819, when the storm raised against him had somewhat abated, he was appointed to the important post of governor of Siberia. In 1821 he returned to St. Petersburg, but he never regained his former power. To the mild influence of Speranski succeeded that of Shishkoff, Novosiltzeff, and Arakcheeff. The last of these men made himself universally detested in Russia. He rose to great influence in the time of Paul, and managed to continue in favor under his son. Besides many other pernicious measures, it was to him that Russia owed the military colonies which were so unpopular and led to serious riots. The censorship of the press became much stricter, and many professors of liberal tendencies were dismissed from their chairs in the universities. The country was now filled with secret societies, and the emperor became gloomy and suspicious. In this condition of mind he died, a man thoroughly disenchanted and weary of life. He has been judged harshly by some authors; readers will remember that Napoleon said of him that he was false as a Byzantine Greek. To us he appears as a well-intentioned man, utterly unable to cope with the discordant elements around him. He had discovered that his life was a failure.

The heir to the throne according to the principles of succession recognized in Russia was Constantine, the second son of the emperor Paul, since Alexander left no children. But he had of his own free will secretly renounced his claim in 1822, having espoused a Roman Catholic, the Polish princess Julia Grudzinska. In consequence of this change in the devolution of the sovereign's authority, the conspiracy of the Dekabrists[4] broke out at the end of the year, their object being to take advantage of the confusion caused by the alteration of the succession to get constitutional government in Russia. Their efforts failed, but the rebellion was not put down without great bloodshed. Five of the conspirators were executed, and a great many sent to Siberia. Some of the men implicated were among the most remarkable of their time in Russia, but the whole country had been long honeycombed with secret societies, and many of the Russian officers had learned liberal ideas while engaged in the campaign against Napoleon. So ignorant, however, were the common people of the most ordinary political terms that when told to shout for Constantine and the constitution (*constitutzia*) they naively asked if the latter was

[1] This has been fully described in the pages of Eugène Labaume and Sir Robert Wilson. In the recent volumes of the excellent review, *Russki Arkhiv*, edited by M. Bartenieff, will be found some most interesting details based upon Russian family papers and traditions.

[2] [Jomini in his *Life of Napoleon* (vol. iii. p. 344, Halleck's ed., New York, 1864) gives the total of the French and Allied army as 509,700 men, and adds: "These numbers exhibit the army organization rather than the forces which actually made the campaign."—Am. Ed.]

[3] [J. C. Ropes in *The First Napoleon*, p. 194 (1886), says this is a Russian estimate, and gives his own at 110,000.—Am. Ed.]

[4] Literally, the men of December, the month in which Alexander died.

Constantine's wife. The new emperor, Nicholas, the next brother in succession, showed throughout his reign reactionary tendencies; all liberalism was sternly repressed. In 1830 appeared the *Complete Collection of the Laws of the Russian Empire*, which Nicholas had caused to be codified. He partly restored the right of primogeniture which had been taken away by the empress Anna as contrary to Russian usages, allowing a father to make his eldest son his sole heir. In spite of the increased severity of the censorship of the press, literature made great progress in his reign. From 1826 to 1828 Nicholas was engaged in a war with Persia, in which the Russians were completely victorious, having beaten the enemy at Elizabetpol, and again under Paskewitch at Javan Bulak. The war was terminated by the peace of Turkmantchai (February 22, 1828), by which Persia ceded to Russia the provinces of Erivan and Nakhitchevan, and paid twenty millions of roubles as an indemnity.[1] The next foreign enemy was Turkey. Nicholas had sympathized with the Greeks in their struggle for independence, in opposition to the policy of Alexander; he had also a part to play as protector of the Orthodox Christians, who formed a large number of the sultan's subjects. In consequence of the sanguinary war which the Turks were carrying on against the Greeks and the utter collapse of the latter, England, France, and Russia signed the treaty of London in 1827, by which they forced themselves upon the belligerents as mediators. From this union resulted the battle of Navarino (October 20, 1827), in which the Turkish fleet was annihilated by that of the allies. Nicholas now pursued the war with Turkey on his own account; in Asia Paskewitch defeated two Turkish armies, and conquered Erzeroum, and in Europe Diebitsch defeated the grand vizier. The Russians crossed the Balkans and advanced to Adrianople, where a treaty was signed in 1829 very disadvantageous to Turkey.

Nicholas.

In 1831 broke out the Polish insurrection, of which a description has already been given (see POLAND, vol. xix. p. 310). Paskewitch took Warsaw in 1831. The cholera which was then raging had already carried off Diebitsch and the grand-duke Constantine. Poland was now entirely at the mercy of Nicholas. The constitution which had been granted by Alexander was annulled; there were to be no more diets; and for the ancient palatinates, familiar to the historical student, were substituted the governments of Warsaw, Radom, Lublin, Plock, and Modlin. The university of Vilna, rendered celebrated by Mickiewicz and Lelewel, was suppressed. By another treaty with Turkey, that of Unkiar-Skelessi (1833), Russia acquired additional rights to meddle with the internal politics of that country. Soon after the revolution of 1848, the emperor Nicholas, who became even more reactionary in consequence of the disturbed state of Europe, answered the appeal of the emperor Francis Joseph, and sent an army under Paskewitch to suppress the Hungarian revolt. After the capitulation of Görgei in 1849, the war was at an end, and the Magyars cruelly expiated their attempts to procure constitutional government. In 1853 broke out the Crimean War. The emperor was anxious to distribute the possessions of the "sick man," but found enemies instead of allies in England and France. The chief events of this memorable struggle were the battles of the Alma, Balaklava, Inkermann, and Tchernaya, and the siege of Sebastopol; this had been skilfully fortified by Todleben, who appears to have been the only man of genius who came to the front on either side during the war. In 1855 the Russians destroyed the southern side of the city, and retreated to the northern. In the same year, on March 14th,[2] died the emperor Nicholas, after a short illness. Finding all his plans frustrated he had grown weary of life, and rashly exposed himself to the severe temperature of the northern spring. He was succeeded by his son Alexander II. (1855–1881), at the age of thirty-seven. One of the first objects of the new czar was to put an end to the war, and the treaty of Paris was signed in 1856, by which Russia consented to keep no vessels of war in the Black Sea, and to give up her protectorate of the Eastern Christians; the former, it must be added, she has recently recovered. A portion of Russian Bessarabia was also cut off and added to the Danubian principalities, which were shortly to be united under the name of Roumania. This was afterwards given back to Russia by the treaty of Berlin. Sebastopol also has been rebuilt, so that it is difficult to see what the practical results of the Crimean War were, in spite of the vast bloodshed and expenditure of treasure which attended it. The next important measure was the emancipation of the serfs in 1861. This great reform had long been meditated by Nicholas, but he was unable to accomplish it, and left it to be carried out by his son. The landlords, on receiving an indemnity, now released the serfs from their seigniorial rights, and the village commune became the actual property of the serf. This great revolution was not, however, carried out without great difficulty. The Polish insurrection of 1863 has already been described, as well as its fatal effects upon that part of Poland which had been incorporated with Russia. On the other hand Finland has seen her privileges confirmed.

Alexander II.

Among important foreign events of this reign must be mentioned the capture of Schamyl in 1859 by Prince Bariatinski, and the pacification of the Caucasus; many of the Circassians, unable to endure the peaceful life of cultivators of the soil under the new regime, migrated to Turkey, where they have formed one of the most turbulent elements of the population. Turkestan also has been gradually subjugated. In 1865 the city of Tashkend was taken, and in 1867 Alexander II. created the government of Turkestan. In 1858 General Muravieff signed a treaty with the Chinese, by which Russia acquired all the left bank of the river Amur. A new port has been created in Eastern Asia (Vladivostok), which promises to be a great centre of trade. In 1877 Russia came to the assistance of the Slavonic Christians against the Turks. After the terrible siege of Plevna, nothing stood between them and the gates of Constantinople. In 1878 the treaty of San Stefano was signed, by which Roumania became independent, Servia was enlarged, and a free Bulgaria, but under Turkish suzerainty, was created. But these arrangements were subsequently modified by the treaty of Berlin. Russia got back the portion of Bessarabia which she had lost, and advanced her Caucasian frontier. The new province of Bulgaria was cut into two, the southern portion being entitled Eastern Roumelia, with a Christian governor, to be appointed by the Porte, and self-government. Austria acquired a protectorate over Bosnia and Herzegovina. The latter part of the reign of Alexander II. was a period of great internal commotion, on account of the spread of Nihilism, and the attempts upon the emperor's life, which unfortunately were at last successful. In the cities in which his despotic father had walked about fearless, without a single attendant, the mild and amiable Alexander was in daily peril of his life. On April 16, 1866, Karakozoff shot at the emperor at St. Petersburg; in the following year another attempt was made by a Pole, Berezowski, while Alexander was at Paris on a visit to Napoleon III.; on April 14, 1879, Solovioff shot at him. The same year saw the attempt to blow up the Winter Palace and to wreck the train by which the czar was travelling from Moscow to St. Petersburg. A similar conspiracy in 1881 (March 13) was successful. Five of the conspira-

[1] [The value of twenty million roubles, which is the indemnity stated by Rambaud (*History of Russia*, vol. iii. p. 37, 1886), is in paper money $9,720,000, or in coin, $15,400,000. See, however, vol. xviii. p. 659.—AM. ED.]

[2] [Rambaud (see *History*, *ut supra*, p. 173) says: "On the 18th of February, or, in accordance with the new style, the 2d of March, he died."—AM. ED.]

tors, including a woman, Sophia Perovskaia, were publicly executed. Thus terminated the reign of Alexander II., which had lasted nearly twenty-six years. He died leaving Russia exhausted by foreign wars and honeycombed by plots. His wife and eldest son Nicholas had predeceased him, the latter at Nice.

Alexander III.

He was succeeded by his second son Alexander, born in 1845, whose reign has been characterized by conspiracies and constant deportations of suspected persons. It was long before he ventured to be crowned in his ancient capital of Moscow (1883), and the chief event since then has been the disturbed relations with England, which for a time threatened war. (W. R. M.)

Part V.—Russian Literature.

To get a clear idea of Russian literature, it will be most convenient for us to divide it into oral and written. The first of these sections includes the interesting *bîlinî*, or "tales of old time," as the word may be translated, which have come down to us in great numbers, as they have been sung by wandering minstrels all over the country. The scholars who during the last forty years have given their attention to these compositions have made the following division of them into cycles: (1) that of the older heroes; (2) that of Vladimir, prince of Kieff; (3) that of Novgorod; (4) that of Moscow; (5) that of the Cossacks; (6) that of Peter the Great; (7) the modern period. These poems, if they may be so styled, are not in rhyme; the ear is satisfied with a certain cadence which is observed throughout. For a long time they were neglected, and the collection of them only began at the commencement of the present century. The style of Russian literature which prevailed from the time of Lomonosoff was wholly based upon the French or pseudo-classical school. It was, therefore, hardly likely that these peasant songs would attract attention. But when the gospel of romanticism was preached and the *History* of Karamzin appeared, which presented to the Russians a past of which they had known but little, described in poetical and ornate phraseology, a new impulse was given to the collection of all the remains of popular literature. In 1804 appeared a volume based upon those which had been gathered together by Cyril or Kirsha Daniloff, a Cossack, at the beginning of the 18th century. They were received with much enthusiasm, and a second edition was published in 1818. In the following year there appeared at Leipsic a translation of many of these pieces into German, in consequence of which they became known much more widely. This little book of 160 pages is important in many ways, and not the least so because the originals of some of the bîlinî translated in it are now lost. Since that time large collections of these poems have been published, edited by Rîbnikoff, Hilferding, Srcznevski, Avenarius, and others.

Bîlinî.

These curious productions have all the characteristics of popular poetry in the endless repetitions of certain conventional phrases—the "green wine," "the bright sun" (applied to a hero), "the damp earth," and others. The heroes of the first cycle are monstrous beings, and seem to be merely impersonifications of the powers of nature; such are Volga Vseslavich, Mikula Selianinovich, and Sviatogor. They are called the *bogatîri starshie*. Sometimes we have the giants of the mountain, as Sviatogor, and the serpent Gorinich, the root of part of both names being *gora* (mountain). The serpent Gorinich lives in caves, and has the care of the precious metals. Sometimes animal natures are mixed up with them, as *zmei-bogatîr*, who unites the qualities of the serpent and the giant, and bears the name of Tugarin Zmievich. There is the Pagan Idol (*Idolistche Poganskoe*), a great glutton, and Nightingale the Robber (*Solovei Razboinik*), who terrifies travellers and lives in a nest built upon six oaks.

In the second cycle the legends group themselves round the celebrated prince Vladimir of Kieff, in whose time the Christian religion was introduced into Russia, as previously mentioned. The chief hero is Ilya Murometz, who performs prodigies of valor, and is of gigantic stature and superhuman strength. The cycle of Novgorod deals with the stories of Vasilii Buslaevich and Sadko, the rich merchant. The great commercial prosperity of Novgorod has been already described. The fourth cycle deals with the autocracy; already Moscow has become the capital of the future empire. We are told of the taking of Kazan, of the conquest of Siberia by Yermak, of Ivan the Terrible and his confidant Maliuta Skuvlatovich. It is observable that in the popular tradition Ivan, in spite of his cruelties, is not spoken of with any hatred. As early as 1619 some of these bîlinî were committed to writing by Richard James, an Oxford graduate who was in Russia about that time as chaplain of the embassy. The most pathetic of these is that relating to the unfortunate Xenia, the daughter of Boris Godunoff. Yermak, the conqueror of Siberia, forms the subject of a very spirited lay, and there is another on the death of Ivan the Terrible. Considering the relation in which she stood to the Russians, we cannot wonder that Marina, the wife of the false Demetrius, appears as a magician. Many spirited poems are consecrated to the achievements of Stenka Razin, the bold robber of the Volga, who was a long time a popular hero. The cycle of Peter the Great is a very interesting one. We have songs in abundance on the various achievements of the wonderful czar, as the taking of Azoff in 1696. There is also a poem on the execution of the streltzî, and another on the death of Peter. In the more modern period there are many songs on Napoleon. The Cossack songs, written in the Little Russian language, dwell upon the glories of the *sech*, the sufferings of the people from the invasions of the Turks and Mongols, the exploits of the Haidamaks, and lastly the fall of the Cossack republic. Besides these, the Russians can boast of large collections of religious poems, many of them containing very curious legends. In them we have a complete store of the beliefs of the Middle Ages. A rich field may be found here for the study of comparative mythology and folk-lore. Many of them are of considerable antiquity, and some seem to have been derived from the Midrash. Some of the more important of these have been collected by Beszonoff. Besides the bîlinî or legendary poems, the Russians have large collections of *skazki* or folk-tales, which have been gathered together by Sakharoff, Afanasieff, and others. They also are full of valuable materials for the study of comparative mythology.

Leaving the popular and oral literature, we come to what has been committed to writing. The earliest specimen of Russian, properly so-called, must be considered the Ostromir Codex, written by the *diak* Gregory at the order of Ostromir, the *posadnik* or governor of Novgorod. This is a Russian recension of the Slavonic Gospels, of the date 1056–57. Of the year 1073 we have the *Izbornik* or "Miscellany" of Sviatoslaff. It was written by John the diak or deacon for that prince, and is a kind of Russian encyclopædia, drawn from Greek sources. The date is 1076. The style is praised by Buslaeff as clear and simple. The next monument of the language is the *Discourse concerning the Old and New Testament* by Ilarion, metropolitan of Kieff. In this work there is a panegyric on Prince Vladimir of Kieff, the hero of so much of the Russian popular poetry. Other writers are Theodosius, a monk of the Pestcherski cloister, who wrote on the Latin faith and some *Pouchenia* or "Instructions," and Luke Zhidiata, bishop of Novgorod, who has left us a curious *Discourse to the Brethren*. From the writings of Theodosius we see that many pagan habits were still in vogue among the people. He finds fault with them for allowing these to continue, and also for their drunkenness; nor do the monks escape his censures.

Earliest written literature.

Zhidiata writes in a more vernacular style than many of his contemporaries; he eschews the declamatory tone of the Byzantine authors.

With the so-called *Chronicle* of NESTOR (*q.v.*) begins the long series of the Russian annalists. There is a regular catena of these chronicles, extending with only two breaks to the time of Alexis Mikhailovich, the father of Peter the Great. Besides the work attributed to Nestor, we have chronicles of Novgorod, Kieff, Volhynia, and many others. Every town of any importance could boast of its annalists, Pskoff and Suzdal among others. In some respects these compilations, the productions of monks in their cloisters, remind us of the *Anglo-Saxon Chronicle*, dry details alternating with here and there a picturesque incident; but the *Anglo-Saxon Chronicle* has nothing of the saga about it, and many of these annals abound with the quaintest stories. There are also works of early travellers, as the igumen Daniel, who visited the Holy Land at the end of the 11th and beginning of the 12th century. A later traveller was Athanasius Nikitin, a merchant of Tver, who visited India in 1470. He has left a record of his adventures, which has been translated into English and published for the Hakluyt Society. Later also is the account written by the two merchants, Korobeinikoff and Grekoff. They were sent with a sum of money to the Holy Sepulchre to entreat the monks to pray without ceasing for the soul of the son of Ivan the Terrible, whom his father had killed. A curious monument of old Slavonic times is the *Pouchenie* ("Instruction") written by Vladimir Monomakh for the benefit of his sons. This composition is generally found inserted in the *Chronicle* of Nestor; it gives a quaint picture of the daily life of a Slavonic prince.

Annalists and travellers.

In the 12th century we have the sermons of Cyril, the bishop of Turoff, which are attempts to imitate in Russian the florid Byzantine style. He is very fond of allegorical representations; thus, in his sermon on Holy Week, Christianity is represented under the form of spring, Paganism and Judaism under that of winter, and evil thoughts are spoken of as boisterous winds. An attempt to carry this symbolism through other portions of his writings leads him to many fantastic conceits which are far from being in good taste. And here may be mentioned the many lives of the saints and the Fathers to be found in early Russian literature. Some of these have been edited by Count Bezborodko in his *Pametniki Starinnoi Russkoi Literaturî* ("Memorials of Ancient Russian Literature").

Religious literature.

We now come to the story of the expedition of Prince Igor, which is a kind of bîlina in prose, and narrates the expedition of Igor, prince of Novgorod-Severski, against the Polovtzes. The manuscript was at one time preserved in a monastery at Yaroslavl, but was burnt in the great fire at Moscow in the year 1812. Luckily the story had been edited (after a fashion) by Count Musin-Pushkin, and a transcript was also found among the papers of the empress Catherine. The authenticity of this production has been disputed by some modern scholars, but without solid grounds. The original was seen by several men of letters in Russia, Karamzin among the number. There is a mixture of Christian and heathen allusions, but there are parallels to this style of writing in such a piece as the "Discourse of a Lover of Christ and Advocate of the True Faith," from which an extract has been given by Buslaeff in his *Chrestomathy*. Unlike most of the productions of this period, which are tedious, and interesting only to the philologist and antiquary, there is a great deal of poetical spirit in the story of Igor, and the metaphors are frequently very vigorous. Mention is made in it of another bard named Boyan, but none of his inspirations have come down to us. A strange legend is that of the czar Solomon and Kitovras, but the story occurs in the popular literatures of many countries. Some similar productions among the Russians are merely adaptations of old Bulgarian tales, especially the so-called apocryphal writings. The *Zadonstchina* is a sort of prose-poem much in the style of the "Story of Igor," and the resemblance of the latter to this piece and to many other of the *skazania* included in or attached to the Russian chronicle, furnishes an additional proof of its genuineness. The account of the battle of the "Field of Woodcocks," which was gained by Dmitri Donskoi over the Mongols in 1380, has come down in three important versions. The first bears the title "Story of the Fight of the Prince Dmitri Ivanovich with Mamai"; it is rather meagre in details but full of expressions showing the patriotism of the writer. The second version is more complete in its historical details, but still is not without anachronisms. The third is altogether poetical. The *Poviest o Drakule* ("Story of Drakula") is a collection of anecdotes relating to a cruel prince of Moldavia, who lived at the beginning of the 15th century. Several of the barbarities described in it have also been assigned to Ivan the Terrible.

The Story of Igor.

Other popular tales.

The early Russian laws present many features of interest, such as the *Russkaia Pravda* of Yaroslaff, which is preserved in the chronicle of Novgorod; the date is between 1018 and 1054. Large additions were made to it by subsequent princes. It has many points in common with the Scandinavian codes, *e.g.*, trial by wager of battle, the wergild, and the circuits of the judges. The laws show Russia at that time to have been in civilization quite on a level with the rest of Europe. But the evil influence of the Mongols was soon to make itself felt. The next important code is the *Sudebnik* of Ivan III., the date of which is 1497; this was followed by that of Ivan IV., of the year 1550, in which we have a republication by the czar of his grandfather's laws, with additions. In the time of this emperor also was issued the *Stoglav* (1551), a body of ecclesiastical regulations. Mention must also be made of the *Ulozhenie* or "Ordinance" of the czar Alexis. This abounds with enactments of sanguinary punishment: women are buried alive for murdering their husbands; torture is recognized as a means of procuring evidence; and the knout and mutilation are mentioned on almost every page. Some of the penalties are whimsical: for instance, the man who uses tobacco is to have his nose cut off; this, however, was to be altered by Peter the Great, who himself practiced the habit and encouraged it in others.

Codes of laws.

In 1553 a printing press was established at Moscow, and in 1564 the first book was printed, an "Apostol," as it is called, *i.e.*, a book containing the Acts of the Apostles and the Epistles. The printers were Ivan Feodoroff and Peter Mstislavetz; a monument was erected a year or two ago to the memory of the former. As early as 1548 Ivan had invited printers to Russia, but they were detained on their journey. Feodoroff and his companions were soon, however, compelled to leave Russia, and found a protector in Sigismund III. The cause of their failure appears to have been the enmity which they had stirred up among the copyists of books, who felt that their means of gaining a livelihood were lessened. They succeeded accordingly in drawing over to their side the more fanatical priests, who thought it degrading that the sacred books should be multiplied by such an art, just as at the present day the Arabs refuse to allow the Koran to be printed. The first Slavonic Bible was printed at Ostrog in Volhynia in 1581. Another press, however, was soon established at Moscow; up to 1600 sixteen books had been issued there.

Introduction of printing.

A curious work of the time of Ivan the Terrible is the *Domostroi*, or "Book of Household Management," which is said to have been written by the monk Sylvester, although this statement has been disputed. This priest was at one time very influential with Ivan, but

Time of Ivan the Terrible.

ultimately offended him and was banished to the Solovetzkoi monastery on the White Sea. The work was originally intended by Sylvester for his son Anthemius and his daughter-in-law Pelagia, but it soon became very popular and in general use. We have a faithful picture of the Russia of the time, with all its barbarisms and ignorance. We see the unbounded authority of the husband in his own household: he may inflict personal chastisement upon his wife; and her chief duty lies in ministering to his wants. The Mongols had introduced into Russia the Oriental seclusion of women; those of the older time knew nothing of these restrictions. Sylvester, or whoever wrote the book, was a complete conservative, as indeed the clergy of Russia almost universally were.[1] To the reign of Ivan the Terrible must also be assigned the *Chetii-Minei* or "Book of Monthly Readings," containing extracts from the Greek fathers, arranged for every day of the week. The work was compiled by the metropolitan Macarius, and was the labor of twelve years. An important writer of the same period was Prince Alexander Kurbski, descended from the sovereigns of Yaroslavl, who was born about 1528. In his early days Kurbski saw a great deal of service, having fought at Kazan and in Livonia. But he quarrelled with Ivan, who had begun to persecute the followers of Sylvester and Adasheff, and fled to Lithuania in 1563, where he was well received by Sigismund Augustus. From his retreat he commenced a correspondence with Ivan, in which he reproached him for his many cruelties. Ivan in his answer declared that he was quite justified in taking the lives of his slaves, if he thought it right to do so. While living in Lithuania, Kurbski appeared as the defender of the Greek faith, which was being undermined by the Jesuits. He died in exile in 1583. Kurbski was a fluent writer, but Bestuzheff Riumin thinks that his hatred of Ivan led him to exaggerate, and he regrets that Karamzin should have followed him so closely. Besides the answers of Ivan to Kurbski, there is his letter to Cosmas, and the brotherhood of the Cyrillian monastery on the White Lake (Bielo Ozero), in which he reproaches them for the self-indulgent lives they are leading. Other works of the 16th century are the *Stepennaya Kniga*, or "Book of Degrees" ("or Pedigrees"), in which historical events are grouped under the reigns of the grand-dukes, whose pedigrees are also given; and the *Life of the Czar Feodor Ivanovich* (1584-1598), written by the patriarch Job. To the beginning of the 17th century belongs the *Chronograph* of Sergius Kubasoff of Tobolsk. His work extends from the creation of the world to the accession of Michael Romanoff, and contains interesting accounts of such of the members of the Russian royal family as Kubasoff had himself seen. Something of the same kind must have been the journal of Prince Mstislavski, which he showed the English ambassador Jerome Horsey, but which is now lost.[2]

17th century.

To the time of the first Romanoffs belongs the story of the siege of Azoff, a prose-poem, which tells us, in an inflated style, how in 1637 a body of Cossacks triumphantly repelled the attacks of the Turks. They had seized this town, which they were anxious to hand over to the czar Michael, but circumstances were not ripe for it. There is also an account of the siege of the Toritza monastery by the Poles during the "Smutnoye Vremya," or period of troubles, as it is called,—that which deals with the adventures of the false Demetrius and the Polish invasion which followed. But all these are surpassed by the work on Russia of Gregory Karpoff Kotoshikhin. He served in the ambassador's office (*posolski prikaz*), and when called upon to give information against his colleagues fled to Poland about 1664. Thence he passed into Sweden and wrote his account of Russia at the request of Count Delagardie, the chancellor of that country. He was executed about 1669 for slaying in a quarrel the master of the house in which he lived. The manuscript was found by Prof. Solovieff (not the eminent historian lately deceased) at Upsala and printed in 1840. A new edition has recently appeared, and Prof. Grote has collected some fresh facts about the author's life, but we have no space here for a minute examination of them. The picture which Kotoshikhin draws of his native country is a sad one; ignorance, cruelty, and superstition are seen everywhere rampant. His work is of great importance, since it is from his description, and the facts we gather from the *Domostroi*, that we can reconstruct the Old Russia of the time before Peter the Great, as in our days the valuable labors of M. Zabielin have done in his work on Russian domestic life. Perhaps, as an exile from his country, Kotoshikhin has allowed himself to write too bitterly. A curious work is the *Uriadnik Sokolnichia Puti* ("Directions for Falconry"), which was written for the use of the emperor Alexis, who, like many Russians of old time, was much addicted to this pastime. The Serb Yuri Krizhanich, who wrote in Russian, was the first Panslavist, anticipating Kollar by one hundred and fifty years or more. He wrote a critical Servian grammar (with comparison of the Russian, Polish, Croatian, and White Russian), which was edited from the manuscripts by Bodianski in 1848. For his time he had a very good insight into Slavonic philology. His Panslavism, however, sometimes took a form by no means practical. He went so far as to maintain that a common Slavonic language might be made for all the peoples of that race,—an impossible project which has been the dream of many enthusiasts. From some unexplained cause he was banished to Siberia and finished his grammar at Tobolsk. He also wrote a work on the Russian empire, which was edited by Beszonoff in 1860. In it he shows himself a widely-read man, and with very extensive Western culture. The picture drawn, as in the corresponding production of Kotoshikhin, is a very gloomy one. The great remedy suggested by the Serb is education. To this period belongs the life of the patriarch Nikon by Shusherin. The struggles of Nikon with the czar, and his emendations of the sacred books, which led to a great schism in Russia, are well known. They have been made familiar to Englishmen by the eloquent pages of Dean Stanley.[3] At Moscow may be seen the portrait of this celebrated divine and his tomb; his robes, which have been preserved, show him to have been a man of 7 feet in stature. The mistakes which had crept into the translation of the Scriptures, from the blunders of generations of copyists, were frequently of a ludicrous character; still a large number of the people preferred retaining them, and from this revision may be dated the rise of the Raskolniks (Dissenters) or Staro-obriadtzi (those who adhere to the old ritual). With the name of Simeon Polotzki (1628–1680) the old period of Russian literature may be closed. He was tutor to the czar Feodor, son of Alexis, and may be said in a way to have helped to introduce the culture of the West into Russia, as he was educated at Kieff, then a portion of Polish territory. Polotzki came to Moscow about 1664. He wrote religious works (*Vienetz Vieri*, "The Garland of Faith") and composed poems and relig-

Kotoshikhin.

Krizhanich.

Polotzki.

[1] In a curious letter of the date of 1698, and now among the manuscripts of the Bodleian, Bishop Burnet writes thus of a priest who accompanied Peter the Great to England: "The czar's priest is come over, who is a truly holy man, and more learned than I should have imagined, but thinks it a great piece of religion to be no wiser than his fathers, and therefore cannot bear the thought of imagining that anything among them can want amendment."

[2] Horsey says: "I read in their cronickells written and kept in secreat by a great priem prince of that country named Knez Ivan Fedorowich Mistisloskoie, who, owt of his love and favour, imparted unto me many secreats observed in the memory and procis of his tyme, which was fowerscore yeares, of the state, natur, and government of that comonweelth."—Bond, *Russia at the Close of the Sixteenth Century* (Hakluyt Society), 1856.

[3] *Lectures on the Eastern Church.*

ious dramas (*The Prodigal Son*, *Nebuchadnezzar*, etc.). He has left us some droll verses on the czar's new palace of Kolomenskoe, which are very curious doggerel. The artificial lions that roared, moved their eyes, and walked especially delighted him. Alexis had probably ordered something to be constructed resembling the machinery we find mentioned in the Byzantine writers. There does not seem to be any ground for the assertion (often met with even in Russian writers) that Sophia, the sister of Peter the Great, was acquainted with French and translated some of the plays of Molière.

The modern period.

And now all things were to be changed as if by an enchanter's wand. Russia was to leave her martyrologies and historical stories and fragmentary chronicles, and to adopt the forms of literature in use in the West. One of the chief helpers of Peter the Great in the education of the people was Feofane (Theophanes) Procopovich, who advocated the cause of science, and attacked unsparingly the superstitions then prevalent; the cause of conservatism was defended by Stephen Yavorski. The *Rock of Faith* of the latter was written to refute the Lutherans and Calvinists. Another remarkable writer of the times of Peter the Great was Pososhkoff, who produced a valuable work on *Poverty and Riches*, a kind of treatise on political economy. Antiokh Kantemir (1708–1744), son of a former hospodar of Moldavia, wrote some clever satires still read; they are imitated from Boileau. He also translated parts of Horace. Besides his satires, he published versions of Fontenelle's *Pluralité des Mondes* and the histories of Justin and Cornelius Nepos. He was for some time Russian ambassador at the courts of London and Paris. But more celebrated than these men was

Lomonosoff.

Michael Lomonosoff (*q.v.*). He was an indefatigable writer of verse and prose, and has left odes, tragedies, didactic poetry, essays, and fragments of epics; without being a man of great genius he did much to advance the education of his country. He also made many valuable contributions to science.

Tatistcheff.

Basil Tatistcheff (1686–1750), a statesman of eminence, was the author of a Russian history, which, although written in a confused style and hardly superior to a chronicle, is interesting as the first attempt in that field, which was afterwards so successfully cultivated by Karamzin, Solovieff, and Kostomaroff. His work was not given to the world till after his death. There had been a slight sketch published before by Khilkoff, entitled the *Marrow of Russian History*.

Trediakovski.

Basil Trediakovski (1703–1769) was but a poor poetaster, in spite of his many productions. He was born at Astrakhan, and we are told that Peter, passing through that city at the time of his Persian expedition, had Trediakovski pointed out to him as one of the most promising boys of the school there. Whereupon, having questioned him, the czar said, with truly prophetic insight, "A busy worker, but master of nothing." His *Telemakhida*, a poem in which he versified the *Télémaque* of Fénelon, drew upon him the derision of the wits of the time. He had frequently to endure the rough horse-play of the courtiers, for the position of a literary man at that time in Russia was not altogether a cheerful one.

Sumarokoff.

From the commencement of the reign of Elizabeth Russian literature made great progress, the French furnishing models. Alexander Sumarokoff (1718–1777) wrote prose and verse in abundance—comedies, tragedies, idyls, satires, and epigrams. He is, perhaps, best entitled to remembrance for his plays, which are rhymed and in the French style. It took the Russians some time to find out that their language was capable of the unrhymed iambic line, which is the most suitable for tragedy. His *Dmitri Samozvanetz* ("Demetrius the Pretender") is certainly not without merit. Some of the pieces of Kniazhnin had great success in their time, such as *The Chatterbox*, *The Originals*, and especially *The Fatal Carriage*. He is now, however almost forgotten.

Kniazhnin.

In 1756 the first theatre was opened at St. Petersburg, the director being Sumarokoff. Up to this time the Russians had acted only religious plays, such as those written by Simeon Polotzki. The reign of Catherine II. (1762–96) saw the rise of a whole generation of court poets, many of whom were at best but poor writers. Everything in Russia was to be forced like plants in a hot-house; she was to have Homers, Pindars, Horaces, and Virgils. Michael Kheraskoff (1733–1807) wrote besides other poems two enormous epics—the *Rossiada* in twelve books, and *Vladimir* in eighteen; they are now but little read.

Kheraskoff.

Although they are tedious poems on the whole, yet we occasionally find spirited passages. Bogdanovich (1743–1803) wrote a pretty lyric piece, *Dushenka*, based upon La Fontaine, and telling the old story of the loves of Cupid and Psyche. Perhaps the elegance of the versification is the best thing to be found in it.

Bogdanovich.

With Ivan Khemnitzer begins the long list of fabulists; this half-Oriental form of literature, so common in countries ruled absolutely, has been very popular in Russia. Khemnitzer (1744–1784), whose name seems to imply a German origin, began by translating the fables of Gellert, but afterwards produced original specimens of this kind of literature.

Khemnitzer.

A writer of real national comedy appeared in Denis von Visin, probably of German extraction, but born at Moscow (1745–1792). His best production is *Nedorosl* ("The Minor"), in which he satirizes the coarse features of Russian society, the ill-treatment of the serfs, and other matters. The coloring of the piece is truly national. He has also left some very good letters describing his travels. He saw France on the eve of the great Revolution, and has well described what he did see. Russian as he was, and accustomed to serfdom, he was yet astonished at the wretched condition of the French peasants.

Visin.

The great poet of the age of Catherine, the laureate of her glories, was Gabriel Derzhavin (1743–1816). He essayed many styles of composition, and was a great master of his native language. Many of his lyric pieces are full of fire. No one can deny the poet a vigorous imagination and a great power of expressing his ideas. There is something grandiose and organ-like in his high-sounding verses; unfortunately he occasionally degenerates into bombast. His versification is perfect; and he had the courage, rare at the time, to write satirically of many persons of high rank. His *Ode to God* is the best known of his poems in Western countries. We can see from some of his pieces that he was a student of Edward Young, the author of the *Night Thoughts*. Tawdry rhetoric, containing, however, occasionally fine and original thoughts, rendered this writer popular throughout Europe. Other celebrated poems of Derzhavin are the *Odes on the Death of Prince Mestcherski*, *The Nobleman*, *The Taking of Ismail*, and *The Taking of Warsaw*.

Derzhavin.

An unfortunate author of the days of Catherine was Alexander Radistcheff, who, having in a small work, *A Journey to Moscow*, spoken too severely of the miserable condition of the serfs, was punished by banishment to Siberia, from which he was afterwards allowed to return, but not till his health had been permanently injured by his sufferings.

Radistcheff.

An equally sad fate befell the spirited writer Novikoff, who, after having worked hard as a journalist, and done much for education in Russia, fell under the suspicion of the government, and was imprisoned by Catherine. On her death he was released by her successor. The short reign of Paul was not favorable to literary production;

Novikoff.

the censorship of the press was extremely severe, and many foreign books were excluded from Russia. Authors and lovers of literature were liable to get into trouble, as we see by the experiences of the poet Kotzebue and pastor Seidler.

But a better state of things came with the reign of Alexander, one the glories of whose days was NICHOLAS KARAMZIN (*q.v.*). His chief work is his *History of the Russian Empire*, but he appeared in the fourfold aspect of historian, novelist, essayist, and poet. Nor need we do more than mention the celebrated Archbishop PLATON (*q.v.*). Ivan Dmitrieff (1760–1837) wrote some pleasing lyrics and epistles, but without much force. He is like some feeble British poets towards the close of last century, in whom the elegance of the diction will not atone for the feebleness of the ideas. He appears from his translations to have been well acquainted with the English poets. Ozeroff wrote a great many tragedies, which are but little read now. They are in rhyming alexandrines. His form belongs to the faise classical school, but he occasionally handled native subjects with success, as in his *Dmitri Donskoi* and *Yaropolk and Oleg*. In Ivan Krîloff (1768–1844) the Russians found their most genial fabulist. His pieces abound with vigorous pictures of Russian national life, and many of his lines are standard quotations with the Russians, just as *Hudibras* is with ourselves. Long before his death Krîloff had become the most popular man in Russia. He resembled La Fontaine not only in the style of his verse but in his manner of life. He was the same careless, unpractical sort of person, and showed the same simplicity of character. As Derzhavin was the poet of the age of Catherine, so Zhukovski (1783–1852) may be said to have been that of the age of Alexander. He is more remarkable, however, as a translator than as an original poet. With him Romanticism began in Russia. The pseudo-classical school, led by the French, was now dead throughout Europe. In 1802 he published his version of Gray's *Elegy*, which at once became a highly popular poem in Russia. Zhukovski translated many pieces from the German (Goethe, Schiller, Uhland) and English (Byron, Moore, Southey). One of his original productions, "The Poet in the Camp of the Russian Warriors," was on the lips of every one at the time of the war of the fatherland (*Otechestvennaia Voina*) in 1812. He attempted to familiarize the Russians with all the most striking specimens of foreign poetical literature. He produced versions of the episode of Nala and Damayanti from the *Mahabharata*, of Rustam and Zohrab from the *Shah-Namah*, and of a part of the *Odyssey*. In the case of these three masterpieces, however, he was obliged to work from literal translations (mostly German), as he was unacquainted with the original languages. The *Iliad* was translated during this period by Gnedich, who was familiar with Greek. He has produced a faithful and spirited version, and has naturalized the hexameter in the Russian language with much skill. Constantine Batiushkoff (1787–1855) was the author of many elegant poems, and at the outset of his career promised much, but sank into imbecility, and lived in this condition to an advanced age. Merzliakoff and Tzîganoff deserve a passing notice as the writers of songs some of which still keep their popularity. As the poet of the age of Catherine was Derzhavin, and of that of Alexander Zhukovski, so the next reign, that of Nicholas, was to have its representative poet, by the common consent of his critics the greatest whom Russia had yet seen. During his short life (1799–1837) Alexander Pushkin produced many celebrated poems, which will be found enumerated in the article devoted to him (see POUSHKIN). It may suffice to say here that he tried almost all styles of composition—the drama, lyric poetry, the novel, and many others. In Alexander Griboiedoff (1794–1829) the Russians saw the writer of one of their most clever comedies (*Gore ot Uma*), which may perhaps be translated "The Misfortune of being too Clever" (lit. "Grief out of Wit"). The fate of Griboiedoff was sad; he was murdered in a riot at Teheran, where he was residing as Russian minister at the court of Persia. The poet is said to have had a presentiment of his fate and to have been unwilling to go. Pushkin, while travelling in the Caucasus, in the track of the army of Paskewitch, met the body of his friend, which was being carried to Tiflis for burial. The satirical powers of Griboiedoff come out in every line of his play; he was unquestionably a man of genius. A few words may be allowed to Ivan Kozloff (1774–1838), the author of some pretty original lyrics, and some translations from the English, among others Burns's *Cotter's Saturday Night*. He became a cripple and blind, and his misfortunes elicited some cheering and sympathetic lines from Pushkin, which will always be read with pleasure.

Since the death of Pushkin, the most eminent Russian poet is Lermontoff (1814–41); his life terminated, like that of his predecessor, in a duel. He has left us many exquisite lyrics, mostly written in a morbid and melancholy spirit. In quite a different vein is his clever imitation of a Russian bîlina, "Song about the Czar Ivan Vasilievich, the Young Oprichnik, and the Bold Merchant Kalashnikoff." The poet was of Scotch extraction (Learmont), the termination being added to Russify his name. In one of his pieces he has alluded to his Caledonian ancestors. His chief poems are "The Demon," "The Novice" ("Mtzîri," a Georgian word), and "Hadji Abrek." He also wrote a novel, *A Hero of our Time*. He has faithfully reproduced in his poems the wild and varied scenery of the Caucasus and Georgia; from them he has drawn his inspiration—feeling, no doubt, that the flat gray landscapes of northern Russia offered no attractions to the poet. A genuine bard of the people, and one of their most truly national authors, was Koltzoff (1809–1842), the son of a tallow merchant of Voronezh. He has left us a few exquisite lyrics, which are to be found in all the collections of Russian poetry. He died of consumption after a protracted illness. Another poet who much resembled Koltzoff was Nikitin, born in the same town, Voronezh. His life was spent in poverty; his father was an incurable drunkard, and brought his family to the greatest distress. Nikitin, to support his relations, was obliged to keep an inn; this he was afterwards enabled to change for the more congenial occupation of a bookseller. He died in 1861. The novel in Russia has had its cultivators in Zagoskin and Lazhechnikoff, who imitated Sir Walter Scott. The most celebrated of the romances of Zagoskin was *Yuri Miloslavski*, a tale of the expulsion of the Poles from Russia in 1612. The book may even yet be read with interest; it gives a very spirited picture of the times; unfortunately, as is but too often the case with the writings of Sir Walter Scott himself, a gloss is put upon the barbarity of the manners of the period, and the persons of the novel have sentiments and modes of expressing them which could only have existed about two centuries afterwards. There is also too much of the sentimentalism which was prevalent at the time when the author wrote. Among the better known productions of Lazhechnikoff are *The Heretic* and *The Palace of Ice*. A flashy but now forgotten writer of novels was Bulgarin, author of *Ivan Vishigin*, a work which once enjoyed considerable popularity. The first Russian novelist of great and original talent was Nicholas Gogol (1809–1852). In his *Dead Souls* he satirized all classes of society, some of

the portraits being wonderfully vivid; take, for example, that of Pliushkin, the miser. Being a native of Little Russia, he is very fond of introducing descriptions of its scenery and the habits of the people, especially in such stories as the *Old-fashioned Household*, or in the more powerful *Taras Bulba*. This last is a highly-wrought story, giving us a picture of the savage warfare carried on between the Cossacks and Poles. Taras is brave, but perhaps too much of a barbarian to be made interesting to Western readers. He reminds us of some of the heroes of the Cossack poet Shevchenko. Gogol was also the author of a good comedy, *The Reviser*, wherein the petty pilferings of Russian municipal authorities are satirized. In his *Memoirs of a Madman* and *Portrait*, he shows a weird and fantastic power which proves him to have been a man of strong imagination. The same may be said of *The Cloak*, and the curious tale *Vii* ("The Demon"), where he gives us a picture of Kieff in the old days. He has very dexterously interwoven his tales with the traditions and superstitions of Little Russia. The fate of Gogol was sad; he sank into religious melancholy, and ultimately into imbecility. He made great efforts to destroy all his writings, and indeed burnt most of the second part of his *Dead Souls;* only fragments have been preserved. His *Confessions of an Author* is the production of a mind verging on insanity. He died in 1852, aged forty-two. Since his time the novel has been very much cultivated in Russia, the school culminating in Ivan Turgenieff, but it is the school of Thackeray and Dickens, not that of Balzac and George Sand. The Russians seem to affect especially the realistic novels of England. Among the most conspicuous of these writers was the celebrated Alexander Herzen, author of a striking romance, *Kto Vinovat?* ("Who is to Blame?") which he published under the assumed name of Iskander. The public career of Herzen is well known. The freedom of his opinions soon embroiled him with the authorities. He was exiled to Perm, and, seizing the first opportunity which offered itself of passing the Russian frontiers, he spent the remainder of his life chiefly in France and England, and died at Geneva in 1869. His celebrated journal *Kolokol* ("The Bell") had a great circulation. A novelist of repute was Goncharoff, his two chief works being *A Common-place Story* and *Oblomoff*. Grigorovich has written *The Fisherman* and *The Emigrants*. Pisemski, another novelist of the realistic type, is the author of *The Man of St. Petersburg* and *Lieshî* ("The Wood Demons"). Other novelists of celebrity are Saltîkoff, who writes under the name of Stchedrin, and whose *Provincial Sketches* published a few years ago made a great sensation and have been followed by *Letters to My Aunt* and other works; Dostoievski (d. 1881), author of *Poor People*, *Letters from the House of the Dead* (describing his impressions of Siberia, whither he was banished in consequence of a political offence), a powerful writer; and Ostrovski. We may also add Ryeshetnikoff, who takes his characters from the humbler classes; he died at the early age of thirty-nine. All these are disciples of the school of Dickens and Thackeray. Count A. Tolstoi, also celebrated as a dramatist, has written an historical novel entitled *Prince Serebrianni*. Count L. Tolstoi is author of a work of fiction describing the war of 1812, which has gained great celebrity in Russia, *Voina i Mir* ("War and Peace"). Novelists of the French school are Krestovski, Stebnitzki, and Boborîkin. During 1885 a new writer of merit, Kozolenko, appeared, who describes Siberian life.

Herzen.

On September 4, 1883, died Ivan Turgenieff, aged sixty-four, the most eminent Russian novelist, and perhaps the only Russian man of letters universally known. His celebrity dates from his *Memoirs of a Sportsman*, in which he appears as the advocate of the Russian *muzhik* or peasant. He had witnessed in his youth many sad scenes at his own home, where his mother, a wealthy lady of the old school, treated her serfs with great cruelty. The poet devoted all his energies to procure their emancipation. This work was followed by a long array of tales, too well known to need recapitulation here, which have gained their author a European reputation, such as *Dvorianskoe Gnezdo* ("A Nest of Gentle People"), one of the most pathetic tales in any language, *Nov* ("Virgin Soil"), and others; nor can the minor tales of Turgenieff be forgotten, especially *Mumu*, a story based upon real life, for the dumb doorkeeper was a serf of his mother's, and experienced her ill-treatment. His last two works were *Poetry in Prose* and *Clara Milich*.

Turgenieff.

In Belinski the Russians produced their best critic. For thirteen years (1834–1847) he was the Aristarchus of Russian literature and exercised a healthy influence. In his latter days he addressed a withering epistle to Gogol on the newly-adopted reactionary views of the latter.

Belinski.

Since the time of Karamzin the study of Russian history has made great strides. He was followed by Nicholas Polevoi, who wrote what he called the *History of the Russian People*, but his work was not received with much favor and has now fallen into oblivion. Polevoi was a self-educated man, the son of a Siberian merchant; besides editing a well-known Russian journal *The Telegraph*, he was also the author of many plays, among others a translation of *Hamlet*. Since his time, however, the English dramatist has been produced in a more perfect dress by Kroneberg, Druzhinin, and others. In the year 1879 died Sergius Solovieff, whose *History of Russia* had reached its twenty-eighth volume, and fragments of the twenty-ninth were published after his death. This stupendous labor lacks something of the critical faculty, and perhaps may be described rather as a quarry of materials for future historians of Russia than an actual history. During 1885 the Russians have had to mourn the loss of Kostomaroff, the writer of many valuable monographs on the history of their country, of which those on Bogdan Khmelnitzki and the False Demetrius deserve special mention. From 1847 to 1854 Kostomaroff, who had become obnoxious to the Russian Government, wrote nothing, having been banished to Saratoff, and forbidden to teach or publish. But after this time his literary activity begins again, and, besides separate works, the leading Russian reviews, such as *Old and New Russia*, *The Historical Messenger*, and *The Messenger of Europe*, contain many contributions from his pen of the highest value. In 1885 also died Constantine Kavelin, the author of many valuable works on Russian law, and Kalatcheff, who published a classical edition of the old Russian codes. Ilovaiski and Gedeonoff have attempted to upset the general belief that the founders of the Russian empire were Scandinavians. Their opinions have been alluded to above (p. 96). A good history of Russia was published by Ustrialoff (1885), but his most celebrated work was his *Tzarstvovanie Petra Velikago* ("Reign of Peter the Great"); in this many important documents first saw the light, and the circumstances of the death of the unfortunate Alexis were made clear. Russian writers of history have not generally occupied themselves with any other subject than that of their own country, but an exception may be found in the writings of Granovski, such as *Abbé Suger* (1849) and *Four Historical Portraits* (1850). So also Kudriavtzoff, who died in 1850, wrote on "The Fortunes of Italy, from the Fall of the Roman Empire of the West till its Reconstruction by Charlemagne." He also wrote on "The Roman Women as described by Tacitus." We may add Kareyeff, now professor at Warsaw, who has written on the condition of the French peasantry before the Revolution. Other writers

Historians.

Polevoi.

Solovieff.

Kosto-maroff.

Ustrialoff.

on Russian history have been Pogodine, who compiled a *History of Russia till the invasion of the Mongols*, 1871, and especially Zabielin, who has written a *History of Russian Life from the most Remote Times* (1876), and the *Private Lives of the Czarinas* and *Czars* (1869 and 1872). Leshkoff has written a *History of Russian Law to the 18th Century*, and Tchitcherin a *History of Provincial Institutions in Russia in the 17th Century* (1856). To these must be added the work of Zagoskin, *History of Law in the State of Muscovy* (Kazan, 1877). Prof. Michael Kovalevski, of the university of Moscow, is now publishing an excellent work on *Communal Land Tenure*, in which he investigates the remains of this custom throughout the world. Of the valuable history of Russia by Prof. Bestuzheff-Riumin (1872) one volume only has appeared; the introductory chapters giving an account of the sources and authorities of Russian history are of the highest value. It is the most critical history of Russia which has yet appeared. In 1885 Dubrovin published an excellent history of the revolt of Pugatcheff. The valuable work by Messrs. Pîpin and Spasovich, *History of Slavonic Literatures*, is the most complete account of the subject, and has been made more generally accessible to Western students by the German translation of Pech. The *History of Slavonic Literature* by Schafarik, published in 1826, has long been antiquated. Previous to this, a history of Russian literature by Paul Polevoi had appeared, which has gone through two editions. It is modelled upon Chambers's *Cyclopœdia of English Literature*. The account of the Polish rebellion of 1863, by Berg, published in 1873, which gave many startling and picturesque episodes of this celebrated struggle, has now been withdrawn from circulation. It appeared originally in the pages of the Russian magazine, *Starina*.

Since the death of Lermontoff the chief Russian poet who has appeared is Nicholas Nekrasoff, who died in 1877. He has left six volumes of poetry, which in many respects remind us of the writings of Crabbe; the poet dwells mainly upon the melancholy features of Russian life. He is of that realistic school in which Russian authors so much resemble English. Another writer of poetry deserving mention is Ogarieff, for a long time the companion in exile of Herzen in England; many of his compositions appeared in the *Polar Star* of the latter, a medley of prose and verse, which contains some very important papers, including the interesting autobiographical sketches of Herzen, entitled *Bîloe i Dumî* ("The Past and my Thoughts"). Maikoff at one time enjoyed great popularity as a poet; he is a kind of link between the present generation and that of Pushkin, of whose elegance of versification he is somewhat of an imitator. Another poet of a past generation was Prince Viazemski, whose works are now being collected. Graceful lyrics have also been written by Mei, Fet (whose name would apparently prove Dutch extraction, Veth), Stcherbina, and, going a little farther back, Yazîkoff, the friend of Pushkin, and Khomiakoff, celebrated for his Slavophile propensities. To these may be added Mdlle Zhadovskaia, who died a short time ago, Benediktoff, Podolinski, and Tiutcheff. It will be seen that in Russia (as in England) lyrical poetry is almost the only form now cultivated. It is becoming more and more colored with imitations of the bîlinî and reproductions of the old Russian past, which is perhaps getting treated somewhat fantastically, as was the old Irish life in the Irish melodies of Moore. Occasionally Polonski contributes one of his exquisite lyrics to the *Viestnik Yevropî* ("European Messenger").

Recent poets.

Excellent works on subjects connected with Slavonic philology have been published by Vostokoff, who edited the Ostromir Codex, mentioned above (p. 111), and Sreznevski and Bodianski, who put forth an edition of the celebrated codex used at Rheims for the coronation of the French kings. Since their deaths their work has been carried on by Prof. Grote (*Philological Investigations*, also many critical editions of Russian classics). Budilovich, now a professor at Warsaw, Potebnya of Kharkoff, and Baudoin de Courtenay, who, among other services to philology, has described the Slavonic dialect spoken by the Resanians, a tribe living in Italy, in two villages of the Julian Alps. The songs (bîlinî) of the Russians have been collected by Zakrevski, Rîbnikoff, Hilferding, Barsoff, and others, and their national tales by Sakharoff, Afanasieff, and Erlenvein. Kotliarevski, Tereshenko, and others have treated of their customs and superstitions, but it is to be regretted that no one as yet has made a complete study of the vexed question of Slavonic mythology. At the present time Stanislaus Mikutzki, professor at the university of Warsaw, is publishing his *Materials for a Dictionary of the Roots of the Russian and all Slavonic Dialects*, but, unfortunately, it represents a somewhat obsolete school of philology. The Early Russian Text Society continues its useful labors, and has edited many interesting monuments of the older Slavonic literature. Quite recently two valuable codices have been printed in Russia, Zographus and Marianus, interesting versions of the Gospels in Palæoslavonic. They were edited by the learned Croat Jagić, who now occupies the chair of Sreznevski in St. Petersburg. An excellent *Tolkovi Slovar Velikorusskago Yazîka* ("Explanatory Dictionary of the Great Russian Language"), by Dahl, has gone into a second edition. Alexander Hilferding published some valuable works on ethnology and philology, among others on the Polabes, an extinct Slavonic tribe who once dwelt on the banks of the Elbe. Although they have produced some good Slavonic scholars, the Russians have not exhibited many works in the field of classical or other branches of philology. Exception, however, must be made in favor of the studies of Tchubinoff in Georgian, Minayeff in the Indian, and Tzvetayeff in the old languages of Italy.

Philologists.

In moral and mental philosophy the Russians have produced but few authors. We meet with some good mathematicians, Ostrogradski among others, and in natural science the publications of the Society for Natural History at Moscow have attracted considerable attention.

Since the *Boris Godunoff* of Pushkin, which was the first attempt in Russia to produce a play on the Shakespearian model, many others have appeared in the same style. A fine trilogy was composed by Count A. Tolstoi on the three subjects, *The Death of Ivan the Terrible* (1866), *The Czar Feodor* (1868), and *The Czar Boris* (1869). Other plays of merit have been written by Ostrovski and Potiekhin.

Recent drama.

Many excellent literary journals and magazines make their appearance in the country; among these may especially be mentioned the time-honored *Viestnik Yevropî* ("Messenger of Europe"), which contains some of the most brilliant writing produced in the Russian empire. The *Istoricheski Viestnik* ("Historical Messenger") is full of curious matter, and does not confine itself merely to Russian subjects. It is edited by M. Shubinski, the author of some pleasant sketches on the manners of Russia in the old time. On the contrary *Starina* (the "Antiquary," if we may so freely translate the original name, is entirely Russian, and is a valuable repertory of documents concerning the history of the country, and memoirs, especially relating to the latter part of the 17th century. The highly interesting magazine *Drevnaia i Novaia Rossia* did not protract its existence beyond six years, having come to an end in 1881. Many of the best Russian writers contributed to it; it contains much valuable material for the student of history. The *Russkii Arkhiv* is edited by M. Bartenieff, and has long been celebrated; some of the most important notes on Russian history of the

Serials.

18th and 19th century have appeared in this journal. During the last few years extensive excavations have been made in many parts of Russia, and much has been done to throw light upon the prehistoric period of the country. A large "kurgan," called *Cherna Mogila*, or the Black Grave, was opened by Samokvasoff in the government of Tchernigoff and described in the pages of *Old and New Russia*. Explorations have been carried on on the site of Bolgari, the ancient capital of the Ugrian Bolgars on the Volga. One of the most active workers in this field was the late Count Uvaroff (d. 1884), who published a valuable monograph on the Stone Age in Russia, and many other important works.

A few words must be said on the literature of the Russian dialects, the Little and White Russian. The Little Russian is rich in *skazki* (tales) and songs. Peculiar to them is the *duma*, a narrative poem which corresponds in many particulars with the Russian bîlina. Since the commencement of the present century, when curiosity was first aroused on the subject of national poetry, the Little Russian *dumî* have been repeatedly edited, as by Maksimovich Metlinski and others. An elaborate edition (far surpassing the earlier ones) was commenced by Dragomanoff and Antonovich, but as yet only one volume and a portion of a second have made their appearance. Just as the bîlinî of the Great Russians, so also these dumî of the Little Russians admit of classification, and they have been divided by their latest editors as follows: (1) the songs of the *druzhina*, treating of the early princes and their followers; (2) the Cossack period (*Kozachestvo*), in which the Cossacks are found in continual warfare with the Polish *pans* and the attempts of the Jesuits to introduce the Roman Catholic religion; (3) the period of the Haidamaks, who formed the nucleus of the national party, and prolonged the struggle. The gradual break up of the military republic of these sturdy freebooters has already been described.

The Little Russian dialect, or Malorussian.

The foundation of the Little Russian literature (written, as opposed to the oral) was laid by Ivan Kotliarevski (1769–1838), whose travesty of part of the *Æneid* enjoys great popularity among some of his countrymen. Others, however, object to it as tending to bring the language or dialect into ridicule. A truly national poet appeared in Taras Shevchenko, born at the village of Kirilovka in the government of Kieff, in the condition of a serf. The strange adventures of his early life he has told us in his autobiography. He did not get his freedom till some time after he had reached manhood, when he was purchased from his master by the generous efforts of the poet Zhukovski and others. Besides poetry, he occupied himself with painting with considerable success. He unfortunately became obnoxious to the Government, and was punished with exile to Siberia from 1847 to 1857. He did not long survive his return, dying in 1861, aged forty-six. No one has described with greater vigor than Shevchenko the old days of the Ukraine. In his youth he listened to the village traditions handed down by the priests, and he has faithfully reproduced them. The old times of Nalivaiko, Doroshenko, and others live over again. Like Gogol he is too fond of describing scenes of bloodshed. In the powerful poem entitled *Haidamak* we have a graphic picture of the horrors enacted by Gonta and his followers at Uman. The sketches are almost too realistic. Like Burns with the old Scottish songs, so Shevchenko has reproduced admirably the spirit of the lays of the Ukraine. All those familiar with his works will remember the charming little lyrics with which they are interspersed. The funeral of the poet was a vast public procession; a great cairn, surmounted with a cross, was raised over his remains, where he lies buried near Kanioff on the banks of the Dnieper. His grave has been styled the "Mecca of the South Russian Revolutionists." He is the great national poet of the Southern Russians. A complete edition of his works, with interesting biographical notices—one contributed by the novelist Turgenieff—appeared at Prague in 1876. Besides the national songs, excellent collections of the South Russian folk-tales have appeared, edited by Dragomanoff, Rudchenko, and others. Many of these are still recited by the "tchumaki" or wandering peddlers. A valuable work is the *Zapiski o Yuzhnoi Rossii* ("Papers on Southern Russia"), published at St. Petersburg in 1857 by Panteleimon Kulish. After he got into trouble (with Kostomaroff and Shevchenko) for his political views, the late works of this author show him to have undergone a complete change. Other writers using the Little Russian language are Marko-Vovchok (that is, Madame Eugenia Markovich), and Yuri Fedkovich, who employs a dialect of Bukovina. Fedkovich, like Shevchenko, sprang from a peasant family, and served as a soldier in the Austrian army against the French during the Italian campaign. Naturally we find his poems filled with descriptions of life in the camp. Like the Croat Preradovic, he began writing poetry in the German language, till he was turned into more natural paths by some patriotic friends. A collection of songs of Bukovina was published at Kieff in 1875 by Lonachevski. At the present time Eugene Zelechowski continues his valuable *Dictionary of Little Russian*, of which about one-half has appeared. This promises to be a very useful book, for up to the present time students have been obliged to rest satisfied with the scanty publications of Levchenko, Piskunoff, and Verchratzki. There is a good grammar by Osadtza, a pupil of Miklosich.

Shevchenko.

In the White Russian dialect are to be found only a few songs, with the exception of portions of the Scriptures and some legal documents. A valuable dictionary was published a short time ago by Nosovich, but this is one of the most neglected of the Russian dialects, as the part in which it is spoken is one of the dreariest of the empire. Collections of White Russian songs have been published by Shein and others. For details regarding this and the other Russian dialects see SLAVS. (W. R. M.)

White Russian dialect.

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RUSTCHUK (Rusc̆uk), a city of Bulgaria, Turkey in Europe, on the south bank of the Danube, opposite Giurgevo, at the point where the river receives the waters of the Lom, a fine stream from the northern slopes of the Balkans. Since 1867 it has been connected by rail (139 miles) with Varna. The town was nearly destroyed by the Russian bombardment from Giurgevo in 1877, and the military works have since been dismantled in terms of the treaty of Berlin. Its position on the river frontier of Turkey long made it a place of strategic importance. In 1871 the population was about 23,000 (10,800 Turks, 7700 Bulgarians, 1000 Jews, 800 Armenians, 500 Gipsies, 800 Wallachians and Serbs, 400 Western Europeans), and in 1881 it was returned as 26,163.

In the time of the Romans Rustchuk was one of the fortified points along the line of the Danube. In the *Tabula Peutingeriana* it appears as Prisca, in the *Antonine Itinerary* as Serantaprista, in the *Notitia* as Seragintaprista, and in Ptolemy as Priste Polis. Destroyed by the barbarian invasion, the town recovered its importance only in comparatively modern times. In 1810 it was captured by the Russians, and on his departure next year Kutusoff destroyed the fortifications. In 1828–29 and again in 1853–54 it played a part in the Russo-Turkish War, and in 1877, as already mentioned, it was nearly destroyed.

RUTH, Book of. The story of Ruth, the Moabitess, great-grandmother of David, one of the Old Testament Hagiographa, is usually reckoned as the second of the five Megilloth or Festal Rolls. This position corresponds to the Jewish practice of reading the book at the Feast of Pentecost; Spanish MSS., however, place Ruth at the head of the Megilloth (see Canticles); and the Talmud, in a well-known passage of *Baba Bathra*, gives it the first place among all the Hagiographa. On the other hand the Septuagint, the Vulgate, and the English version make Ruth follow Judges. It has sometimes been held that this was its original place in the Hebrew Bible also, or rather that Ruth was originally reckoned as an appendix to Judges, since it is only by doing this, and also by reckoning Lamentations to Jeremiah, that all the books of the Hebrew canon can be reduced to twenty-two, the number assigned by Josephus and other ancient authorities. But it has been shown in the article Lamentations (*q.v.*) that the argument for the superior antiquity of this way of reckoning breaks down on closer examination, and, while it was very natural that a later rearrangement should transfer Ruth from the Hagiographa to the historical books, and place it between Judges and Samuel, no motive can be suggested for the opposite change. That the book of Ruth did not originally form part of the series of *Prophetæ priores* (Judges–Kings) is further probable from the fact that it is quite untouched by the process of "prophetic" or "Deuteronomistic" editing, which gave that series its present shape at a time soon after the fall of the kingdom of Judah; the narrative has no affinity with the point of view which looks on the whole history of Israel as a series of examples of divine justice and mercy in the successive rebellions and repentances of the people of God.[1] But if the book had been known at the time when the history from Judges to Kings was edited, it could hardly have been excluded from the collection; the ancestry of David was of greater interest than that of Saul, which is given in 1 Sam. ix. 1, whereas the old history named no ancestor of David beyond his father Jesse. In truth the book of Ruth does not offer itself as a document written soon after the period to which it refers; it presents itself as dealing with times far back (Ruth i. 1), and takes obvious delight in depicting details of antique life and obsolete usages; it views the rude and stormy period before the institution of the kingship through the softening atmosphere of time, which imparts to the scene a gentle sweetness very different from the harsher color of the old narratives of the book of Judges. In the language, too, there is a good deal that makes for and nothing that makes against a date subsequent to the captivity, and the very designation of a period of Hebrew history as "the days of the judges" is based on the Deuteronomistic additions to the book of Judges (ii. 16 *sq.*) and does not occur till the period of the exile. An inferior limit for the date of the book cannot be assigned with precision. It has been argued that, as the author seems to take no offence at the marriage of Israelites with Moabite women, he must have lived before the time of Ezra and Nehemiah (Ezra ix.; Neh. xiii.); but the same argument would prove that the book of Esther was written before Ezra, and indeed "a disposition to derive prominent Jewish families from proselytes prevailed to a much later date," and finds expression in the Talmud (see Wellhausen-Bleek, p. 205). The language of Ruth, however, though post-classical, does not seem to place it among the very latest Old Testament books, and the manner in which the story is told is as remote from the legal pragmatism of Chronicles as from the prophetic pragmatism of the editor of the older histories. The tone of simple piety and graciousness which runs through the narrative, unencumbered by the pedantry of Jewish legality, seems to indicate that the book was written before all the living impulses of Jewish literature were choked by the growing influence of the doctors of the law. In this respect it holds in Hebrew prose writing a position analogous to that of the older *Chokma* in Hebrew poetry. But the triumph of the scribes in literature as well as in law was not accomplished till long after the time of Ezra.

Wellhausen in Bleek, 4th edition, p. 204 *sq.*, finds the clearest indication of the date of Ruth in the appended genealogy, Ruth iv. 18–22; compare his re-

[1] The religious pragmatism lacking in the original is in part supplied by the Targum (i. 5, 6).

marks in *Prol. Gesch. Israels*, p. 227 (Eng. tr., pp. 217 *sq.*). Salma (Salmon), father of Boaz, is a tribe foreign to old Judah, which was not "father" of Bethlehem till after the exile, and the names of Salma's ancestors are also open to criticism. But this genealogy is also found in Chronicles, and is quite in the manner of other genealogies in the same book. That it was borrowed from Chronicles and added to Ruth by a later hand seems certain, for the author of Ruth clearly recognizes that Obed was legally the son of Mahlon, not of Boaz (iv. 5, 10), so that from his standpoint the appended genealogy is all wrong.

The design of the book of Ruth has been much discussed, and often in too narrow a spirit; for the author is an artist who takes manifest delight in the touching and graceful details of his picture, and is not simply guided by a design to impart historical information about David's ancestors, or enforce some particular lesson. Now the interest of the story, as a work of art, culminates in the marriage of Boaz and Ruth, not in the fact that their son was David's ancestor, which, if the book originally ended with iv. 17, is only mentioned in a cursory way at the close of the story. Had the author's main design been to illustrate the history of the house of David, as many critics think, or to make the point that the noblest stock in Israel was sprung from an alien mother (Wellhausen), this design would certainly have been brought into more prominence. The marriage acquires an additional interest when we know that Ruth was David's great-grandmother, but the main interest is independent of that, and lies in the happy issue of Ruth and Naomi from their troubles through the loyal performance of the kinsman's part by Boaz. Doubtless the writer meant his story to be an example to his own age, as well as an interesting sketch of the past; but this is effected simply by describing the exemplary conduct of Naomi, Ruth, Boaz, and even Boaz's harvesters. All these act as simple, kindly, God-fearing people ought to act in Israel.

There is one antique custom which the writer follows with peculiar interest and describes with archæological detail as a thing which had evidently gone out of use in his own day. By old Hebrew law, as by the old law of Arabia, a wife who had been brought into her husband's house by contract and payment of a price to her father was not set free by the death of her husband to marry again at will. The right to her hand lay with the nearest heir of the dead. Originally we must suppose, among the Hebrews as among the Arabs, this law was all to the disadvantage of the widow, whose hand was simply part of the dead man's estate; but, while this remained so in Arabia to the time of Mohammed, among the Hebrews the law early took quite an opposite turn; the widow of a man who died childless was held to have a right to have a son begotten on her by the next kinsman, and this son was regarded as the son of the dead and succeeded to his inheritance, so that his name might not be cut off from Israel. The duty of raising up a son to the dead lay upon his brother, and in Deut. xxv. 5 is restricted to the case when brothers live together. In old times, as appears from Gen. xxxviii., this was not so, and the law as put in the book of Ruth appears to be that the nearest kinsman of the dead in general had a right "to redeem for himself" the dead man's estate, but at the same time was bound to marry the widow. The son of this marriage was reckoned as the dead man's son and succeeded to his property, so that the "redeemer" had only a temporary usufruct in it. Naomi was too old to be married in this way, but she had certain rights over her husband's estate which the next kinsman had to buy up before he could enter on the property. And this he was willing to do, but he was not willing also to marry Ruth and beget on her a son who would take the name and estate of the dead and leave him out of pocket. He therefore withdraws and Boaz comes in in his place. That this is the sense of the transaction is clear; there is, however, a little obscurity in iv. 5, where one letter seems to have fallen out and we must read גם את־רות for וגם את־רות, and translate "What day thou buyest the field from Naomi thou must also buy Ruth," etc. Comp. vv. 9, 10.

Among older commentaries special mention may be made of J. B. Carpzov, *Collegium rabbinico-biblicum in libellum Ruth*, Leipsic, 1703. In recent times Ruth has usually been taken up by commentators along with JUDGES (*q.v.*). (W. R. S.)

RUTHENIANS. See SLAVS. For Ruthenian (Little Russian) literature, see RUSSIA.

RUTHENIUM. See PLATINUM.

RUTHERFURD, or RUTHERFORD, SAMUEL (1600–1661), Scottish divine, was born about 1600 at the village of Nisbet in Roxburghshire. He is supposed to have received his early education at Jedburgh, and he entered the university of Edinburgh in 1617. He graduated M.A. in 1621, and two years afterwards was elected professor of humanity. On account of some alleged indiscretion or irregularity connected with his marriage in 1625, he resigned his professorship in that year, but, after studying theology, he was in 1627 appointed minister of Anwoth, Kirkcudbrightshire, where he displayed remarkable diligence and zeal, alike as preacher, pastor, and student, and soon took a leading place among the clergy of Galloway. In 1636 his first book, entitled *Exercitationes de Gratia*—an elaborate treatise against Arminianism—appeared at Amsterdam, and attracted some attention both in Great Britain and on the Continent. Combined with his strict and non-conforming Presbyterianism, the severe Calvinism set forth in this work led to a prosecution by the new bishop of the diocese, Sydserff, in the High Commission Court, first at Wigtown and afterwards at Edinburgh, with the result that Rutherfurd was deposed from his pastoral office, and sentenced to confinement to Aberdeen during the king's pleasure. His banishment lasted from September, 1636, to February, 1638, and was chiefly remarkable for the epistolary activity he displayed, the greater number of his published *Letters* belonging to this period of his life. He was present at the signing of the Covenant in Edinburgh in 1638, and afterwards at the meeting of the Glasgow Assembly the same year, which restored him to his parish. In 1639 he was appointed professor of divinity in St. Mary's College, St. Andrews, and shortly afterwards became colleague to Robert Blair in the church of St. Andrews. He was sent up to London in 1643 as one of the eight commissioners from Scotland to the Westminster Assembly. Arriving along with Baillie in November, and remaining at his post over three years, he did great service to the cause of his party. In 1642 he had published his *Peaceable and Temperate Plea for Paul's Presbyterie in Scotland*, and the sequel to it in 1644 on *The Due Right of Presbyteries* provoked Milton's contemptuous reference to "mere A. S. and Rutherfurd" in his sonnet *On the New Forcers of Conscience under the Long Parliament*. In 1644 also appeared Rutherfurd's *Lex Rex, a Dispute for the Just Prerogative of King and People*, which gives him a recognized place among the early writers on constitutional law; it was followed by *The Divine Right of Church Government* (1646), and *Free Disputation against Pretended Liberty of Conscience* (1649). Among his other works are the *Tryal and Triumph of Faith* (1645), *Christ Dying and Drawing Sinners to Himself* (1647), and *Survey of the Spiritual Antichrist* (1648). In 1647 he returned to St. Andrews to become principal of the New College there, and in 1648 and 1651 he declined successive invitations to theological chairs at Harderwijk and Utrecht. His last days were assailed by the persecution which followed the Restoration in 1660. His *Lex Rex* was ordered to be burned at the cross of Edinburgh, and also at the gate of the college. He was deprived of all his offices, and on a charge of high treason was cited to appear before the ensuing parliament. His health, however, now utterly broke down, and knowing that he had not long to live he drew up, on 26th February, 1661, a *Testimony*, which was posthumously published. He died on the 20th of the following March.

The fame of Rutherfurd now rests principally upon his remarkable *Letters*, on which Wodrow thus comments: "He seems to have outdone even himself as well as everybody else in his admirable and every way singular letters, which, though jested upon by profane wits because of some

familiar expressions, yet will be owned of all who have any relish of piety to contain such sublime flights of devotion and to be fraughted with such massy thoughts as loudly speak a soul united to Jesus Christ in the closest embraces, and must needs at once ravish and edify every serious reader." In addition to the other works already mentioned, Rutherfurd published in 1651 a treatise *De Divina Providentia*, against Molinism, Socinianism, and Arminianism, of which Richard Baxter, not without justice, remarked that "as the *Letters* were the best piece so this was the worst he had ever read."

The *Letters*, to the number of 215, were first published anonymously by M'Ward, an amanuensis at Rotterdam, in 1664. They have been frequently reprinted, the best edition (365 letters) being that by Rev. A. A. Bonar, 1848. with a sketch of his life. See also a short *Life* by Rev. Dr. Andrew Thomson, 1884.

RUTHERGLEN, an ancient royal burgh of Lanarkshire, Scotland, is situated near the left bank of the Clyde, 2 miles southeast of Glasgow. It consists chiefly of one long wide irregular street, with narrow streets, wynds, and alleys branching from it at intervals. The parish church is situated near the centre of the town, a little distance from the tower of the old church where the treaty was made in 1297 with Edward I., by which Sir John Monteith agreed with the English to betray the Scottish hero Wallace. The most important public building is the town-hall, a handsome structure with a large square tower. In the vicinity there are extensive collieries and ironworks, and the town possesses chemical works, a paper mill, a pottery, and a shipbuilding yard. The corporation consists of a provost, two bailies, a dean of guild, a treasurer, and fifteen councillors. The population of the royal burgh in 1871 was 9239, and in 1881 it was 11,473.

Rutherglen was erected into a royal burgh by King David in 1126. At this time it included a portion of Glasgow, but in 1226 the boundaries were rectified so as to exclude the whole of that city. In early times it had a castle, which was taken by Bruce from the English in 1313. It was kept in good repair till after the battle of Langside it was burnt by order of the regent Murray. After this the town for a time gradually decayed, the trade being absorbed by Glasgow. Rutherglen is included in the Kilmarnock district of parliamentary burghs.

RUTILIUS CLAUDIUS NAMATIANUS is known to us as the author of a Latin poem in elegiac metre, describing a coast voyage from Rome to Gaul in 416 A.D. The literary excellence of the work and the flashes of light which it throws across a momentous but dark epoch of history combine to give it exceptional importance among the relics of late Roman literature. The poem was in two books; the exordium of the first and the greater part of the second have been lost. What remains consists of about 700 lines.

The poet's voyage took place in the late autumn of 416 (i. 135 *sq.*), and the verses as we have them were evidently written at or very near the time. The author is a native of southern Gaul, and belonged, like Sidonius, to one of the great governing families of the Gaulish provinces. His father, whom he calls Lachanius, had held high offices in Italy and at the imperial court, had been governor of Etruria and Umbria (*consularis Tusciae*) probably in 389, when a Claudius is named in the Theodosian Code (2, 4, 5) as having held the office, then imperial treasurer (*comes sacrarum largitionum*), imperial recorder (*quaestor*), and governor of the capital itself (*praefectus urbis*). Rutilius boasts his career to have been no less distinguished than his father's and particularly indicates that he had been secretary of state (*magister officiorum*) and governor of the capital (i. 157, 427, 467, 561). It is probable that a certain Namatius named in the Theodosian Code (6, 27, 15) as *magister officiorum* of the year 412 is no other than our poet. The true literary man is apt to be inordinately proud of political distinction, and Rutilius celebrates his own praises in a style worthy of Cicero or Pliny. At all events, he had lived long in the great world of the Western empire, and knew much of the inner history of his time. After reaching manhood, he had passed through the tempestuous period that stretches between the death of Theodosius (395) and the fall of the usurper Attalus, which occurred near the date when our poem was written. He had witnessed the checkered career of Stilicho as actual, though not titular, emperor of the West; he had seen the hosts of Radagaisus rolled back from Italy, only to sweep over the helpless provinces of Gaul and Spain, the defeats and triumphs of Alaric, the three sieges and final sack of Rome, followed by the marvellous recovery of the city, Heraclian's vast armament dissipated by a breath, and the fall of seven pretenders to the Western diadem. Undoubtedly the sympathies of Rutilius were with those who during this period dissented from, and, when they could, opposed the general tendencies of the imperial policy. We know from himself that he was the intimate of distinguished men who belonged to the circle of the great orator Symmachus,—men who had scouted Stilicho's compact with the Goths, and had led the Roman senate to support the pretenders Eugenius and Attalus in the vain hope of reinstating the gods whom Julian had failed to save.

While making but few direct assertions about historical characters or events, the poem, by its very texture and spirit and assumptions, forces on us important conclusions concerning the politics and religion of the time, which are not brought home to us with the same directness by any other authority. The attitude of the writer towards paganism is remarkable. The whole poem is intensely pagan, and is penetrated by the feeling that the world of literature and culture is and must remain pagan, that outside paganism lies a realm of barbarism. The poet wears an air of exalted superiority over the religious innovators of his day, and entertains a buoyant confidence that the future of the ancient gods of Rome will not belie their glorious past. Invective and apology he scorns alike, nor troubles himself to show, with Claudian, even a suppressed grief at the indignities put upon the old religion by the new. As a statesman, he is at pains to avoid offending those politic Christian senators over whom pride in their country had at least as great power as attachment to their new religion. Only once or twice does Rutilius speak directly of Christianity, and then only to attack the monks, whom the temporal authorities had hardly as yet recognized, and whom indeed, only a short time before, a Christian emperor had forced by thousands into the ranks of his army. Judaism Rutilius could assail without wounding either pagans or Christians, but he intimates, not obscurely, that he hates it chiefly as the evil root whence the rank plant of Christianity had sprung.

We read in Gibbon that "Honorius excluded all persons who were adverse to the catholic church from holding any office in the state," that he "obstinately rejected the service of all those who dissented from his religion," and that "the law was applied in the utmost latitude and rigorously executed." Far different is the picture of political life impressed upon us by Rutilius. His voice is assuredly not that of a partisan of a discredited and overborne faction. We see by the aid of his poem a senate at Rome composed of past office-holders, the majority of whom were certainly pagan still. We discern a Christian section whose Christianity was political rather than religious, who were Romans first and Christians afterwards, whom a new breeze in politics might easily have wafted back to the old religion. Between these two sections the broad old Roman toleration reigns. Some ecclesiastical historians have fondly imagined that after the sack of Rome the bishop Innocent returned to a position of practical predominance. No one who fairly reads Rutilius can cherish this idea. The air of the capital, perhaps even of Italy, was still charged with paganism. The court was far in advance of the people, and the persecuting laws were in large part incapable of execution.

Perhaps the most interesting lines in the whole poem are those in which Rutilius assails the memory of "dire Stilicho," as he names him. Stilicho, "fearing to suffer all that had caused himself to be feared," annihilated those defences of Alps and Apennines which the provident gods had interposed between the barbarians and the Eternal City, and planted the cruel Goths, his "skin-clad" minions, in the very sanctuary of the empire. His wife was wickeder than the wife of the Trojan horse, than the wife of Althæa or of Scylla. May Nero rest from all the torments of the damned, that they may seize on Stilicho, for Nero smote his own mother, but Stilicho, the mother of the world!

We shall not err in supposing that we have here (what we find nowhere else) an authentic expression of the feeling entertained by a majority of the Roman senate concerning Stilicho. He had but imitated the policy of Theodosius with regard to the barbarians; but even that great emperor had met with passive opposition from the old Roman families. The relations, however, between Alaric and Stilicho had been closer and more mysterious than those between Alaric and Theodosius, and men who had seen Stilicho surrounded by his bodyguard of Goths not unnaturally looked on the Goths who assailed Rome as Stilicho's avengers. It is noteworthy that Rutilius speaks of the crime of Stilicho in terms far different from those used by Orosius and the historians of the lower empire. They believed that Stilicho was plotting to make his son emperor, and that he called in the Goths in order to climb higher. Rutilius holds that he used the barbarians merely to save himself from impending ruin. The Christian historians assert that Stilicho designed to restore paganism. To Rutilius he is the most uncompromising foe of paganism. His crowning sin (recorded by our poet alone) was the destruction of the Sibylline books—a sin worthy of one who had decked his wife in the spoils of Victory, the goddess who had for centuries presided over the deliberations of the senate. This crime of Stilicho alone is sufficient in the eyes of Rutilius to account for the disasters that afterwards befell the city, just as Merobaudes, a generation or two later, traced the miseries of his own day to the overthrow of the ancient rites of Vesta.

With regard to the form of the poem, Rutilius handles the elegiac couplet with great metrical purity and freedom, and betrays many signs of long study in the elegiac poetry of the Augustan era. The Latin is unusually clean for the times, and is generally fairly classical both in vocabulary and construction. The taste of Rutilius too is comparatively pure. If he lacks the genius of Claudian, he also lacks his overloaded gaudiness and his large exaggeration, and the directness of Rutilius shines by comparison with the labored complexity of Ausonius. It is common to call Claudian the last of the Roman poets. That title might fairly be claimed for Rutilius, unless it be reserved for Merobaudes. At any rate in passing from Rutilius to Sidonius no reader can fail to feel that he has left the region of Latin poetry for the region of Latin verse.

Of the many interesting details of the poem we can only mention a few. At the outset we have an almost dithyrambic address to the goddess Roma, whose glory has ever shone the brighter for disaster, and who will rise once more in her might and confound her barbarian foes. The poet shows as deep a consciousness as any modern historian that the grandest achievement of Rome was the spread of law. Next we get incidental but not unimportant references to the destruction of roads and property wrought by the Goths, to the state of the havens at the mouths of the Tiber, and the general decay of nearly all the old commercial ports on the coast. Most of these were as desolate then as now. Rutilius even exaggerates the desolation of the once important city of Cosa in Etruria, whose walls have scarcely changed from that day to ours. The port that served Pisæ, almost alone of all those visited by Rutilius, seems to have retained its prosperity, and to have foreshadowed the subsequent greatness of that city. At one point on the coast the villagers everywhere were "soothing their wearied hearts with holy merriment," and were celebrating the festival of Osiris.

All existing MSS. of Rutilius are later than 1494, and are copies from a lost copy of an ancient MS. once at the monastery of Bobio, which disappeared about 1700. The *editio princeps* is that by J. B. Pius (Bologna, 1520), and the principal editions since have been those by Barth (1623), P. Burman (1731, in his edition of the minor Latin poets), Wernsdorf (1778, part of a similar collection), Zumpt (1840), and the critical edition by Lucian Müller (Teubner, Leipsic, 1870). Müller writes the poet's name as Claudius Rutilius Namatianus, instead of the usual Rutilius Claudius Namatianus; but if the identification of the poet's father with the Claudius mentioned in the Theodosian Code be correct, Müller is probably wrong. Rutilius receives more or less attention from all writers on the history or literature of the times, but a lucid chapter in Beugnot, *Histoire de la Destruction du Paganisme en Occident* (1835), may be especially mentioned. It should be noted that in using the passage concerning Stilicho we have ventured to read the line at ii. 45 thus—*Iliacae cladis deteriore dolo;* the change from the MSS. reading *Illatae cladis liberoire dolo* (preserved in all editions) seems demanded by the context, as well as by the sense. (J. S. R.)

RUTLAND, the smallest county in England, is bounded N. and N.E. by Lincolnshire, S. E. by Northamptonshire, and W. by Leicestershire. Its shape is extremely irregular. The greatest length from northeast to southwest is about 20 miles, and the greatest breadth from east to west about 16 miles. The area is 94,889 acres, or about 148 square miles. The surface is pleasantly undulating, ridges of high ground running east and west, separated by rich and luxuriant valleys, generally about half a mile in breadth. The principal valley is that of Catmoss to the south of Oakham, having to the north of it a tract of table-land commanding an extensive prospect into Leicestershire.

See vol. xiv. Pl. VI.

The Welland, which is navigable to Stamford, flows northeast, forming the greater part of the boundary of the county with Northamptonshire. The Gwash or Wash, which rises in Leicestershire, flows eastwards through the centre of the county, and just beyond its borders, enters the Welland in Lincolnshire. The Chater, also rising in Leicestershire and flowing eastwards, enters the Welland about two miles from Stamford. The Eye flows southeastwards along the borders of Leicestershire. The county belongs almost entirely to the Jurassic formation, consisting of Liassic and Oolitic strata—the harder strata, chiefly limestone containing iron, forming the hills and escarpments, and the clay-beds the slopes of the valleys. The oldest rocks are those belonging to the Lower Lias in the northwest. The bottom of the vale of Catmoss is formed of marlstone rock belonging to the Middle Lias, and its sides are composed of long slopes of Upper Lias clay. The Upper Lias also covers a large area in the west of the county. The lowest series of the Oolitic formation is the Northampton sands bordering Northamptonshire. The Lincolnshire Oolitic limestone prevails in the east of the county north of Stamford. It is largely quarried for building purposes, the quarry at Ketton being famous beyond the boundaries of the county. The Great Oolite prevails towards the southeast. Formerly the iron was largely dug and smelted by means of the wood in the extensive forests, and the industry is again reviving.

Agriculture.—In the eastern and southeastern districts the soil is light and shallow. In the other districts it consists chiefly of a tenacious but fertile loam, and in the fertile vale of Catmoss the soil is either clay or loam, or a mixture of the two. The prevailing redness, which colors even the streams, is owing to the ferruginous limestone carried down from the slopes of the hills. The name of the county is by some authorites derived from this characteristic of the soil, but the explanation is doubtful. The eastern portions of the county are chiefly under tillage and the western in grass. Out of 94,889 acres no fewer than 86,477 acres in 1885 were under cultivation, corn crops occupying 22,820 acres, green crops 7520 acres, rotation grasses 6553 acres, and permanent pasture 47,816 acres. Over 3000 acres were under woodland. The principal corn crop is barley, which occupied 9484 acres, but wheat and oats are also largely grown. Turnips and swedes occupy about five-sixths of the area under green crops. The rearing of sheep and cattle occupies the chief attention of the farmer. Large quantities of cheese are manufactured and sold as Stilton. Cattle, principally shorthorns, numbered 19,810, of which 3054 were cows and heifers in milk and in calf. Sheep—Leicesters and South Downs—numbered 80,881, horses 3062, pigs 3054, and poultry 27,376. According to the parliamentary return of 1873 the number of proprietors was 1425, of whom 861 possessed less than one acre. The largest proprietors were the earl of Gainsborough 15,076, Lord Aveland 13,634, marquis of Exeter 10,713, and George H. Finch 9182.

Railways.—The main line of the Great Northern intersects the northeastern corner of the county, and branches of that system, of the London and Northwestern, and of the Midland connect it with all parts of the country.

Administration and Population.—Rutland comprises five hundreds and contains fifty-seven civil parishes, and part of the parish of Stoke-Dry, which extends into Leicestershire. Formerly represented by two members of parliament, since 1885 it returns one only. There is no municipal or parliamentary borough. The county has one court of quarter sessions, but is not subdivided for petty sessional purposes. Ecclesiastically it is entirely in the diocese of Peterborough. The population was 21,861 in 1861, 22,073 in 1871, and 21,434 in 1881. The average number of persons to an acre in 1881 was 0.23, and of acres to a person 4.43.

History and Antiquities.—In the time of the Romans the district now included in Rutlandshire was probably inhabited by the Coritani, and was included in Flavia Cæsariensis. Ermyn Street traversed it in the northeast, and there was an important station at Great Casterton. As a shire it is later than Domesday, when a portion of it was included in Northamptonshire but the greater part in Nottingham. It is referred to as com. Roteland in the fifth year of King John, in the document assigning a dowry to Queen Isabella, but for a long time previous to this the name Roteland was applied to Oakham and the country round it. Edward, eldest son of Edmund of Langley, fifth son of Edward III., was created earl of Rutland, but the title became extinct in the royal house when Edward earl of Rutland was stabbed to death at the battle of Wakefield. In 1525 the title was revived in the person of Lord Ros, and the tenth earl was created duke in 1703. At the battle of Stamford in 1470 Lancaster was defeated by Edward IV. The only old castle of which there are important remains is Oakham, dating from the time of Henry II., and remarkable for its Norman hall.

RUTLAND, a township and village of the United States, capital of Rutland county, Vermont, 117 miles north-northwest of Boston. It is an important railway junction, being the terminus of several minor lines and the seat of machine-shops and engine-houses; but its name is even better known through its quarries of white marble. The population of the township was 12,149 and that of the village 7502 in 1880.

Chartered by New Hampshire in 1761 and again chartered as Socialborough in 1772 by New York, Rutland became in 1775 a fortified post on the great northern military road, and in 1781 was made the chief town of Rutland county. Between 1784 and 1804 it was one of the capitals of the State.

RUYSBROECK, or RUYSBROEK, JOHN, mystic, was born at Ruysbroek, near Brussels, about 1293, and died as first prior of the convent of Groenendael, near Waterloo, in 1381. See MYSTICISM, vol. xvii. p. 141.

RUYSCH, FREDERIK (1638–1731), anatomist, was born at The Hague in 1638, and died at Amsterdam on February 22, 1731. See ANATOMY, vol. i. p. 712.

RUYSDAEL, or RUISDAAL, JACOB (*c.* 1625–1682), the most celebrated of the Dutch landscapists, was born at Haarlem about 1625. The accounts of his life are very conflicting, and recent criticism and research have discredited much that was previously received as facts regarding his career. He appears to have studied under his father Izaac Ruysdael, a landscape-painter, though other authorities make him the pupil of Berghem and of Albert van Everdingen. The earliest date that appears on his paintings and etchings is 1645. Three years later he was admitted a member of the guild of St. Luke in Haarlem; in 1659 he obtained the freedom of the city of Amsterdam, and we know that he was resident there in 1668, for in that year his name appears as a witness to the marriage of Hobbema. During his lifetime his works were little appreciated, and he seems to have suffered from poverty. In 1681 the sect of the Mennonites, with whom he was connected, petitioned the council of Haarlem for his admission into the almshouse of the town, and there the artist died on the 14th of March, 1682.

The works of Ruysdael may be studied in the Louvre and the National Gallery, London, and in the collections at The Hague, Amsterdam, Berlin, and Dresden. His favorite subjects are simple woodland scenes similar to those of Everdingen and Hobbema, or views of picturesque mills and cottages, or of ruined towers and temples, set upon broken ground, beside streams or waterfalls. He is especially noted as a painter of trees, and his rendering of foliage, particularly of oak leafage, is characterized by the greatest spirit and precision. His views of distant cities, such as that of Haarlem in the possession of the marquis of Bute, and that of Katwijk in the Glasgow Corporation Galleries, clearly indicate the influence of Rembrandt. He frequently paints coast-scenes, and sea-pieces with breaking waves and stormy skies filled with wind-driven clouds, but it is in his rendering of lonely forest glades that we find him at his best. The subjects of certain of his mountain scenes, with bold rocks, waterfalls, and firtrees, seem to be taken from Norway, and have led to the supposition that he had travelled in that country. We have, however, no record of such a journey, and the works in question are probably merely adaptations from the landscapes of Van Everdingen, whose manner he copied at one period. Only a single architectural subject from his brush is known—an admirable interior of the New Church, Amsterdam, in the possession of the marquis of Bute. The prevailing hue of his landscapes is a full rich green, which, however, has darkened with time, while a clear gray tone is characteristic of his sea-pieces.

The art of Ruysdael, while it shows little of the scientific knowledge of later landscapists, is sensitive and poetic in sentiment, and direct and skilful in technique. Figures are sparingly introduced into his compositions, and such as occur are believed to be from the pencils of Adrian Vandevelde, Philip Wouwerman, and Jan Lingelbach. In his love of landscape for itself, in his delight in the quiet and solitude of nature, the painter is thoroughly modern in feeling.

Ruysdael etched a few plates, which were reproduced by Amand Durand in 1878, with text by M. Georges Duplessis. The "Champ de Blé" and the "Voyageurs" are characterized by M. Duplessis as "estampes de haute valeur qui peuvent être regardées comme les spécimens les plus significatifs de l'art du paysagiste dans les Pays-Bas."

RUYSSELÈDE, or RUISSELÈDE, a market-town of Belgium, in the province of West Flanders, 15 miles southeast of Bruges. It is best known as the seat of a great reformatory for boys, founded by the Government in 1849. The population was 6663 in 1874, and 6670 in 1881.

RUYTER, MICHAEL ADRIAN DE (1607–1676), a distinguished Dutch naval officer, was born at Flushing, 24th March, 1607. He began his seafaring life at the age of eleven as a cabin boy, and in 1636 was entrusted by the merchants of Flushing with the command of a cruiser against the French pirates. In 1640 he entered the service of the States, and, being appointed rear-admiral of a fleet fitted out to assist Portugal against Spain, specially distinguished himself at Cape St. Vincent, 3d November, 1641. In the following year he left the service of the States, and, until the outbreak of war with England in 1652, held command of a merchant vessel. In 1653 a squadron of seventy vessels was despatched against the English, under the command of Admiral Tromp. Ruyter, who accompanied the admiral in this expedition, seconded him with great skill and bravery in the three battles which were fought with the English. He was afterwards stationed in the Mediterranean, where he captured several Turkish vessels. In 1659 he received a commission to join the king of Denmark in his war with the Swedes. As a reward of his services, the king of Denmark ennobled him and gave him a pension. In 1661 he grounded a vessel belonging to Tunis, released forty Christian slaves, made a treaty with the Tunisians, and reduced the Algerine corsairs to submission. From his achievements on the west coast of Africa he was recalled in 1665 to take command of a large fleet which had been organized against England, and in May of the following year, after a long contest off the North Foreland, he compelled the English to take refuge in the Thames. On June 7th, 1672, he fought a drawn battle with the combined fleets of England and France, in Southwold or Sole Bay, and after the fight he conveyed safely home a fleet of merchantmen. His valor was displayed to equal advantage in several engagements with the French and English the following year. In 1676 he was despatched to the assistance of Spain against France in the Mediterranean, and, receiving a mortal wound in the battle on the 21st April, off Messina, died on the 29th at Syracuse. A patent by the king of Spain, investing him with the dignity of duke, did not reach the fleet till after his death. His body was carried to Amsterdam, where a magnificent monument to his memory was erected by command of the states-general.

See *Life* of Ruyter by Brandt, Amsterdam, 1687, and by Klopp, 2d ed., Hanover, 1858.

RYAZAÑ, a government of Central Russia, is bounded by Moscow and Tula on the W., by Vladimir on the N., and by Tamboff on the E. and S., with an area of 16,255 square miles, and a population of 1,713,581 in 1882. Ryazañ is an intermediate link between the central Great Russian governments and the Steppe governments of the southeast,—the wide and deep valley of the Oka, by which it is traversed from west to east, with a broad curve to the south, being the natural boundary between the two. On the left of the Oka the surface often consists of sands, marshes, and forests; while on the right the fertile black-earth prairies begin, occupying especially the southern part of the government (the districts of Ranenburg, Sapojok, and Dankoff). The whole of Ryazañ is a plateau about 700 feet above the sea, but deeply cut by the river valleys and numerous ravines. The geological formations represented are the Devonian, the Carboniferous, the Jurassic, and the Quaternary. The Devonian appears in the deeper valleys in the south, and belongs to the well-known "Malevka-Muraevnya horizon," now considered as equivalent to the *Cypridina serrato-striata* Upper Devonian deposits of the Eifel. The Carboniferous deposits are widely spread, and appear at the surface in the bottoms of the ravines and valleys. They contain strata of excellent coal between plastic blue clays, which are worked at several places. Upper Carboniferous limestones, as also sandstones, the age of which has not yet been determined, but which seem to be Lower Jurassic, cover the Carboniferous clays. The Upper Jurassic deposits are widely spread, but they have been much destroyed and now appear as separate insular tracts. They belong to the Oxford and Callovian horizons, the former containing corals, which are very rare on the whole in the Russian Jurassic deposits. The Quaternary deposits are represented by the Glacial boulder clay and more recent alluvial deposits, which occupy wide areas in the valley of the Oka. Iron-ores, limestone, grindstone grits, potters' clays, and thick beds of peat are worked, besides coal. The northern parts of Ryazañ belong to the forest regions of Russia, and, notwithstanding the wholesale destruction of forests in that part of the country, these (chiefly Coniferous) still cover one-third of the surface in several districts. In the south, where the proximity of the Steppes is felt, they are much less extensive, the prevailing species being oak, birch, and other deciduous trees. They cover an aggregate area of more than two million acres.

The Oka is the chief river; it is navigable throughout, and receives the navigable Pronya, Pra, and Tsna, besides a great many smaller streams utilized for floating timber. Steamers ply on the Oka to Kasimoff and Nijni Novgorod. The Don and the Lyesnoi Voronezh belong to Ryazañ in their upper courses only. On the whole, the south districts are not well watered. Small lakes are numerous in the broad depression of the Oka and elsewhere, while extensive marshes cover the northeast districts; a few attempts at draining several of these on the banks of the Oka have resulted in the reclamation of excellent pasture lands. The climate is a little warmer than at Moscow, the average temperature at Ryazañ being 41°.

The territory of Ryazañ was occupied in the 9th century by Finnish stems (Mordvinians, Mers, Muroms, and Meshers), which for the most part have either given way before or disappeared amongst the Slavonian colonizers. The population is now Great Russian throughout, and contains only a trifling admixture of some 6000 Tartars, 1500 Poles, and 500 Jews in towns. Some Tartars immigrated into the Kasimoff region in the 15th century, and are noted for their honesty of character as well as for their agricultural prosperity. The people of the Pra river are described as Meshcheriaks, but their manners and customs do not differ from those of the Russians.

The chief occupation in Ryazañ is agriculture. Out of 10,100,000 acres only 838,000 are unfit for tillage. 5,482,000 acres are under crops, and the annual produce is estimated at about 4,248,000 quarters of corn and 972,000 quarters of potatoes. The area under cultivation and the crops themselves are increasing, as also is the export of corn. But even here, in one of the wealthiest governments of Russia, the situation of the peasants is far from satisfactory. Cattle-breeding is rapidly falling off on account of want of pasture lands, but hay, which is abundant, especially on the rich meadow lands of the Oka, is exported. In 1882 there were 283,500 horses, 262,200 cattle, and 839,600 sheep, the figures having been 446,000, 297,000, and 847,000 respectively in 1858. In the northern part of the government various industries are carried on, such as boatbuilding, the preparation of pitch and tar, the manufacture of wooden vessels, sledges, etc. Various other petty trades, such as weaving, lace-making, and boot-making, are combined with agriculture. Manufactures also have lately begun to make progress, and in 1882 their aggregate production reached 13,000,000 roubles [in paper = $6,318,000] (cotton and flax-spinning mills, glass-works and metal-ware works, and distilleries, the last-named producing to the value of 1,850,000 roubles [in paper $899,100]). Trade, especially in corn and other agricultural produce and in merchandise manufactured in the villages, is very active. The railway from Ryazañ to Moscow is one of the most important in Russia, from the amount of goods carried from the southeast Steppe governments. The Oka is another artery of traffic, the aggregate amount shipped to or sent from its ports within Ryazañ reaching 3,634,000 cwts. in 1880. The government is divided into twelve districts, the chief towns of which, with their populations in 1883, are subjoined: Ryazañ (30,325 inhabitants), Dankoff (2475), Egorievsk (6055), Kasimoff (15,260), Mikhailoff (2720), Pronsk (1740), Ranenburg (4500), Ryazhsk (4265), Sapojok (2670), Skopin (10,260), Spassk (4320), and Zaraisk (5870). Ranenburg, Skopin, and Zaraisk are important markets for corn and hemp. Several villages, such as Muraevnya, Dyedinovo (6600) and Lovtsy (loading places on the Oka), and Ukolovo (market for corn), have more commerce and industry than the district towns. Large villages are numerous, about sixty having each from 2500 to 7000 inhabitants.

The Slavonians began to colonize the region of Ryazañ as early as the 9th century, penetrating thither both from the northwest (Great Russians) and from the Dnieper (Little Russians). As early as the 10th century the principality of Murom and Ryazañ is mentioned in the chronicles. During the following centuries this principality increased both in extent and in wealth and included parts of what are now the governments of Kaluga and Moscow. Owing to the fertility of the soil, its Russian population rapidly increased, while the Finnish stems which formerly inhabited it migrated farther east, or became merged among the Slavonians. A dozen towns, all fortified and commercial, are mentioned as belonging to the principality towards the end of the 12th century. The Mongolian invasion stopped all this development. The horsemen of Batu burned and destroyed several towns in 1237, and killed many people, desolating the country. The principality, however, still continued to exist; its great princes strongly opposed the annexation plans of Moscow, making alliance with the Mongols and with Lithuania, but they succumbed, and the last of them, Ivan, having been imprisoned in Moscow, his principality was definitely annexed in 1517.

RYAZAÑ, capital of the above government, lies 119 miles to the southeast of Moscow, on the elevated right bank of the Trubej, a mile above its junction with the Oka. A wide prairie dotted with large villages, being the bottom of a former lake, spreads out from the base of the crag on which Ryazañ stands, and has the aspect of an immense lake when it is inundated in the spring. Except one or two streets, the town is badly built, chiefly of wood, and ill-paved. It has often suffered from fire, and has few remains of former days. The large church of Uspensk dates from 1770. Those of Arkhangelsk and Krestovozdvijensk have preserved, however, their old architecture, though obliterated to some extent by subsequent repairs, as also the archiepiscopal palace, formerly the "terem" of the great princes. The industries are undeveloped, and the trade has less importance than might be expected from the position of the town in so rich a region. It is, however, an important railway centre, no less than 15,000,000 cwts., chiefly of corn, being brought from the southeast and sent on to Moscow, while nearly 3,390,000 cwts. of various manufactured and grocery wares are conveyed in the opposite

direction. The loading place on the Oka also has some importance. The population, 30,325 in 1883, is increasing but slowly.

The capital of Ryazañ principality was Ryazañ—now Old Ryazañ, a village close to Spassk, also on the Oka. It is mentioned in annals as early as 1097, but continued to be the chief town of the principality only until the 14th century. In the 11th century one of the Kieff princes—probably Yaroslaff Svyatoslavitch in 1095—founded, on the banks of a small lake, a fort which received the name of Pereyaslaff-Ryazanskiy. In 1294 (or in 1335) the bishop of Murom, compelled to leave his own town and probably following the usual policy of that epoch—that of selecting a new town with no municipal traditions, as the nucleus of a new state,—settled in Pereyaslaff-Ryazanskiy, and thus gave new importance to this formerly insignificant settlement. The great princes of Ryazañ followed his example and by-and-by completely abandoned the old republican town of Ryazañ, transferring also its name to Pereyaslaff-Ryazanskiy. In 1300 a congress of Russian princes was held there, and in the following year the town was taken by the Moscow prince. It continued, however, to be the residence of the Ryazañ princes until 1517. In 1365 and 1377 it was plundered and burned by Tartars, but in the two following centuries (in 1460, 1513, 1521, and 1564) it was strong enough to repel them. Earthen walls with towers were erected after 1301; and in the 17th century a "kreml" still stood on the high crag above the Trubej. Ryazañ became chief town of the Ryazañ lieutenancy in 1778.

RYBINSK, or RUIBINSK, though but a district town of the government of Yaroslavl, with a permanent population (1883) of only 18,900, is, as being virtually the port of St. Petersburg on the Volga, one of the most important towns of the northern part of Central Russia. It lies 54 miles to the northwest of Yaroslavl, and is connected by rail (186 miles) with Bologoye, on the line between St. Petersburg and Moscow. It derives its importance from its situation on the Volga, opposite the mouth of the Sheksna,—one of those tributaries which, flowing from the northwest, have since the dawn of Russian history connected the Volga with the regions around Lake Ladoga. Russians settled there as early as the 12th century, or perhaps earlier; subsequently it seems to have become a mere fishing station under Moscow, with perhaps some shipbuilding. It became a considerable centre for traffic when the Vyshnevolotsk, Tikhvinsk, and Mariinsk canal systems, connecting St. Petersburg with the Volga, were opened. The cargoes of the larger boats from the lower Volga, consisting mainly of corn and flour, as also of salt, spirits, potash, and tallow, are here transferred to smaller boats capable of accomplishing the navigation to St. Petersburg, and *vice versa*. The amount of goods thus transhipped is estimated at 16,000,000 cwts., worth 32,800,000 roubles [in paper = $15,940,800]. Since the opening of the line to Bologoye, a large proportion of this merchandise is sent to St. Petersburg by rail (9,293,000 cwts. in 1880). The total number of boats visiting Rybinsk annually is estimated at 5000 to 7000, their aggregate cargoes amounting to nearly 20,000,000 cwts. (about 40,000,000 roubles [in paper = $19,440,000]). Upwards of 100,000 laborers (male and female) assemble at Rybinsk during the navigation, and the number of vessels is so great as to cover the Volga and the Sheksna like a bridge. Besides the business of transhipment, Rybinsk has an active trade in corn, hemp, etc., from the neighboring districts. The town is but poorly built, and its sanitary condition leaves very much to be desired, especially in summer.

RYCAUT, or RICAUT, SIR PAUL (d. 1700), traveller and diplomatist, was the tenth son of Sir Peter Ricaut, a Royalist who on account of his support of King Charles had to pay a composition of £1500 [$7290]. The son was admitted a scholar of Trinity College, Cambridge, in 1647, and took his B.A. degree in 1650. After travelling in Europe and in various parts of Asia and Africa, he, in 1661, accompanied as secretary the earl of Winchelsea, ambassador extraordinary to Turkey. During a residence there of eight years he wrote *The Present State of the Ottoman Empire, in three books; containing the Maxims of the Turkish Politie, their Religion and Military Discipline* (1670; 4th ed., 1686; Fr. transl. by Briot, 1670; and another with notes by Bespier, 1677). In 1663 he published at Constantinople *The Capitulation, Articles of Peace, etc., concluded between the King of England and the Sultan of the Ottoman Empire.* Subsequently he was for eleven years consul at Smyrna, and at the command of Charles II. wrote *The Present State of the Greek and Armenian Churches, Anno Christi* 1678, which on his return to England he presented to the king and published in 1679. In 1685 Lord Clarendon, lord lieutenant of Ireland, made him principal secretary for the provinces of Leinster and Connaught. He at the same time received from James II. the honor of knighthood, was made a member of the privy council of Ireland, and named judge of the high court of admiralty, which office he retained till 1688. From 1690 to 1700 he was employed by King William as English resident at the Hanse towns, and shortly after his return to England, worn out with age and infirmities, he died on the 16th December, 1700.

Rycaut was a fellow of the Royal Society, and wrote an article on Sable Mice which was published in their *Transactions*. In addition to the works already mentioned he was the author of *A Continuation of Knolles' History of the Turks from* 1623 *to* 1677 (1680), and *from* 1679 *to* 1699 (1700); *A Translation of Platina's Lives of the Popes, with a Continuation from* 1471 *to the Present Time* (1685); *The Critick, from the Spanish of Gracian* (1686); and the *Royal Commentaries of Peru, from the Spanish of Garcilasso* (1688).

RYDE, a municipal borough and watering place of the Isle of Wight, is finely situated on a sloping eminence above the Solent, 5 miles south by west of Portsmouth, and 7 (12 by rail) from West Cowes. It occupies the site of a village called La Rye or La Riche, which was destroyed by the French in the reign of Edward II. About the close of the 18th century it was a small fishing hamlet, but when the beauty of its site attracted attention it rapidly grew into favor as a watering place. The streets are wide, regular, and well paved, and there are a large number of fine villas on the slopes of the hill. It is connected by rail with the principal other towns in the island, and there is also steamboat communication with Portsmouth, Southampton, Southsea, Portsea, and Stoke's Bay. The pier built originally in 1812, but since then greatly extended, forms a delightful promenade half a mile in length. The principal buildings are All Saint's church, erected in 1870 from the designs of Sir Gilbert Scott, and other churches, the market-house and town hall, the Royal Victoria Yacht club-house, the theatre, and the Royal Isle of Wight Infirmary. The town was incorporated in 1868, and is governed by a mayor, six aldermen, and eighteen councillors. The population of the municipal borough (area 792 acres) in 1871 was 11,260 and in 1881 it was 11,461.

RYE. As in the case of other cereals, it is doubtful if rye (*Secale cereale*) exists at the present time in a truly wild state. The best evidence on this point goes to show that the plant is a native of the regions between the Black and Caspian Seas. It is also recorded from Afghanistan and Turkestan; but botanists are very chary about admitting the validity of the evidence hitherto adduced. Aitchison, the latest investigator of the flora of Afghanistan, mentions it as growing in wheat-fields, where it is considered as a weed, not being intentionally sown. In some fields "it almost eradicates the wheat crop." But this merely shows that the conditions are more favorable to the growth of rye than to that of wheat. In spite of the uncertainty as to the precise origin of the cultivated plant, its cultivation does not appear to have been practiced at a very early date, relatively speaking. Alphonse de Candolle, who has collected the evidence on this point, draws attention to the fact that no traces of this cereal

have hitherto been found in Egyptian monuments or in the earlier Swiss dwellings, though seeds have been found in association with weapons of the Bronze period at Olmütz. The absence of any special name for it in the Semitic, Chinese, and Sanskrit languages is also adduced as an indication of its comparatively recent culture. On the other hand, the general occurrence of the name in the more modern languages of northern Europe, under various modifications, point to the cultivation of the plant then, as now, in those regions. The origin of the Latin name *secale*, which exists in a modified form among the Basques and Bretons is not explained. The circumstances that the cultivation of rye is relatively not of great antiquity and that it is confined to a relatively restricted area must be taken into account, in connection with the fact that the variations of this cereal are much fewer than are noted in the case of other plants of like character.

The fact stated by Müller that the anthers and stigmas of the flowers come to maturity at the same time would tend to "close fertilization" and a consequent constancy of "characters" in the offspring, and as a matter of fact, the varieties of this grass are not numerous. Rye is a tall-growing annual grass, with fibrous roots, flat, narrow, ribbon-like bluish-green leaves, and erect or decurved cylindrical slender spikes like those of barley. The spikelets contain two or three flowers, of which the uppermost is usually imperfect. The outer glumes are acute glabrous, the flowering glumes lance-shaped, with a comb-like keel at the back, and the outer or lower one prolonged at the apex into a very long bristly awn. Within these are three stamens surrounding a compressed ovary, with two feathery stigmas. When ripe, the grain is of an elongated oval form with a few hairs at the summit.

In the southern parts of Great Britain rye is chiefly or solely cultivated as a forage-plant for cattle and horses, being usually sown in autumn for spring use. after the crop of roots, turnips, etc., is exhausted, and before the clover and lucerne are ready. For forage purposes it is best to cut early, before the leaves and haulms have been exhausted of their supplies to benefit the grain. In the northern parts of Europe, and more especially in Scandinavia, Russia, and parts of northern Germany, rye is the principal cereal; and in nutritive value, as measured by the amount of gluten it contains, it stands next to wheat, a fact which furnishes the explanation of its culture in northern latitudes ill-suited for the growth of wheat. Rye bread or black-bread is in general use in northern Europe, but finds little favor with those unaccustomed to its use, owing to its sour taste, the sugar it contains rapidly passing into the acetous fermentation.

When the ovaries of the plant become affected with a peculiar fungus (*Cordyceps*), they become blackened and distorted, constituting ERGOT (*q.v.*).

RYE, a municipal town and seaport at the eastern extremity of the county of Sussex, 63 miles south-southeast of London, is built upon a rocky eminence which two or three centuries ago was washed on all sides by the influx of the tide, but now, in consequence of the gradual recession of the sea, lies two miles inland. It is surrounded by rich marsh land through which flows the river Rother, uniting at the southeast foot of the rock with two rivulets to form a small serpentine estuary, Rye harbor, the mouth of which is connected with the town by means of a branch line of railway. In bygone years, when the adjacent marshes were flooded with tidal water, the efflux was so powerful as to effectually maintain safe and free entrance into Rye harbor; and in the reign of Charles II. a frigate of 50 guns could enter and ride at anchor. Now the harbor suffers seriously from the shifting sand and shingle, and considerable sums of money have been expended by the harbor commissioners with the view of overcoming these impediments, with but partial success. The trade is chiefly in coal, timber, and bark, and shipbuilding is carried on as well as fishing. There is a large market every alternate Wednesday, and considerable business in cattle, sheep, corn, wool, and hops is transacted. Rye is a quaint, compactly built town perched upon the rock to which for centuries it was restricted, but in the course of the last half century it has gradually extended itself over the northern slopes beyond the town wall. It is excellently drained, abundantly supplied with clear spring water, and very healthy. The church, said to be the largest parish church in England, is of very mixed architecture, chiefly Transitional, Norman, and Early English; the nave and high chancel were judiciously restored in 1882, according to designs by the late Mr. G. E. Street. Of the old fortifications there still remain portions of the town wall, much hidden by newer buildings, a strong quadrangular tower built by William of Ypres, earl of Kent, and lord warden in the time of Stephen, and now forming part of the police station, and a handsome gate with a round tower on each side, known as the Sandgate, at the entrance into Rye from the London road. Rye ceased in 1885 to be a parliamentary borough, but gives its name to the eastern division of the county. The population in 1881 was 4224.

Of the early history of Rye little is known. In the mediæval French chronicles it is always mentioned as "La Rie." Having been conferred upon the abbey of Fécamp by Edward the Confessor, it was taken back by King Henry III. into his own hands, "for the better defence of his realm," and received from that sovereign the full rights and privileges of a Cinque Port under the title of "Ancient Town." In consequence of the frequent incursions of the French, by whom it was sacked and burnt three times in the 14th century, it was fortified by order of Edward III. on the landward side, the steep precipitous sides of the rock affording ample protection towards the sea. In addition to the naval services rendered by Rye as a Cinque Port under the Plantagenet and Tudor sovereigns, it was a principal port of communication with France in times of peace,—for which reason successive bands of Huguenots fled thither between 1562 and 1685, many of whom settled at Rye and have left representatives now living.

RYEZHITZA, a town of European Russia at the head of a district in the Vitebsk government, in 56° 30′ N. lat and 27° 21′ E. long., 198 miles northwest from Vitebsk on the railway between St. Petersburg and Warsaw, near the Ryezhitza, which falls into Lake Luban. Its population increased from 7306 (2902 Jews) in 1867 to about 9000 in 1881; but its importance is mainly historical. The cathedral is a modern building (1846).

Ryezhitza, or, as it is called in the Livonian chronicles, Roziten, was founded in 1285 by Wilhelm Von Harburg to keep in subjection the Lithuanians and Letts. The castle was continually the object of hostile attacks. In 1559 the Livonian order, exhausted by the war with Russia, gave it in pawn to Poland, and though it was captured by the Russians in 1567 and 1577, and had its fortifications dismantled by the Swedes during the war of 1656–1660, it continued Polish till 1772, when White Russia was united with the Russian Empire. In early times Ryezhitza was a large and beautiful town.

RYLAND, WILLIAM WYNNE (1738–1783), engraver, was born in London in July, 1738, the son of an engraver and copper-plate printer. He studied under Ravenet, and in Paris under Boucher and J. P. le Bas. After spending five years on the Continent he returned to England, and having engraved portraits of George III. and Lord Bute after Ramsay (a commission declined by Strange), and a portrait of Queen Charlotte and the Princess Royal after Francis Cotes, R.A., he was appointed engraver to the king. In 1766 he became a member of the Incorporated Society of Artists, and he exhibited with them and in the Royal Academy. In his later life Ryland abandoned line engraving, and introduced "chalk engraving," in which the line is composed of stippled dots, a method by means of which he attained great excellence, and in which he transcribed Mortimer's King John Signing Magna Charta, and copied the drawings of the old masters and the works of Angelica Kauffman. He

traded largely in prints, but in consequence of he extravagant habits his affairs became involved; he was convicted of forging bills upon the East India Company, and, after attempting to commit suicide, was executed at Tyburn on the 29th of August, 1783. A short memoir of Ryland was published the year after his death.

RYMER, THOMAS (1641–1713), historiographer royal, was the younger son of Ralph Rymer, lord of the manor of Brafferton in Yorkshire, described by Clarendon as "possessed of a good estate" and executed for his share in the "Presbyterian rising" of 1663. Thomas was probably born at Yafforth Hall early in 1641, and was educated at a private school kept by Thomas Smelt, a noted Royalist with whom Rymer was "a great favorite," and "well known for his great critical skill in human learning, especially in poetry and history."[1]

He was admitted as *pensionarius minor* at Sidney Sussex College, Cambridge, on April 29, 1658, but left the university without taking a degree. On May 2, 1666, he became a member of Gray's Inn, and was called to the bar on June 16, 1673. His first appearance in print was as translator of *Cicero's Prince* (1668), from the Latin treatise (1608) drawn up for Prince Henry. He also translated Rapin's *Reflections on Aristotle's Treatise of Poesie* (1674), and followed the principles there set forth in a tragedy in verse, licensed September 13, 1677, called *Edgar, or the English Monarch*, which was not, however very successful. The printed editions of 1678, 1691, and 1693 belong to the same issue, with new title-pages. Rymer's views on the drama were again given to the world in the shape of a printed letter to Fleetwood Shepherd, the friend of Prior, under the title of *The Tragedies of the Last Age Considered* (1678). To *Ovid's Epistles Translated by Several Hands* (1680), with preface by Dryden, "Penelope to Ulysses" was contributed by Rymer, who was also one of the "hands" who Englished the Plutarch of 1683–86. The life of Nicias fell to his share. He furnished a preface to Whitelocke's *Memorials of English Affairs* (1682), and wrote in 1681 *A General Draught and Prospect of the Government of Europe*, reprinted in 1689 and 1714 as *Of the Antiquity, Power, and Decay of Parliaments*, where, ignorant of his future dignity, the critic had the misfortune to observe, "You are not to expect truth from an historiographer royal." He contributed three pieces to the collection of *Poems to the Memory of Edmund Waller* (1688), afterwards reprinted in Dryden's *Miscellany Poems*, and is said to have written the Latin inscription on Waller's monument in Beaconsfield churchyard. He produced a congratulatory poem upon the arrival of Queen Mary in 1689. His next piece of authorship was to translate the sixth elegy of the third book of Ovid's *Tristia* for Dryden's *Miscellany Poems* (1692, p. 148). On the death of Thomas Shadwell in 1692 Rymer received the appointment of historiographer royal, at a yearly salary of £200 [$972]. Immediately afterwards appeared his *Short View of Tragedy* (1693), criticising Shakespeare and Ben Jonson, which produced *The Impartial Critick* (1693) of Dennis, the epigram of Dryden,[2] and the judgment of Macaulay, that Rymer was "the worst critic, that ever lived." Within eight months of his official appointment Rymer was directed (August 26, 1693) to carry out that great national undertaking with which his name will always be honorably connected, and of which there is reason to believe that Lords Somers and Halifax were the original promoters. The *Codex Juris Gentium Diplomaticus* of Leibnitz was taken by the editor as the model of the *Fœdera*. The plan was to publish all records of alliances and other transactions in which England was concerned with foreign powers from 1101 to the time of publication, limiting the collection to original documents in the royal archives and the great national libraries. Unfortunately, this was not uniformly carried out, and the work contains some extracts from printed chronicles. From 1694 he corresponded with Leibnitz, by whom he was greatly influenced with respect to the plan and formation of the *Fœdera*. While collecting materials, Rymer unwisely engraved a spurious charter of King Malcolm, acknowledging that Scotland was held in homage from Edward the Confessor. When this came to be known, the Scottish antiquaries were extremely indignant. G. Redpath published a MS. on the independence of the Scottish crown, by Sir T. Craig, entitled *Scotland's Sovereignty Asserted* (1695), and the subject was referred to by Bishop Nicholson in his *Scottish Historical Library* (1702). This led Rymer to address three *Letters to the Bishop of Carlisle* (1702), explaining his action, and discussing other antiquarian matters. The first and second letters are usually found together; the third is extremely rare. Rymer, had now been for some years working with great industry, but was constantly obliged to petition the crown for money to carry on the undertaking. Up to August 1698 he had expended £1253 [$6089.58], and had only received £500 [$2430] on account.

At last, on November 20, 1704, was issued the first folio volume of the *Fœdera, Conventiones, Litteræ, et cujuscunque generis Acta Publica inter reges Angliæ et alios quosvis imperatores, reges, etc., ab* A.D. 1101 *ad nostra usque tempora habita aut tractata.* The publication proceeded with great rapidity, and fifteen volumes were brought out by Rymer in nine years. Two hundred and fifty copies were printed; but, as nearly all of them were presented to persons of distinction, the work soon became so scarce that it was priced by booksellers at one hundred guineas. A hundred and twenty sheets of the fifteenth volume and the copy for the remainder were burnt at a fire at William Bowyer's, the printer, on January 30, 1712–13. Rymer died shortly after the appearance of this volume, but he had prepared materials for carrying the work down to the end of the reign of James I. These were placed in the hands of Robert Sanderson, his assistant. For the greater part of his life Rymer derived his chief subsistence from a mortgage assigned to him by his father. His miscellaneous literary work could not have been very profitable. At one time he was reduced to offer his MSS. for a new edition for sale to the earl of Oxford. About 1703 his affairs became more settled, and he afterwards regularly received his salary as historiographer, besides an additional £200 [$972] a year as editor of the *Fœdera*. Twenty-five copies of each volume were also allotted to him. He died at Arundel Street, Strand, December 14, 1713, and was buried in the church of St. Clement Danes. His will was dated July 10, 1713. Tonson issued an edition of Rochester's *Works* (1714), with a short preface by the late historiographer. Another posthumous publication was in a miscellaneous collection called *Curious Amusements*, by M. B. (1714), which included "some translations from Greek, Latin, and Italian poets, by T. Rymer." Some of his poetical pieces were also inserted in J. Nichols's *Select Collection* (1780–86, 8 vols.).

Two more volumes of the *Fœdera* were issued by Sanderson in 1715 and 1717, and the last three volumes (xviii., xix., and xx.) by the same editor, but upon a slightly different plan, in 1726–35. The latter volumes were published by Tonson, all the former by Churchill. Under Rymer it was carried down to 1586, and continued by Sanderson to 1654. The rarity and importance of the work induced Tonson to obtain a license for a second edition, and George Holmes, deputy keeper of the Tower records, was appointed editor. The new edition appeared between 1727 and 1735. The last three volumes are the same in both issues. There

[1] See Hickes, *Memoirs of John Kettlewell*, 1718, pp. 10–14.

[2] "The corruption of a poet is the generation of a critic" (*Ded. of the Third Miscellany* in *Works*, 1821, xii. p. 49), which is much more pointed than Beaconsfield's reference to critics as "men who have failed in literature and art" (*Lothair*, chap. xxxv., or Balzac's sly hit at Mérimée in similar terms. The poet's remarks on the *Tragedies of the Last Age* have been reprinted in his *Works*, 1821, xv. pp. 383–96, and in Johnson's *Life of Dryden*. See also Dryden's *Works*, i. 377, vi. 351, xi. 60, xiii. 20.

are some corrections, enumerated in a volume, *The Emendations in the new edition of Mr. Rymer's Fœdera*, printed by Tonson in 1730, but in other respects the second is inferior to the first edition. A third edition, embodying Holmes's collation, was commenced at The Hague in 1737 and finished in 1745. It is in smaller type than the others, and is compressed within ten folio volumes. The arrangement is rather more convenient; there is some additional matter; the index is better; and on the whole it is to be preferred to either of the previous editions. When the volumes of the *Fœdera* first appeared they were analyzed by Leclerc and Rapin in the *Bibliothèque Choisie* and *Bibliothèque Ancienne et Moderne*. Rapin's articles were collected together, and appended, under the title of *Abregé historique des actes publiques de l' Angleterre*, to the Hague edition. A translation, called *Acta Regia*, was published by Stephen Whatley, 1726–7, 4 vols. 8vo. reprinted both in 8vo. and folio, the latter edition containing an analysis of the cancelled sheets, relating to the journals of the first Parliament of Charles I., of the 18th volume of the *Fœdera*.

In 1808 the Record Commissioners appointed Dr. Adam Clarke to prepare a new and improved edition of the *Fœdera*. Six parts, large folio, edited by Clarke, Caley, and Holbrooke, were published between 1816 and 1830. Considerable additions were made, but the editing was performed in so unsatisfactory a manner that the publication was suspended in the middle of printing a seventh part. The latter portion, bringing the work down to 1383, was ultimately issued in 1869.

The wide learning and untiring labors of Rymer have received the warmest praise from historians. Sir T. D. Hardy[1] styles the *Fœdera* "a work of which this nation has every reason to be proud, for with all its blemishes—and what work is faultless?—it has no rival in its class" (*Syllabus*, vol. ii., xxxvi.), and Mr. J. B. Mullinger calls it "a collection of the highest value and authority" (Gardiner and Mullinger's *Introduction to English History*, p. 224).

The best account of Rymer is to be found in the prefaces to Sir T. D. Hardy's *Syllabus*, 1869–86, 3 vols. 8vo. There is an unpublished life by Des Maizeaux (Brit. Mus. Add. MS. No. 4223), and a few memoranda in Bishop Kennet's collections (Lansd. MS. No. 987). In Caulfield's *Portraits*, etc., 1819, i. 50, may be seen an engraving of Rymer, with a description of a satirical print. Rymer's two critical works on the drama are discussed by Sir T. N. Talfourd in the *Retrospective Review*, 1820, vol. i. p. 1–15.

Sir T. D. Hardy's *Syllabus* gives in English a condensed notice of each instrument in the several editions of the *Fœdera*, arranged in chronological order. The third volume contains a complete index of names and places, with a catalogue of the volumes of transcripts collected for the Record edition of the *Fœdera*. In 1869 the Record Office printed, for private distribution, Appendices A to E "to a report on the *Fœdera* intended to have been submitted by C. Purton Cooper to the Late Commissioners of Public Records," 3 vols. 8vo. (including accounts of MSS. in foreign archives relating to Great Britain, with facsimiles). In the British Museum is preserved (Add. MS. 24,699) a folio volume of reports and papers relating to the Record edition. Rymer left extensive materials for a new edition of the *Fœdera*, bound in 59 vols. folio, and embracing the period from 1115 to 1698. This was the collection offered to the earl of Oxford. It was purchased by the Treasury for £215 [$1044.90] and is now in the British Museum (Add. MSS. Nos. 4573 to 4630, and 18,911). A catalogue and index may be consulted in the 17th volume of Tonson's edition of the *Fœdera*. The Public Record Office possesses a MS. volume, compiled by Robert Lemon about 1800, containing instruments in the Patent Rolls omitted by Rymer. In the same place may be seen a volume of reports, orders, etc., on the *Fœdera*, 1808–11.

(H. R. T.)

RZHEFF, Rsheff, Rjev, or Rzhoff, a town of European Russia at the head of a district in the Tver government, in 56° 16′ N. lat. and 34° 21′ E, long., 89 miles southwest of Tver, occupies the bluffs on both banks of the Volga (here 350 feet wide) near the confluence of the river Bazuza. It is the terminus of a branch line from the St. Petersburg and Moscow Railway, has a population of 18,569 (1880; 19,660 in 1886), carries on a variety of manufactures—hemp-spinning, malting, brewing, shipbuilding, etc.—and is the centre of a great transit trade between the provinces of the lower Volga, Orel, Kaluga, and Smolensk, and the ports of St. Petersburg and Riga.

Rzheff was already in existence in the 12th century, when it belonged to the principality of Smolensk and stood on the highway between Novgorod and Kieff. Under the rulers of Novgorod it become from 1225 a subordinate principality, and in the 15th century the two portions of the town were held by two independent princes, whose names are still preserved in the designations Knyaz Fedorovskii and Knyaz Dimitrievskii, given respectively to the left and the right bank of the Volga. In 1368 Rzheff was captured by Vladimir Andreevitch, and in 1375 it stood a three weeks' siege and had its suburb burned by the same prince. It was made a district town in 1775.

S.

S represents the hard open (or fricative) sound produced by bringing the blade of the tongue close to the front palate, immediately behind the gums, or rather, this is the normal position for S, as slight varieties can be produced by bringing the tongue farther back. By the "blade" is meant the pointed end of the tongue, not the mere point, which at the same part of the palate produces R. This position differs little from that for TH, into which S passes in a lisping pronunciation; a larger part of the surface of the tongue is brought near to the palate for TH than for S. The symbol which represents the soft open sound corresponding to S is Z, though in practice S often stands for both.

The history of our symbol S is easy up to a certain point. It is the rounded form of , rounded at a very early period for convenience of writing, for the change is apparent in the old Italian alphabet of Cære, and still more on the recently discovered vase of Formello; and even in the scribbling of the Greeks at Abu Simbel—the oldest, or nearly the oldest, bit of Greek epigraphy—perfectly rounded forms stand side by side with the angular ones. The common Greek form Σ was obtained by adding a fourth stroke, and gradually making the top and bottom ones horizontal. When, however, we wish to identify the Greek symbol of three strokes with its Phœnician counterpart, the difficulty begins. The Phœnicians had four symbols for sibilants, known in Hebrew as Zayin, Samekh, Ṣade, and Shin; the last of these at a very early date represented two sounds, the English *sh*, and another sound which resembled that of Samekh and ultimately became indistinguishable from it, both being pronounced as the English *s*. The Greeks did not want all these symbols, consequently in different parts of Greece one or other—not the same—Phœnician symbol fell into disuse. One of these, or , called San, though lost in Ionic, appears in old Doric inscriptions, as those of Thera, Melos, and Crete, Argos, Corinth, and Corcyra; but the latter Doric form is the usual Sigma; probably San was too like the nasal M. There is no doubt that in form Zeta represents Zayin, and that Xi represents Samekh. Moreover, Zeta and Zayin stand seventh in the Greek and Phœnician alphabets respectively, and Xi and Samekh each fifteenth. Again, the form of San with three strokes corresponds fairly with Ṣade, and Sigma is moderately like Shin; but here the evidence of position comes in again to strengthen a somewhat weak case, for in the old Italian alphabets San has the place of Ṣade, the simpler form occurring in the Cære alphabet, the fuller in that of the Formello vase; in both Sigma (rounded in form) has the place of Shin. These identifications would be certain if the names corresponded as well as the forms; but they clearly do not: Zeta and Ṣade (not Zayin) seem to hold together in sound, and Sigma (as has often been suggested) looks like a "popular etymology" for Samekh. But the objection from difference of names is not fatal. All names which are thought of habitually in rows or sets tend to be modified under the influence of analogy; and analogy has certainly been at work here, for Xi,

[1] [He (1804–1878) was born in Jamaica, became Keeper of Public Records in London, and was a bibliological archæologist.—Am. Ed.]

which is a purely Greek name, is, like Psi, and like Chi and Phi, due to the older Pi. Similarly Eta and Theta have probably made Zeta; but it must be allowed that the metamorphosis of Ṣade is more intelligible (as a matter of sound-change) than that of Zayin. Probably we must have recourse to a different principle to explain at least some part of our difficulty. We may suppose that in some part of Greece the sounds denoted originally by Ṣade and Zayin became indistinguishable; there would then exist for a time one sound but two names. It would be a matter of little moment which name should survive; thus Ṣade (or Zeta) might supersede Zayin, or one name might survive in one district—as San in the Doric, but Sigma in the rest of Greece. This suggestion is made by Dr. Taylor (*The Alphabet*, ii. 100). The history of the sounds, as well as of the forms, of the Greek sibilants is difficult. Probably Sigma was generally hard—our *s* in *sign*. But Zeta did not originally denote the corresponding *z*: rather it was *dz*; some say *dj*, as in "John," but this is not likely. Xi was probably a strong sibilant with a weak guttural, as X was in Latin. If the sound *z* existed in Greek, as is probable, it was denoted by Sigma. In Italy, also, we must infer that the soft sibilant was heard too little to need a special symbol, because *z*, which exists in the old alphabets of Cære and Formello, was lost early enough to leave a place for the newly-made Italian symbol G. When Z was restored, it was placed at the end of the alphabet and doubtless with the value of Greek Z in the Greek words in which alone it was used. One Latin *s*—probably *z*—became the trilled *r* between two vowels,—*e.g.*, in "Papirius" for "Papisius," "arboris" for "arbosis."

In English the symbol *s* alone existed till *z* was introduced from France with words of French origin, as "zeal," "zone." An attempt was made to employ it at the end of plural nouns, where the sound is regularly heard except when the last sound of the noun is hard, *e.g.*, "bedz" (beds), but "hops"; but this was not maintained, nor even consistently done, for the symbol was used even when the sound must have been *s*. We regularly write *s* for both sounds,—*e.g.*, in "lose" and "loose," "curs" and "curse," "hers" and "hearse." When there is a distinction in spelling the *s* commonly has the value of *z*,—*e.g.*, "vies" and "vice," "pays" and "pace," "his" and "hiss." S has the sound of *sh* in "sure," "sugar," and some other words; this is due to the palatal sound heard before the *u*. *Sh*, in spite of its spelling, is a single sound, the position of which differs from that for *s* only in a slight retraction of the point of the tongue; it is commonly found in English words which originally had *sk*,—*e.g.*, "shall," O.E. *sceal*; "shabby," a doublet of "scabby"; "fish," O.E. *fisk*. The sound is the same as that of French *ch* in "château," "chef," "sécher," where it is due to assibilation of original *k*.

SAADI. See Sa'dí.

SAADIA, or Saadias (Heb. *Se'adyah*, Arab. *Sa'îd*[1]), was the most accomplished, learned, and noble gaon (head of the academy) of Sūrā (see Rab). Mar Rab Se'adyah b. Yoseph[2] was born in the Fayyûm, Upper Egypt, in 892 and died at Sūrā in 942. Of his teachers only the Jew Abú Kethír is positively known by name,[3] but he must have had at least three more teachers of considerable learning, one a Karaite,[4] one a Mohammedan, and one a Christian, as his acquaintance with the literature of these four religious bodies testifies. His preëminence over his contemporaries is indicated in the fact that he was the only gaon who had not been educated and then advanced by degrees in the academy, to the highest dignity of which he was called from a far-off country, but best appears in the excellence of his many works, which extend over most branches of learning known in his time. And his learning was exceeded by his manifold virtues. His love of truth and justice was made more conspicuous by the darkness of the corruption amid which he lived. When the rēsh gāluthā ("prince of the captivity," the highest dignitary of the Jews in Babylonia, and to some extent of those of the whole world) attempted to wrest judgment in a certain case, and first asked, then requested, and finally demanded the signature[5] of the gaon of Sūrā in a threatening manner, Se'adyah refused it, fearless of consequences. David b. Zakkai, the rēsh gāluthā, deposed him and chose another gaon in his stead. A reconciliation took place some years afterwards, and Se'adyah was reinstated in his old dignity. And, although his health had been fatally undermined by the behavior of the rēsh gāluthā and his son, Se'adyah, when his former opponent died, was indefatigable in his endeavors to have this very son of his once mortal enemy placed on the throne of his fathers. But the new prince of the captivity enjoyed his dignity for little more than half a year. He left behind him a boy, twelve years of age, whom Se'adyah took into his own house and treated in every respect as his own child. This learning and these virtues endeared Se'adyah not merely to his contemporaries but also to the best men of succeeding ages. Behayye b. Yoseph (the author of the *Ḥoboth Hallebaboth*), Rashi, Se'adyah (the author of the commentary on Daniel in the Rabbinic Bible), David Kimḥi, Behayye b. Asher (the author of *Kad Haḳḳemah*), all appeal to him as an authority not to be questioned. Even Ibn 'Ezra defers more to him than to any other authority. To this day Jewish and Christian scholars alike express for him the highest admiration.

The numerous works which are ascribed to him may be conveniently divided into four classes.

I. *Genuine and still extant Works.*—(1) Arabic translations of, and in part commentaries[6] on, books of the Bible: (*a*) the Pentateuch (printed in Hebrew characters, Constantinople, 1546, fol., and in Arabic characters in the Paris and London polyglotts); (*b*) Isaiah (printed in Arabic characters from Hebrew letters of the Bodleian MS. Uri 156,[7] by Paulus, Jena, 1790–91, 8vo); (*c*) Psalms (Ewald, *Ueber die arabisch geschriebenen Werke jüdischer Sprachgelehrten*, Stuttgart, 1844, 8vo); (*d*) Proverbs (Bodleian MS. Uri 15); (*e*) Job (Uri 45); (*f*) Canticles (Merx, *Die Saadjanische Uebersetzung des Hohen Liedes ins Arabische*, Heidelberg, 1882, 8vo). (2) Hebrew Lexicography: Seventy (90 or 91) ἅπαξ λεγόμενα to be found in the Bible, published from the Bodl. MS. Hunt. 573, by Dukes (*Z. K. M.*, v. 6) and by Benjacob (*Debarim Attikim*, i., Leipsic, 1844). (3) Talmudic Literature: (*a*) Decisions (incorporated in *'Ittur*, Venice, 1608, fol.; and in the book of *Responsa, Sha'are Ṣedeḳ*, Salonica, 1792, 4to); (*b*) On the laws of inheritance (Bodl. MS. Hunt. 630). (4) Liturgy, both in prose and poetry: (*a*) *Siddur* (Bodleian MS. Uri 261);[8]

[1] He signs himself סעיד acrostically in his *Azharoth* (*Ḳobeṣ*, pp. 52, 53; see note 8 below.

[2] Mas'údí, a contemporary, calls the father Ya'aḳob; but see Fürst, *Literaturblatt d. Orients*, vi. col. 140.

[3] Mas'údí (De Sacy, *Chrest. Ar.*, 2d ed., i. 350, 351).

[4] The late learned and ingenious Rabbi S. L. Rapoport rolled here, as in many other places, the stone of Sisyphus ("Toledoth Rabbenu Se'adyah Gaon," in *Bikkure Ha'ittim*, Vienna, 1828, note 31). Perhaps, after all, the Karaites may be right in asserting that Salmon b. Yeruḥam was Rab Se'adyah's teacher.

[5] To make the legal decisions of the rēsh gāluthā more respected, the signatures of the geonim of Sūrā and Pumbadithā were desirable. A specimen of a legal decision by David b. Zakkai signed on the authority of Rab Se'adyah Gaon is to be found in Frankel-Grätz, *Monatsschrift*, xxxi. pp. 167–170.

[6] If we may argue from the known to the unknown, Se'adyah's translations, whether they were called *tafsîr* or *sharḥ*, contained more than a mere translation. From Ibn 'Ezra's preface to his commentary on the Pentateuch and from the Arabic comm. on the Psalms published in excerpt by Ewald we see that Rab Se'adyah was in the habit of explaining in addition to translating. Compare also Munk, "Notice sur Saadia," in Cahen, *La Bible* (Isaïe), Paris, 1838, 8vo., p. 77, note 1.

[7] In the copyist's subscription to this MS. the actual reading is not יבראה (Rapoport), but עבארה; this should be עבארה, as Munk prints it ("Notice," p. 108). The Bodleian MSS. are referred to in this article from personal inspection.

[8] The original codex on brownish paper, in square characters of Babylonian handwriting (14th cent.), is defective at beginning and end. The supplement at the beginning, containing also later matter, is in S. Arabian handwriting. The well-known "Ten reasons for Sounding the Trumpet on the Day of Memorial" are not found in this Siddur (against Rapoport, *ut supra*, note 21). The three poetical pieces published as five by Rosenberg (*Ḳobeṣ*, ii., Berlin, 1856) form an integral part of the *Siddur*, but bear on

(*b*) *Arabischer Midrasch* (!) *zu den Zehn Geboten*, in Hebrew letters (MS. Jellinek of Vienna, with Hebrew and German translation by W. Eisenstädter, Vienna, 1868, 8vo). (5) Religious Philosophy: (*a*) Commentary on the *Sepher Yeṣirah*, MS. Uri 370 (*Opp. Add.*, 4to, 89), contains the earlier part of Heb. trans. in a modern hand; (*b*) *Kitáb al-Amánát wa'l-I'tiqádát* (Landauer, Leyden, 1880, 8vo), translated into Hebrew by Yehudah Ibn Tibbon (*editio princeps*, Constantinople, 1562, 4to), and by R. Berekhyah Hannakdan, author of the *Mishele Shu'alim* (printed only in part; see Dukes, *Beiträge*, pp. 20, 22); nine chapters have been translated into German (Fürst, Leipsic, 1845, 12mo.), and parts into English (*Two Treatises*, by P. Allix, London, 1707, 8vo).

II. *Works now lost, but the existence of which is testified to by contemporary and later authors.*—(1) An Arabic translation of, and in part commentary on, most, if not all, the other books of the Bible.[1] (2) Lexical Treatises: Book of Interpretations (*Sepher Pithronim*), or Collection (*Iggeron*).[2] (3) Grammatical Treatises: (*a*) Elegancy of the Hebrew Tongue—(*a*) Treatise on the Changes, (*β*) Treatise on the Combinations, (*γ*) Treatise on *Dagesh* and *Rapheh*, (*δ*) Treatise on the Letters א, ה, ח, ע;[3] (*b*) Treatise on Punctuation;[4] (*c*) Treatise on Right Reading;[5]—it is not impossible that the first four constituted one work and the last two another work. (4) Talmudic Literature: (*a*) Translation of the *Mishnah*;[6] (*b*) Methodology of the (Babylonian) Talmud;[7] (*c*) Treatise on Bills;[8] (*d*) Treatise on Deposits;[9] (*e*) Treatise on Oaths;[10] (*f*) Treatise on Prohibited Degrees;[11] (*g*) Treatise on *Impura et Pura*, including *Hilekhoth Niddah*;[12]—it is very possible that those marked *c* to *f* constituted one book, just as the treatise marked *g* constituted one book. (5) Calendaric Literature: *Sepher Ha'ibbur* (Treatise on Intercalation).[13] (6) Apologetics: Treatise on Investigations.[14] (7) Polemics: (*a*) against Karaism—(*a*) Anan,[15] (*β*) Ibn Sakkawiyyah,[16] (*γ*) Ibn Zitta (or Zutta);[17] (*b*) against the Rabbanite Ḥivvi al-Balkhi;[18] (*c*) against the Karaite Ben Asher (the completer of the *Massoreth;* see *L.-B. d. Or.*, x. 684). (8) The nature of the *Sepher Haggalui* cited by Rabad II. and Ab. b. Hiyya in his *Sepher Ha'ibbur* is not clear.

III. *Works ascribed to Se'adyah the authorship of which is not sufficiently proven.*—(1) The commentary on Canticles edited by Yiṣḥak Ibn 'Akrish (Constantinople, 1577, 4to), and that published by L. Margaliyyoth at Frankfort-on-Oder, 1777.[19] (2) The well-known piece of didactic poetry which gives account of all the letters of the Bible, how many times they occur, etc. (*editio princeps*, Venice, 1538, at the end of Elias Levita's *Massoreth Hammass.*).

IV. *Works ascribed to Se'adyah by mistake.*—(1) The Commentary on Daniel commonly found in the Rabbinic Bibles belongs to another Rab Se'adyah, who lived at least two hundred years later, and was a native either of France or the south of Germany. (2) The Commentary on the *Sepher Yeṣirah*, printed with the text and three other commentaries at Mantua in 1562, 4to. (3) The Book on Lots (*Sepher Haggoraloth*), often printed separately and in coujunction with similar works. (4) *Eben Happilosophim* (*Lapis Philosophorum*), ascribed to him by R. Mosheh Butrial (Mantua edition of the *Sepher Yeṣirah* as above). (S. M. S.-S.)

SAALFELD, a busy little town of Germany, in the eastern horn of the crescent-shaped duchy of Saxe-Meiningen, is picturesquely situated on the left bank of the Saale (here spanned by a bridge), 24 miles south of Weimar and 77 miles southwest of Leipsic. One of the most ancient towns in Thuringia, Saalfeld was the capital of the now extinct duchy of Saxe-Saalfeld, and contains some interesting old buildings. Among these are the former residential palace, built in 1679 on the site of the Benedictine monastery of St. Peter, destroyed during the Peasants' War; the Gothic church of St. John, dating from the 13th century; the quaint town-house, built in 1533–37; and the Kitzerstein, a shooting-lodge said to have been originally erected by the emperor Henry I., though the present building is not older than the 16th century. But perhaps the most interesting relic of the past in Saalfeld is the striking ruin of the Sorbenburg or Hoher Schwarm, a strong castle said to have been built by Charlemagne to protect his borders from the Slavonic hordes. Its destruction took place in 1290, under Rudolf of Hapsburg. Saalfeld is situated in one of the busiest parts of Meiningen, and carries on a number of brisk industries, including the manufacture of sewing-machines, colors, wax-cloth and wire-cloth, brewing, and iron-founding. It has an active trade in iron, slate, wood, and wooden goods, and there are ochre and iron mines in the neighborhood. The population in 1880 was 7458.

Springing up under the wing of the Sorbenburg, Saalfeld early became an imperial demesne, and received various benefits at the hands of successive emperors. After a somewhat checkered career, the town became the capital of the duchy of Saxe-Saalfeld, founded in 1680 by the youngest son of the duke of Gotha; but in 1735, when the succession to the duchy of Coburg was assigned to the dukes of Saalfeld, their residence was removed to Coburg. In 1826 the united duchies merged by inheritance in the duchy of Saxe-Meiningen.

SAARBRÜCKEN, an important industrial and commercial town in Prussia, on the left bank of the Saar, a navigable tributary of the Moselle, is situated 49 miles east of Metz, at the south end of one of the most extensive coal-fields in Europe, to which it has given its name. With the town of St. Johann, immediately opposite on the right bank of the river, here spanned by two bridges, Saarbrücken forms in reality a single community, with a united population of nearly 22,000. St. Johann, though now the larger, is the more recent town, being in fact the creation of the important railways whose junction is fixed there. Saarbrücken itself is not directly on any main line. The industries of St. Johann-Saarbrücken include wool-spinning, brewing, and the manufacture of tobacco, chemicals, tin, and stoneware. The trade is chiefly connected with the produce of the neighboring coal-mines and that of the numerous important iron and glass works of the district. The Saarbrücken coal-field extends over 70 square miles; and its annual output is about 6 million tons. Of this total the Prussian state mines yield about 5,200,000 tons, Prussian private mines 100,000 tons, the mines in Lorraine 500,000 tons, and mines in Rhenish Bavaria 200,000 tons. In 1880 the population of Saarbrücken alone was 9514, and of St. Johann 12,346.

Till 1233 Saarbrücken was in the possession of the old counts of Ardennes; from 1381 till 1793 it was the residence of the princes of Nassau-Saarbrücken; from 1793 till 1815 it was in the possession of the French; and since 1815 it has been Prussian. St. Johann is said to have been founded as an outwork to Saarbrücken in 1046, and to have received town-rights in 1321. In the Franco-Prussian War of 1870–71 Saarbrücken was seized by the French on 2d August, 1870, but the first German victory, on the heights of Spicheren, 3 miles to the south, relieved it four days later.

SAARDAM. See ZAANDAM.

SAARGEMÜND (Fr. *Sarreguemines*), an industrial town and railway junction of Germany, in the imperial province of Alsace-Lorraine, is situated at the confluence of the Blies and the Saar, 40 miles east

the surface marks of having been taken from a second-hand, if not a third-hand, copy, as the editor admits with regard to the "second petition." The "Two Petitions" must have served Ibn Gebirol (AVICEBRON) as a model for the latter or liturgical part of his כתר מלכות, just as he and others after him silently utilized Se'adyah's philosophy.

[1] See *Hoboth Hallebaboth* (preface) and *Sibbub* (Travels) of R. Pethaḥyah of Ratisbon (London, 1861, 8vo, p. 22).
[2] *L.-B. d. Orients*, x. coll. 516, 541, 684.
[3] *Ibid.*, coll. 516, 518.
[4] See Rashi on Psalm xlv. 10.
[5] *L.-B. d. Or.*, x. 518.
[6] *Sibbub* (as in note 1 above).
[7] See *Shem Haggedolim* (Vilna, 1852, 8vo), ii. leaf 16a, col. 2.
[8] See *Sha'are Ṣedek* (*ut supra*), leaf 17b.
[9] See R. Menaḥem b. Shelomoh lebeth Meir (commonly called Meiri) on *Aboth* (Vienna, 1854, 8vo, Introduction, p. 17).
[10] See Rapoport, *l. c.*, note 20.
[11] See Pinsker, *Likkute Ḳadmoniyyoth* (Vienna, 1860, p. 174, note 1, in *Nispaḥim*).
[12] See Rapoport, *l. c.*, note 19.
[13] See *L.-B. d. Or.*, xii. coll. 101, 102.
[14] See *Ṣion* (Frankfort-on-Main, 1842–43, 8vo), ii. p. 137.
[15] See Pinsker (*ut supra*), p. 103.
[16] *Ṣion* (as before).
[17] On this commentator see Ibn 'Ezra on Exodus xxi. 24. From this passage we learn that Se'adyah and Ben Zitta were contemporaries, and even had oral controversies with one another.
[18] See *Halikhoth Ḳedem*, Amsterdam, 1846, p. 71. Ḥivvi al-Balkhi had raised strong objections against the truth of Scripture in his *Two Hundred Questions*, or *Objections to the Bible*.
[19] The editions "Prag," 1782 (Steinschneider), and Nowydwor, 1783 (Zedner), are probably the same as that of Frankfort with different titles.

of Metz. It carries on considerable manufactures of silk, plush, porcelain, and earthenware, and is a chief depôt for the papier-maché boxes (mostly snuff-boxes) which are made in great quantity in the neighborhood. To the south lies the district lunatic asylum of Steinbacherhof. The town, which is garrisoned by four squadrons of cavalry, in 1880 had a population of 9573, chiefly Roman Catholics.

SAAVEDRA, Angel de, Duke of Rivas (1791–1865), Spanish poet and politician, was born at Cordova in 1791, and fought with bravery in the Spanish War of Independence. From 1813 to 1820 he lived in retirement in Andalucia, but in the latter year he sided actively with the revolutionary party, and in consequence had to go into exile in 1823. He lived successively in England, Malta, and France until 1834, when he received permission to return to Spain, shortly afterwards succeeding his brother as duke of Rivas. In 1836 he became minister of the interior under Isturiz, and along with his chief had again to leave the country. Having returned with Maria Christina in 1844, he again held a portfolio for a short time in 1854; and during the last two decades of his life he was ambassador at Naples, Paris, and Florence for considerable periods. He died in 1865.

In 1813 he published *Ensayos poeticos*, and between that date and his first exile several tragedies of his composition (*Aliatar*, 1814; *El Duque d' Aquitania*, 1814; *Lanuza*, 1822) were put upon the stage. *Tanto vales quanto tienes*, a comedy, appeared in 1834, *Don Alvaro*, a tragedy, in 1835, and two other dramatic compositions in 1842. Saavedra was also the author of *El Moro Exposito*, a narrative poem in ballad metre (two volumes), and *Florinda*, an epic romance.

SAAVEDRA, Miguel de Cervantes. See Cervantes.

SAAVEDRA FAXARDO, Diego de (1584–1648), diplomatist and man of letters, was born of a noble family at Algezares in the Spanish province of Murcia in 1584. Having been educated for the church at Salamanca, and admitted to the priesthood, he accompanied Cardinal Borgia, the Spanish ambassador, to Rome in the capacity of secretary. Ultimately he rose to high rank in the diplomatic service, and was Spanish plenipotentiary at Ratisbon in 1636 and at Münster in 1645. He was nominated to the supreme council of the Indies in 1646, but not long afterwards retired to a monastery, where he died in 1648.

In 1640 he published a treatise entitled *Empresas politicas, ó idea de un principe politico cristiano representado en cien empresas*, a hundred short essays, in which he discusses the education of a prince, his relation and duties to those around him, and so forth, primarily intended for and dedicated to the son of Philip IV. It is sententious in style and characterized by the curious learning of the time, and is still read and admired in Spain. It passed through a number of editions and was translated into several languages, the English version being by Astry (2 vols., 8vo., London, 1700). An unfinished historical work entitled *Corona Gotica, Castellana, y Austriaca politicamente ilustrada*, appeared in 1646. Another work by Saavedra, only second in popularity to the *Empresas*, his *Republica Literaria*, was published posthumously in 1670; it discusses in a somewhat mocking tone some of the leading characters in the ancient and modern world of letters. Collected editions of his works appeared at Antwerp in 1677–78, and again at Madrid in 1789–90; see also vol. xxv. of the *Bibl. de Aut. Esp.* (1853).

SAAZ (Bohemian *Žatec*), a manufacturing and commercial town in the north of Bohemia, is situated on the right bank of the Eger, 42 miles northwest of Prague. The suspension bridge, 210 feet long, which here spans the river was constructed in 1826 and is one of the oldest of the kind in Bohemia. Saaz, which claims to have existed as early as the 8th century, contains a number of ancient churches, of which one is said to date from 1206, and five others from before the close of the 14th century. The town-house was built in 1559. A technical school was added in 1878 to the already fairly numerous educational institutions. Nails, leather, beetroot-sugar, and pasteboard are among the chief manufactures of Saaz, which, however, owes its main importance to being the centre of the extensive hop-trade of the neighborhood. The hops of Saaz are said to have been renowned for the last five hundred years; and nearly 800 tons are annually raised in the district to which the town gives its name. The population of Saaz was 12,425 in 1880.

SABÆA. See Yemen.

SABAH, or British North Borneo, is all that portion of the island of Borneo (*q.v.*) which was formally recognized by the charter of incorporation granted in November, 1881, as the territory of the British North Borneo Company. It has a coast-line of over 600 miles, and its area, still to a great extent unexplored,[1] is estimated at 30,000 square miles. Leaving out of account the deep indentations of the coast-line, it may be said to form a pentagon, of which three sides, the northwest, northeast, and southeast, are washed by the sea, while the remaining two sides are purely conventional lines drawn from Gura Peak (3° 50′ N. lat., 116° 10′ E. long.), the one almost due east to the Sibuco river, the other north-northwest to the mouth of the Sipitong on Brunei Bay. The latter separates the Company's territory from the independent sultanate of Brunei; the former is the frontier towards the Dutch possessions.

The great central feature of Sabah is the magnificent mountain of Kinabalu (compare Borneo) or Nabalu, built up of porphyritic granite and igneous rocks to a height of 13,698 feet, and dominating the whole northern part of the island, with all its profusion of lesser mountains and hills. Kinabalu, which has the appearance of two mountains, unites towards the east by a low ridge with "Nonohan t' agaioh (the great Nonohan) and the terminal cone Tumboyonkon (Tamboyukon)." These two summits are respectively 8000 and 7000 feet high, and there are others of considerable elevation in the same neighborhood. At some 15 or 20 miles to the north rises Mount Madalon (5000 feet), separated from Kinabalu and the other igneous and metamorphic hills by a wide valley, and consisting of those aqueous rocks, limestones, sandstones, and clays which appear to occupy the whole country to the north. Westward from Kinabalu are hills between 1000 and 2000 feet in height, and about 40 or 50 miles southeast is an important group on the north side of the Labuk valley known as the Mentapok Mountains (3000–8000 feet). The whole surface of the country is channelled by countless streams whose precipitous ravines, boulder-strewn rapids, and enormous beds of rolled pebbles bespeak the denuding energy of tropical rains. The coasts are generally low and flat, and to a great extent lined with casuarina trees, with here and there a stretch of mangrove, a low sandstone or limestone cliff, or a patch of that great forest which in the interior still covers so large a portion of the territory. In the low grounds along the coast and also inland among the hills are vast swamps and watery plains, which in the rainy season, when the rivers rise 20 or 30 feet above their usual level, are transformed into lakes. On the west side of Sabah the principal rivers are the Padas and the Klias, debouching opposite Labuan, but quite unexplored in their upper courses; the Papar (Pappar or Pappal), which passes the village of that name and enters the sea at Papar Point; the Tampassuk, one of the first to be explored (see St. John's *Life in the Forests of the Far East*) and remarkable for the waterfall of Pandassan or Tampassuk (1500 feet high, and thus one of the highest in the world), formed by its headwater the Kalupis. The Sekwati, a comparatively small river farther north, is well-known for its oil-springs. At the northern extremity of the island the deep inlet of Marudu Bay receives the waters of the Marudu or Maludu river, which rises on the

[1] But the officers of the company are very active in exploration. L. B. von Donop, F. Witti (killed 1882), W. B. Pryer, Frank Hatton (killed 1883), and Henry Walker are or have been among the more energetic.

west side of Mount Madalon. On the east coast are the Sugut, which has its headwaters in the hills to the east of Kinabalu, and forms its delta in the neighborhood of Torongohok or Purpura Island; the Labuk, debouching in Labuk Bay, and having its sources in the highlands about 70 miles inland; the Kinabatangan, with a longer course than any yet mentioned, rising probably between 116° and 117° E. long., and forming at its mouth a very extensive delta to the south of Sandakan Harbor; and finally the Segama, the scene of Frank Hatton's death (1883). Further south, and inland from Darvel Bay and Sibuco (or St. Lucia) Bay, there are no doubt other rivers of equal, it may be superior, importance; such, to judge by its delta, is the Kalabakong, debouching opposite Sebattik Island. Most of the rivers mentioned are navigable for steam launches of light draught, but their value is frequently impaired by a bar near the mouth. Several of the natural harbors of North Borneo, on the other hand, are at once accessible, safe, and commodious. Sandakan Harbor, on the northeast coast (5° 40′ N. lat. and 118° 10′ E. long.), runs inland some 17 miles, with a very irregular outline broken by the mouths of numerous creeks and streams. The mouth, only 2½ miles across, is split into two channels by the little island of Balhalla. The depth in the main entrance varies from 10 to 17 fathoms, and vessels drawing 20 feet can advance half-way up the bay. Just within the mouth on the north side, lies Elopura (see below). At Silam, on Darvel Bay, farther south, there is good anchorage. Kudat (discovered by Commander Johnstone, of H.M.S. "Egeria," in 1881) is a small but valuable harbor in Marudu Bay running inland for 2 or 3 miles, but rapidly shoaling after the first mile to 1 and 2 fathoms. It affords anchorage for vessels of any draught, but the frontage available for wharves is limited to some 1500 feet. In Gaya Bay, on the west coast, any number of vessels may lie in safety during either monsoon, the depths varying from 6 to 16 and 17 fathoms.

The climate of North Borneo is of course tropical, with a very equable temperature. The lowest minimum of the thermometer recorded in 1883 at Sandakan was 68·5° in December. The greatest interval without rain was eight days in March. The rainfall was 34½ inches (157 in 1880) at Sandakan, 129 at Papar, and 120 at Kudat. In the interior it must often be much above these figures.

That North Borneo should prove rich in minerals was supposed probable from the character of some other parts of the island; but hitherto investigations have not in this matter proved very successful. Coal or lignite exists, but most frequently in thin seams and insignificant pockets; the petroleum springs cannot come into any true competition with those worked elsewhere; gold has been discovered (1885) in the Segama river and may prove a stimulus to immigration; iron-ores appear both abundant and at times productive; and there are indications of the existence of copper, antimony, tin, and zinc ores. As yet the wealth of the country lies in its timber and jungle products (camphor and gutta-percha in great quantities), and in its edible nuts, guano, sago, sugar, tobacco, coffee, pepper, and gambier. Tobacco is most successfully grown by the natives in the inland districts of Mansalut, Kandassang, Koporingan, Gana-Gana, Tomborongo, Karnahan, Penusak, Tioug-Tuhan, etc.; and its cultivation has been taken up by several foreign companies. The birds'-nest caves of Gomanton (Gormanton) near the village of Malape on the Kinabatangan yield the Government a revenue of from $6000 to $7000; and other caves of the same kind are still unworked. As the natives (Dusuns, Tagaas-Bajaus, Idaan, etc.) are scattered, mostly in small villages, throughout the unexplored as well as the explored districts, their number can only be guessed, but it is usually stated at 150,000. Since the formation of the company there has been a steady immigration, especially of Chinese from Singapore. At Elopura, the capital of the territory and of its East Coast residency, the inhabitants in 1883 numbered 3770 (1500 being Chinese and 1085 Sulus). Hong-Kong and Singapore steamers now call regularly at Sandakan, Gaya, and Kudat. In 1885 the territory was divided into Alcock province (in the north), Keppel province (along the west coast as far north as Kimanis Bay), the East Coast residency (to the southeast of Alcock and Keppel provinces), and Dent province (to the southwest of the East Coast residency with the coast from Kimanis Bay to Brunei Bay).

In 1865 an American company started by Mr. Torrey obtained from the sultan of Brunei certain concessions of territory in North Borneo; but this enterprise proved a financial failure and the settlement formed on the Kimanis river broke up. The rights of the American company were bought up by the Austrian Baron von Overbeck and the English merchant Mr. Alfred Dent, who further obtained from the sultan of Brunei and the sultan of Sulu a series of charters conferring on them the sovereign authority in North Borneo under the titles of maharajah of Sabah, rajah of Gaya and Sandakan and Data Bandahara. In spite of the opposition of Spain, which claimed that the sultan of Sulu being a Spanish vassal could not dispose of his territory without her consent, the English company organized by Mr. Dent succeeded in obtaining a charter of incorporation under Act of Parliament, 1st November, 1881, as the "British North Borneo Company," with right to acquire other interests in, over, or affecting the territories or property comprised in the several grants.

The text of the charter will be found in the *London Gazette*, 8th November, 1881, and in the appendix to Mr. Joseph Hatton's *New Ceylon* (1881); see also Frank Hatton, *North Borneo*, 1885; the *Century Magazine*, 1885; the *Edinburgh Review*, 1882; and the *English Illustrated Magazine*, 1885.

SABAS, or SABBAS, ST. (Syr. *Mār Sābhā*), one of the early leaders of monasticism in Palestine, was a native of Cappadocia, born about 439. While still a child he accompanied his parents to Alexandria, whence in his eighteenth year, having made choice of the ascetic life, he removed to Palestine, settling at the desolate spot now occupied by the convent called by his name, about two hours from the northwest shore of the Dead Sea. As his reputation for holiness increased he was joined by others, who ultimately constituted a "laura" under the rule of St. Basil. He took some part in the doctrinal controversies of the day, being a zealous defender of the decrees of Chalcedon. He died about 532 and is commemorated on 5th December. Another saint of this name, surnamed "the Goth," suffered martyrdom at the hands of Athanaric, the Visigothic king, in the reign of Valentinian; he is commemorated on 15th (or 18th) April. See also Hoffmann, *Syr. Acten Persischer Märtyrer* (1880), Nos. iv. and xii., for lives of two martyrs named Sābhā.

SABBATH (שַׁבָּת), the day of sacred rest which among the Hebrews followed six days of labor and closed the week.

1. *Observance of the Sabbath.*—The later Jewish Sabbath, observed in accordance with the rules of the Scribes, was a very peculiar institution, and formed one of the most marked distinctions between the Hebrews and other nations, as appears in a striking way from the fact that on this account alone the Romans found themselves compelled to exempt the Jews from all military service. The rules of the Scribes enumerated thirty-nine main kinds of work forbidden on the Sabbath, and each of these prohibitions gave rise to new subtilties. Jesus's disciples, for example, who plucked ears of corn in passing through a field on the holy day, had, according to Rabbinical casuistry, violated the third of the thirty-nine rules, which forbade harvesting; and in healing the sick Jesus Himself broke the rule that a sick man should not receive medical aid on the Sabbath unless his life was in danger. In fact, as our Lord puts it, the Rabbinical theory seemed to be that the Sabbath was not made for man but man for the Sabbath, the observance of which was so much an end in itself that the rules prescribed for it did not require to be justified by appeal to any larger principle of religion or humanity. The precepts of the law were valuable in the eyes of the Scribes because they were the seal of Jewish particularism, the barrier erected between the world at large and the exclusive community of Jehovah's grace. For this purpose the most arbitrary precepts were the most effective, and none were more so than the complicated rules of Sabbath observance. The ideal of the Sabbath which all these rules aimed at realizing was absolute rest from everything that could be called work;

and even the exercise of those offices of humanity which the strictest Christian Sabbatarians regard as a service to God, and therefore as specially appropriate to His day, was looked on as work. To save life was allowed, but only because danger to life "superseded the Sabbath." In like manner the special ritual at the temple prescribed for the Sabbath by the Pentateuchal law was not regarded as any part of the hallowing of the sacred day; on the contrary, the rule was that, in this regard, "Sabbath was not kept in the sanctuary." Strictly speaking, therefore, the Sabbath was neither a day of relief to toiling humanity nor a day appointed for public worship; the positive duties of its observance were to wear one's best clothes, eat, drink, and be glad (justified from Isa. lviii. 13). A more directly religious element, it is true, was introduced by the practice of attending the synagogue service; but it is to be remembered that this service was primarily regarded not as an act of worship but as a meeting for instruction in the law. So far, therefore, as the Sabbath existed for any end outside itself it was an institution to help every Jew to learn the law, and from this point of view it is regarded by Philo and Josephus, who are accustomed to seek a philosophical justification for the peculiar institutions of their religion. But this certainly was not the leading point of view with the mass of the Rabbins;[1] and at any rate it is quite certain that the synagogue is a post-exilic institution, and therefore that the Sabbath in old Israel must either have been entirely different from the Sabbath of the Scribes, or else must have been a mere day of idleness and feasting, not accompanied by any properly religious observances or having any properly religious meaning. The second of these alternatives may be dismissed as quite inconceivable, for, though many of the religious ideas of the old Hebrews were crude, their institutions were never arbitrary and meaningless, and when they spoke of consecrating the Sabbath they must have had in view some religious exercise of an intelligible kind by which they paid worship to Jehovah.

Indeed, that the old Hebrew Sabbath was quite different from the Rabbinical Sabbath is demonstrated in the trenchant criticism which Jesus directed against the latter (Matt. xii. 1–14; Mark ii. 27). The general position which He takes up, that "the Sabbath is made for man and not man for the Sabbath," is only a special application of the wider principle that the law is not an end in itself but a help towards the realization in life of the great ideal of love to God and man, which is the sum of all true religion. But Jesus further maintains that this view of the law as a whole, and the interpretation of the Sabbath law which it involves, can be historically justified from the Old Testament. And in this connection He introduces two of the main methods to which historical criticism of the Old Testament has recurred in modern times: He appeals to the oldest history rather than to the Pentatcuchal code as proving that the later conception of the law was unknown in ancient times (Matt. xii. 3, 4), and to the exceptions to the Sabbath law which the Scribes themselves allowed in the interest of worship (ver. 5) or humanity (ver. 11), as showing that the Sabbath must originally have been devoted to purposes of worship and humanity, and was not always the purposeless arbitrary thing which the schoolmen made it to be. Modern criticism of the history of Sabbath observance among the Hebrews has done nothing more than follow out these arguments in detail, and show that the result is in agreement with what is known as to the dates of the several component parts of the Pentateuch. Of the legal passages that speak of the Sabbath all those which show affinity with the doctrines of the Scribes—regarding the Sabbath as an arbitrary sign between Jehovah and Israel, entering into details as to particular acts that are forbidden, and enforcing the observance by severe penalties, so that it no longer has any religious value, but appears as a mere legal constraint—are post-exilic (Exod. xvi. 23–30, xxxi. 12–17, xxxv. 1–3; Num. xv. 32–36); while the older laws only demand such cessation from daily toil, and especially from agricultural labor, as among all ancient peoples naturally accompanied a day set apart as a religious festival, and in particular lay weight on the fact that the Sabbath is a humane institution, a holiday for the laboring classes (Exod. xxiii. 12; Deut. v. 13–15). As it stands in these ancient laws, the Sabbath is not at all the unique thing which it was made to be by the Scribes. "The Greeks and the barbarians," says Strabo (x. 3, 9), "have this in common, that they accompany their sacred rites by a festal remission of labor." So it was in old Israel: the Sabbath was one of the stated religious feasts, like the new moon, and the three great agricultural sacrificial celebrations (Hosea ii. 11); the new moons and the Sabbaths alike called men to the sanctuary to do sacrifice (Isa. i. 14); the remission of ordinary business belonged to both alike (Amos viii. 5), and for precisely the same reason. Hosea even takes it for granted that in captivity the Sabbath will be suspended, like all the other feasts, because in his day a feast implied a sanctuary.

This conception of the Sabbath, however, necessarily underwent an important modification in the 7th century B.C., when the local sanctuaries were abolished, and those sacrificial rites and feasts which in Hosea's time formed the essence of every act of religion were limited to the central altar, which most men could visit only at rare intervals. From this time forward the new moons, which till then had been at least as important as the Sabbath and were celebrated by sacrificial feasts as occasions of religious gladness, fall into insignificance except in the conservative temple ritual. The Sabbath did not share the same fate, but with the abolition of local sacrifices it became for most Israclites an institution of humanity divorced from ritual. So it appears in the Deuteronomic decalogue, and presumedly also in Jer. xvii. 19 *sq.* In this form the institution was able to survive the fall of the state and the temple, and the seventh day's rest was clung to in exile as one of the few outward ordinances by which the Israelite could still show his fidelity to Jehovah and mark his separation from the heathen. Hence we understand the importance attached to it in the exilic literature (Isa. lvi. 2 *sq.*, lviii. 13), and the character of a sign between Jehovah and Israel ascribed to it in the post-exilic law. This attachment to the Sabbath, beautiful and touching so long as it was a spontaneous expression of continual devotion to Jehovah, acquired a less pleasing character when after the exile, it came to be enforced by the civil arm (Neh. xiii.), and when the later law even declared Sabbath-breaking a capital offence. But it is just to remember that without the stern discipline of the law the community of the second temple could hardly have escaped dissolution, and that Judaism alone preserved for Christianity the hard-won achievements of the prophets.

The Sabbath exercised a twofold influence on the early Christian church. On the one hand, the weekly celebration of the resurrection on the Lord's day could not have arisen except in a circle that already knew the week as a sacred division of time; and, moreover, the manner in which the Lord's day was observed was directly influenced by the synagogue service. On the other hand, the Jewish Christians continued to keep the Sabbath, like other points of the old law. Eusebius (*H. E.*, iii. 27) remarks that the Ebionites observed both the Sabbath and the Lord's day; and this practice obtained to some extent in much wider circles, for the *Apostolical Constitutions* recommend that the Sabbath shall be kept as a memorial feast of

[1] See the Mishnah, tr. "Shabbath," and *B. of Jubilees*, ch. l.; and compare Schürer, *Gesch. d. jüd. Volkes*, ii. 357, 376, 393 *sq.*, where the Rabbinical Sabbath is well explained and illustrated in detail.

the creation as well as the Lord's day as a memorial of the resurrection. The festal character of the Sabbath was long recognized in a modified form in the Eastern Church by a prohibition of fasting on that day, which was also a point in the Jewish Sabbath law (comp. Judith viii. 6).

On the other hand, Paul had quite distinctly laid down from the first days of Gentile Christianity that the Jewish Sabbath was not binding on Christians (Rom. xiv. 5 *sq.*; Gal. iv. 10; Col. ii. 16), and controversy with Judaizers led in process of time to direct condemnation of those who still kept the Jewish day (*e.g.*, Co. of Laodicea, 363 A.D.). Nay, in the Roman Church a practice of fasting on Saturday as well as on Friday was current before the time of Tertullian. The steps by which the practice of resting from labor on the Lord's day instead of on the Sabbath was established in Christendom and received civil as well as ecclesiastical sanction will be spoken of in SUNDAY; it is enough to observe here that this practice is naturally and even necessarily connected with the religious observance of the Lord's day as a day of worship and religious gladness, and is in full accordance with the principles laid down by Jesus in His criticism of the Sabbath of the Scribes. But of course the complete observance of Sunday rest was not generally possible to the early Christians before Christendom obtained civil recognition. For the theological discussions whether and in what sense the fourth commandment is binding on Christians, see DECALOGUE, vol. vii. p. 17.

2. *Origin of the Sabbath.*—As the Sabbath was originally a religious feast, the question of the origin of the Sabbath resolves itself into an inquiry why and in what circle a festal cycle of seven days was first established. In Gen. ii. 1–3 and in Exod. xx. 11, the Sabbath is declared to be a memorial of the completion of the work of creation in six days. But it appears certain that the decalogue as it lay before the Deuteronomist did not contain any allusion to the creation (see DECALOGUE, vol. vii. p. 16), and it is generally believed that this reference was added by the same post-exilic hand that wrote Gen. i. 1–ii. 4a. The older account of the creation in Gen. ii. 4b *sq.* does not recognize the hexaemeron, and it is even doubtful whether the original sketch of Gen. i. distributed creation over six days. The connection, therefore, between the seven days' week and the work of creation is now generally recognized as secondary. The week and the Sabbath were already known to the writer of Gen. i., and he used them to give the framework for his picture of the creation, which in the nature of things could not be literal and required some framework. At the same time, there was a peculiar appropriateness in associating the Sabbath with the doctrine that Jehovah is the Creator of all things; for we see from Isa. xl.–lxvi. that this doctrine was a mainstay of Jewish faith in those very days of exile which gave the Sabbath a new importance for the faithful.

But, if the week as a religious cycle is older than the idea of the week of creation, we cannot hope to find more than probable evidence of the origin of the Sabbath. At the time of the exile the Sabbath was already an institution peculiarly Jewish, otherwise it could not have served as a mark of distinction from heathenism. This, however, does not necessarily imply that in its origin it was specifically Hebrew, but only that it had acquired distinguishing features of a marked kind. What is certain is that the origin of the Sabbath must be sought within a circle that used the week as a division of time. Here again we must distinguish between the week as such and the astrological week, *i.e.*, the week in which the seven days are named each after the planet which is held to preside over its first hour. If the day is divided into twenty-four hours and the planets preside in turn over each hour of the week in the order of their periodic times (Saturn, Jupiter, Mars, Sun, Venus, Mercury, Moon), we get the order of days of the week with which we are familiar. For, if the Sun presides over the first hour of Sunday, and therefore also over the eighth, the fifteenth, and the twenty-second, Venus will have the twenty-third hour, Mercury the twenty-fourth, and the Moon, as the third in order from the sun, will preside over the first hour of Monday. Mars, again, as the third from the Moon, will preside over Tuesday (Dies Martis, Mardi), and so forth. This astrological week became very current in the Roman empire, but was still a novelty in the time of Dio Cassius (xxxvii. 18). This writer believed that it came from Egypt; but the old Egyptians had a week of ten, not of seven days, and the original home of astrology and of the division of the day into twenty-four hours is Chaldæa. It is plain, however, that there is a long step between the astrological assignation of each hour of the week to a planet and the recognition of the week as an ordinary division of time by people at large. Astrology is in its nature an occult science, and there is not the slightest trace of a day of twenty-four hours among the ancient Hebrews, who had the week and the Sabbath long before they had any acquaintance with the planetary science of the Babylonian priests. Moreover, it is quite clear from extant remains of Assyrian calendars that our astrological week did not prevail in civil life even among the Babylonians and Assyrians: they did not dedicate each day in turn to its astrological planet. These facts make it safe to reject one often-repeated explanation of the Sabbath, viz., that it was in its origin what it is in the astrological week, the day sacred to Saturn, and that its observance is to be derived from an ancient Hebrew worship of that planet. In truth there is no evidence of the worship of Saturn among the oldest Hebrews; Amos v. 26, where Chiun (Kaiwan) is taken by many to mean Saturn, is of uncertain interpretation, and, when the tenses are rightly rendered, refers not to idolatry of the Israelites in the wilderness but to the time of the prophet.

The week, however, is found in various parts of the world in a form that has nothing to do with astrology or the seven planets, and with such a distribution as to make it pretty certain that it had no artificial origin, but suggested itself independently, and for natural reasons, to different races. In fact the four quarters of the moon supply an obvious division of the month; and, wherever new moon and full moon are religious occasions, we get in the most natural way a sacred cycle of fourteen or fifteen days, of which the week of seven or eight days (determined by half moon) is the half. Thus the old Hindus chose the new and the full moon as days of sacrifice; the eve of the sacrifice was called *upavasatha*, and in Buddhism the same word (*upōsatha*) has come to denote a Sabbath observed on the full moon, on the day when there is no moon, and on the two days which are eighth from the full and the new moon respectively, with fasting and other religious exercises.[1]

From this point of view it is most significant that in the older parts of the Hebrew Scriptures the new moon and the Sabbath are almost invariably mentioned together. The month is beyond question an old sacred division of time common to all the Semites; even the Arabs, who received the week at quite a late period from the Syrians (Bîrûnî, *Chronology*, Eng. tr., p. 58), greeted the new moon with religious acclamations. And this must have been an old Semitic usage, for the word which properly means "to greet the new moon" (*ahalla*) is, as Lagarde (*Orientalia*, ii. 19) has shown, etymologically connected with the Hebrew words used of any festal joy. Among the Hebrews, or rather perhaps among the Canaanites, whose speech they borrowed, the joy at the new moon became the type of religious festivity in general. Nor are other traces wanting of the connection of sacrificial occasions—*i.e.*, religious

[1] Childers, *Pali Dict.*, p. 535; Kern, *Buddhismus* (Ger. tr.), p. 8; *Mahâvagga*, ii. 1, 1 (Eng. tr., i. 239, 291).

feasts—with the phases of the moon among the Semites. The Harranians had four sacrificial days in every month, and of these two at least were determined by the conjunction and opposition of the moon.[1]

That full moon as well as new moon had a religious significance among the ancient Hebrews seems to follow from the fact that, when the great agricultural feasts were fixed to set days, the full moon was chosen. In older times these feast days appear to have been Sabbaths (Lev. xxiii. 11; comp. PASSOVER, vol. xviii. p. 348).

A week determined by the phases of the moon has an average length of $29\frac{1}{2} \div 4 = 7\frac{3}{8}$ days, *i.e.* three weeks out of eight would have eight days. But there seems to be in 1 Sam. xx. 27, compared with vv. 18, 24, an indication that in old times the feast of the new moon lasted two days—a very natural institution, since it appears that the feast was fixed in advance, while the Hebrews of Saul's time cannot have been good enough astronomers to know beforehand on which of two successive days the new moon would actually be observed.[2] In that case a week of seven working days would occur only once in two months. We cannot tell when the Sabbath became dissociated from the month; but the change seems to have been made before the Book of the Covenant, which already regards the Sabbath simply as an institution of humanity and ignores the new moon. In both points it is followed by Deuteronomy.

The Babylonian and Assyrian Sabbath.—The word "Sabbath" (*sabattuv*), with the explanation "day of rest of the heart," is claimed as Assyrian on the basis of a textual emendation made by F. Delitzsch in II. Rawl., 32, 16. The value of this isolated and uncertain testimony cannot be placed very high, and it seems to prove too much, for it is practically certain that the Babylonians at the time of the Hebrew exile cannot have had a Sabbath exactly corresponding in conception to what the Hebrew Sabbath had become under very special historical circumstances. What we do know from a calendar of the intercalary month Elul II. is that in that month the 7th, 14th, 19th, 21st, and 28th days had a peculiar character, and that certain acts were forbidden on them to the king and others. There is the greatest uncertainty as to the details (compare the very divergent renderings in *Records of the Past*, vii. 160 *sq.*; Schrader, *K. A. T.*, 2d ed., p. 19; Lotz, *Qu. de historia Sabbati*, 39 *sq.*); but these days, which are taken to be Assyrian Sabbaths, are certainly not "days of rest of the heart," and to all appearance are unlucky days, and expressly designated as such.[3] If, therefore, they are "Assyrian Sabbaths" at all, they are exactly opposite in character to the Hebrew Sabbath, which Hosea describes as a day of gladness, and which never ceased to be a day of feasting and good cheer.

Etymology of the word "Sabbath."—The grammatical inflections of the word "Sabbath" show that it is a feminine form, properly *shabbat-t* for *shabbāt-t*, from שׁבת II. The root has nothing to do with resting in the sense of enjoying repose; in transitive forms and applications it means to "sever," to "put an end to," and intransitively it means to "desist," to "come to an end." The grammatical form of *shabbath* suggests a transitive sense, "the divider," and apparently indicates the Sabbath as dividing the month. It may mean the day which puts a stop to the week's work, but this is less likely. It certainly cannot be translated "the day of rest."

Sabbatical Year.—The Jews under the second temple observed every seventh year as a Sabbath according to the (post-exilic) law of Lev. xxv. 1–7. It was a year in which all agriculture was remitted, in which the fields lay unsown, the vines grew unpruned, and even the natural produce was not gathered in. That this law was not observed before the captivity we learn from Lev. xxvi. 34 *sq.*; indeed so long as the Hebrews were an agricultural people with little trade, in a land often ravaged by severe famines, such a law could not have been observed. Even in later times it was occasionally productive of great distress (1 Mac. vi. 49, 53; Jos., *Antt.*, xiv. 16, 2). In the older legislation, however, we already meet with a seven years' period in more than one connection. The release of a Hebrew servant after six years' labor (Exod. xxi. 2 *sq.*; Deut. xv. 12 *sq.*) has only a remote analogy to the Sabbatical year. But in Exod. xxiii. 10, 11 it is prescribed that the crop of every seventh year (apparently the self-sown crop) shall be left for the poor, and after them for the beasts. The difference between this and the later law is that the seventh year is not called a Sabbath, and that there is no indication that all land was to lie fallow on the same year. In this form a law prescribing one year's fallow in seven may have been anciently observed. It is extended in ver. 11 to the vineyard and the olive oil, but here the culture necessary to keep the vines and olive trees in order is not forbidden; the precept is only that the produce is to be left to the poor. In Deuteronomy this law is not repeated, but a fixed seven years' period is ordained for the benefit of poor debtors, apparently in the sense that in the seventh year no interest is to be exacted by the creditor from a Hebrew, or that no proceedings are to be taken against the debtor in that year (Deut. xv. 1 *sq.*). (W. R. S.)

SABELLIUS. Even after the elimination of Gnosticism the church remained without any uniform Christology; the Trinitarians and the Unitarians continued to confront each other, the latter at the beginning of the 3d century still forming the large majority. These in turn split into two principal groups—the Adoptianists and the Modalists—the former holding Christ to be the man chosen of God, on whom the Holy Spirit rested in a quite unique sense, and who after toil and suffering, through His oneness of will with God, became divine, the latter maintaining Christ to be a manifestation of God Himself. Both groups had their scientific theologians who sought to vindicate their characteristic doctrines, the Adoptianist divines holding by the Aristotelian philosophy, and the Modalists by that of the Stoics; while the Trinitarians (Tertullian, Hippolytus, Origen, Novatian), on the other hand, appealed to Plato.

In Rome Modalism was the doctrine which prevailed from Victor to Calixtus (*c.* 190–220). The bishops just named protected within the city the schools of Epigonus and Cleomenes, where it was taught that the Son is identical with the Father. But the Presbyter Hippolytus was successful in convincing the leaders of that church that the Modalistic doctrine taken in its strictness was contrary to Scripture. Bishop Calixtus saw himself under the necessity of abandoning his friends and setting up a mediating formula designed to harmonize the Trinitarian and the Modalistic positions. But, while excommunicating the strict Unitarians (Monarchians), he also took the same course with Hippolytus and his followers, declaring their teaching to be ditheism. The mediation formula, however, proposed by Calixtus became the bridge by which, in the course of the decades immediately following, the doctrine of the Trinity made its way into the Roman Church. In the year 250, when the Roman Presbyter Novatian wrote his book *De Trinitate*, the doctrine of Hippolytus, once discredited as ditheism, had already become official there. At the same time Rome and most of the other churches of the West still retained a certain leaning towards Modalistic monarchianism. This appears, on the one hand, in the use of expressions having a Modalistic ring about them—see especially the poems of Commodian, written about the time of Valerian—and on the other hand, in the rejection of the doctrine that the Son is subordinate to the Father and is a creature (witness the controversy between Dionysius of Alexandria and Dionysius of Rome), as well as in the readiness of the West to accept the formula of Athanasius, that the Father and the Son are one and the same in substance (ὁμοούσιοι).

The strict Modalists, whom Calixtus had excommunicated along with their most zealous opponent Hippolytus, were led by Sabellius, who was perhaps a Lybyan by birth. His party continued to subsist in Rome for a considerable time afterwards,[1] and with-

[1] The others—according to the *Fihrist*, 319, 14—are the 17th and the 28th.

[2] It appears from Judith viii. 6 that even in later times there were two days at the new moon on which it was improper to fast.

[3] Lotz says they are lucky days; but the expression which he renders "*dies faustus*" is applied to every day in the calendar. The rest of his book does not rise above this example of acumen.

[1] In the 18th century there was discovered in one of the catacombs of Rome an inscription containing the words "qui et Filius diceris et Pater inveniris." This can only have come from a Sabellian.

stood Calixtus as an unscrupulous apostate. In the West, however, the influence of Sabellius seems never to have been important; in the East, on the other hand, after the middle of the 3d century his doctrine found much acceptance, first in the Pentapolis and afterwards in other provinces.[1] It was violently controverted by the bishops, notably by Dionysius of Alexandria, and the development in the East of the philosophical doctrine of the Trinity after Origen (from 260 to 320) was very powerfully influenced by the opposition to Sabellianism. Thus, for example, at the great synod held in Antioch in 268 the word ὁμοούσιος was rejected, as seeming to favor Unitarianism. The Sabellian doctrine itself, however, during the decades above mentioned underwent many changes in the East and received a philosophical dress. In the 4th century this and the allied doctrine of Marcellus of Ancyra were frequently confounded, so that it is exceedingly difficult to arrive at a clear account of it in its genuine form. Sabellianism, in fact, became a collective name for all those Unitarian doctrines in which the divine nature of Christ was acknowledged. The teaching of Sabellius himself was indubitably very closely allied to the older Modalism ("Patripassianism") of Noetus and Praxeas, but was distinguished from it by its more careful theological elaboration and by the account it took of the Holy Spirit. His central proposition was to the effect that Father, Son, and Holy Spirit are the same person, three names thus being attached to one and the same being. What weighed most with Sabellius was the monotheistic interest. The One Being was also named by him υἱοπάτωρ,—an expression purposely chosen to obviate ambiguity. To explain how one and the same being could have various forms of manifestation, he pointed to the tripartite nature of man (body, soul, spirit), and to the sun, which manifests itself as a heavenly body, as a source of light, and also as a source of warmth. He further maintained that God is not at one and the same time Father, Son, and Spirit, but, on the contrary, has been active in three consecutive energies,—first in the prosopon of the Father as Creator, then in the prosopon of the Son as Redeemer, and lastly in the prosopon of the Spirit as the Giver of Life. It is by this doctrine of the succession of the prosopa that Sabellius is essentially distinguished from the older Modalists. In particular it is significant, in conjunction with the reference to the Holy Spirit, that Sabellius regards the Father also as merely a form of manifestation of the one God,—in other words, has formally put Him in a position of complete equality with the other persons. This view prepares the way for Augustine's doctrine of the Trinity. Sabellius himself appears to have made use of Stoical formulas (πλατύνεσθαι, συστέλλεσθαι), but he chiefly relied upon Scripture, especially such passages as Deut. vi. 4, Exod. xx. 3, Isa. xliv. 6, John x. 38. Of his later history nothing is known; his followers died out in the course of the 4th century.

The sources of our knowledge of Sabellianism are Hippolytus (*Philos.*, bk. ix.), Epiphanius (*Hær.*, lxii.), and Dionys. Alex. (*Epp.*); also various passages in Athanasius and the other fathers of the 4th century. For modern discussions of the subject see Schleiermacher (*Theol. Ztschr.*, 1822, hft. 3), Lange (*Ztschr. f. hist. Theol.*, 1832, ii. 2), Döllinger (*Hippolyt u. Kallist*, 1853), Zahn (*Marcell v. Ancyra*, 1867), and Harnack (*s.v.* "Monarchianismus," in Herzog-Plitt, *Encykl. f. Prot. Theol.*, x. 199 *sq.*). (A. HA.)

SABIANS. In three passages of the Koran Mohammed mentions between the Jews and the Christians a sect whom he calls Sabians (*Ṣábi'úna*). He distinguishes them from the Magians and polytheists (xxii. 17), and appears to say that they believed in God and in the day of resurrection and judgment. It has commonly been supposed that the sect referred to is the MANDÆANS (*q.v.*); but it is more probable that they were some obscure half-Christian body (Elkesaites?), which had representatives in Arabia itself (see MOHAMMEDANISM, vol. xvi. p. 571). The name is derived from the Aramaic צבע, with a softening of ע to א, such as took place in certain dialects of that speech, and means "Baptists." The older Mohammedan theologians were agreed that the Sabians possessed a written revelation, and were entitled accordingly to enjoy a toleration not granted to mere heathen, and it appears that the Mandæans got the benefit of this, whether they were the sect Mohammed had in view or not. But under Al-Maṃún (830) a body that had certainly no claim to be deemed other than polytheists began to shield themselves under the same name, viz., the Ḥarranians, or remnant of the old heathen of Mesopotamia. Star-worship had a chief place in the religion of the Ḥarranians, as it had had in the older Babylonian and Syrian faiths, but they had partly disguised their polytheism in a fantastic philosophy, so that they were able on occasion to pose as people of enlightened beliefs. Accounts of these false Sabians reached the West through Maimonides, and then through Arabic sources, long before it was understood that in this application the name was only a disguise. Hence the greatest confusion prevailed in all European accounts of them till Chwolsohn published in 1856 his *Ssabier und Ssabismus*, in which the authorities for the history and belief of the Ḥarranians in the Middle Ages are collected and discussed. See also Dozy and De Goeje in the *Actes* of the sixth Oriental congress, ii. 1, 185 *sq.*, Leyden, 1885. It is quite inappropriate to call star-worshippers in general Sabians or Zabians or to speak of a distinct Sabian religion, as older writers do. The religion of the Ḥarranians is simply a modernized form of the old Syrian polytheism.

SABICU WOOD is the produce of a large leguminous tree, *Lysiloma Sabicu*, a native of Cuba, where alone it appears to be found. The wood has a rich mahogany color; it is exceedingly heavy, hard, and durable, and therefore most valuable for shipbuilding. Sabicu, on account of its durability, was selected for the stairs of the Great Exhibition (London) of 1851, and, notwithstanding the enormous traffic which passed over them, the wood at the end was found to be little affected by wear.

SABINE, SIR EDWARD (1788–1883), an astronomer, was born in Dublin on 14th October, 1788, a scion of a family said to be of Italian origin. He was educated at Woolwich and obtained a commission in the Royal Artillery at the age of fifteen. He attained the rank of major-general in 1859. His only experience in actual warfare seems to have been at the siege of Fort Erie in 1814; but few men have seen more than he of active and sometimes perilous service. In early life he devoted himself to astronomy and physical geography, and in consequence he was appointed astronomer to various expeditions, among others that of Sir J. Ross (1818) in search of the Northwest Passage, and that of Sir E. Parry soon afterwards. Later, he spent long periods on the inter-tropical coasts of Africa and America, and again among the snows of Spitzbergen. Sir Edward Sabine died at East Sheen, Surrey, on 26th May, 1883.

Of Sabine's scientific work two branches in particular deserve very high credit—his determination of pendulum data for the investigation of the figure of the earth and his extensive researches connected with terrestrial magnetism. His pendulum observations were the first to show the altogether unexpected amount of accuracy attainable in a matter which, under the most favorable conditions, is one of great delicacy, but which had to be pursued by him under circumstances often of peculiar difficulty. The establishment of a system of magnetic observatories in various parts of British territory all over the globe was accomplished mainly on his representations; and to the direction of these observatories and to the reduction and discussion of the observations a great part of his life was devoted. His published papers, as shown by the Royal Society's *Catalogue*, amounted in 1872 to 101. While the majority bear on one or other of the subjects just mentioned, others deal

[1] Whether Sabellius himself ever visited the East is unknown.

with such widely different topics as the birds of Greenland, ocean temperatures, the Gulf Stream, barometric measurement of heights, arcs of meridian, glacier transport of rocks, the volcanoes of the Sandwich Islands, and various points of meteorology. Sabine occupied for ten years (1861–71) the president's chair of the Royal Society, and was made K. C. B. in 1869. Though he cannot be said to have been a man of striking originality, his unflagging devotion to his work deservedly won him an honorable position among the foremost scientific men of the present century.

SABINES. The Sabines (Sabini) were a people of Central Italy, who played an important part in the early history of Rome. According to all old writers they were one of the most ancient nations of Italy, and the parent stock from which many of the other tribes that occupied the central and southern regions of the peninsula derived their origin. Of their own origin and affinities we know very little. Strabo calls them a very ancient race and "autochthonous," which may be taken as signifying that there was no authentic tradition of their immigration, or of the quarter from whence they came. The story of their Laconian descent may be safely rejected as one of those fictions by which a certain class of the later Greek writers sought to derive every people in Italy from a Greek origin. But the evidence concerning their language, scanty as it is, is sufficient to prove that they were a cognate race with the neighboring Umbrians and Oscans, as well as, more remotely, with the Latins. Cato, the best authority among the Roman writers with respect to the different races of Italy, affirmed that the Sabines originally occupied the country about Amiternum, in the upper valley of the Aternus, at the foot of the loftiest group of the Apennines. From thence they gradually extended themselves into the fertile valleys about Reate, where we find them established in historical times, and occupied the tract from thence to the Tiber and the Anio. But even in its widest extension the region held by the Sabines was of small dimensions, and for the most part of a rugged and mountainous character. Hence it was natural that they should seek a place for their superfluous population by repeated emigrations into the neighboring districts, and the general tradition among Roman writers ascribed the origin of several of the more powerful and populous nations of the peninsula to such emigrations. This result was especially promoted by a custom which, though not unknown to the other nations of Italy, appears to have been peculiarly characteristic of the Sabines —that of a Ver Sacrum or "sacred spring," when everything born in that year was consecrated to some local divinity, most frequently to Mamers or Mars. All the cattle were duly sacrificed, while the young men were allowed to grow up to manhood, and then sent forth in a body to seek for themselves new abodes beyond the limits of their native land. To such colonies is ascribed the foundation of the Picentes or people of Picenum, the Samnites, and the Hirpini. Of these the last-mentioned derived their name from *hirpus*, the Sabine name for a wolf, an animal of that description being supposed to have been divinely sent as the leader of the colony, as a woodpecker (*picus*), also sacred to Mars, became that of the Piceni. The Peligni also, as we learn from Ovid, himself a native of the district, claimed a Sabine origin, and the same was probably the case with the smaller kindred tribes of the Marsi, Marrucini, and Vestini. The Samnites, again, in their turn sent forth the Frentani and the Lucanians, who extended their dominion throughout the mountainous regions of Southern Italy and carried their arms from the Adriatic to the Sicilian Straits.

Meanwhile the Sabines themselves were confined within comparatively narrow limits, and their extension towards the south was checked by the growing power of the Latins. Here their power appears to have attained its highest point about the time of the foundation of Rome, and the legendary history, familiar to every schoolboy, of the contests between Romulus and Tatius, the divided sovereignty at one time established between them, and the peaceful reign and legislation of the Sabine king Numa may be taken as representing the historical fact that the population of Rome really contained an important Sabine element, and that Sabine influences were largely intermixed with those of Latin origin, both in the civil institutions and still more in the religious rites and ceremonies of the rising republic. Beyond this it is impossible to pronounce with certainty as to the real value and significance of the traditions preserved to us in the poetical legends transmitted in the garb of history; and it is impossible in an article like the present to give even an outline of the various theories that have been devised by modern writers to put an historical interpretation upon the records thus preserved to us. It is clear, however, that the power of the Sabines was by no means broken, even by the establishment of the more powerful monarchy at Rome under the Tarquins, and for a period of more than fifty years after the fall of the monarchy we find the Romans engaged in almost perpetual hostilities against the Sabines on the one side and the Æquians and Volscians on the other. At length in the year 449 B.C. the Sabines were defeated by the consul M. Horatius, in an action which appears to have been of so decisive a character that we do not find them again appearing in arms against the Romans for a period of more than 160 years. Their quiescence is the more singular as during this interval the republic was engaged in the long series of the Samnite Wars, in which their adversaries were the direct descendants of the Sabines, and had therefore every claim on their support. Still more unaccountable is it that, after looking on with apparent neutrality for so long, we find the Sabines in the year 290 B.C. once more in arms against Rome, and that at a period when the Third Samnite War had for a time crushed all the hopes of their natural allies. The result was, as might have been expected, that they found themselves wholly unequal to contend single-handed against the power of Rome, and the consul M'. Curius Dentatus reduced them to submission in a single campaign. They were severely punished for this defection; and henceforth their national existence was at an end. Those who survived the slaughter of the war were admitted to the position of Roman citizens, though at first without the right of suffrage, but twenty years after this also was granted them, and they were to all intents and purposes incorporated in the Roman state. Thus separated from all the tribes of kindred origin, they never again appear in history, and, like the Campanians and Latins, were content to swell the ranks of the Roman legions even in the fierce struggle of the Social War (91–88 B.C.). Under the arrangements of the Roman empire their very name was lost as a territorial designation, but it always continued in popular use, and was revived in the Middle Ages as that of an ecclesiastical province. Even at the present day every peasant in the neighborhood of Rome will point to La Sabina as the familiar appellation of the lofty mountain tract to the north of the city.

The limits of the territory occupied by the Sabines do not appear to have varied much from a very early period till the days of Strabo. That geographer describes them as extending as far south as Eretum near the Tiber, on the road to Rome, and a few miles only from Cures, the reputed birthplace of Tatius and Numa, but which in his time had become a mere village. The principal town of the Sabines was Reate (still called Rieti), in the midst of the beautiful and fertile valley of the Velino, and from thence they occupied the upper valley of that river to its sources in the Monte della Sibilla and the rugged mountain valleys which connected it with that of the Aternus. Here was found Amiternum, the original capital of the tribe, near the modern Aquila, and between that and Reate lay Interocrea (Antrodoco), in a pass that has always formed one of the leading lines of communication

through the central Apennines. In the extreme north was Nursia (Norcia), noted for the coldness of its climate, and celebrated in ecclesiastical history as the birthplace of St. Benedict. These were the only towns of any importance in the territory of the Sabines; but they lived for the most part scattered in villages about the mountains, a circumstance absurdly alleged by some Roman writers as a proof of their Laconian origin. It was doubtless owing to this habit, as well as to the rugged mountainous character of the country in which they dwelt, that the Sabines owed the primitive simplicity of their manners and the frugal and severe character which distinguished them even in the days of Augustus. All readers of Horace must be familiar with his frequent allusions to the moral purity and frugal manners of the people that surrounded his Sabine villa, which was situated on the reverse of Mount Lucretilis, only about 15 miles from the rich and luxurious Tibur (Tivoli). The small town of Varia (Vicovaro), in its immediate neighborhood, seems to have marked the frontier on this side.

No remains of the Sabine language are extant in the form of inscriptions, but coins struck during the Social War with the inscription "Safinim" show that the native appellation was the same as that in use among the Latins. The form "Sabellus" is frequently found in Latin writers as an ethnic adjective equivalent to Sabine; but the practice adopted by modern writers, of employing the term "Sabellian" to designate all the tribes of Sabine origin, including Samnites, Lucanians, etc., was first introduced by Niebuhr, and is not supported by any ancient authority. (E. H. B.)

SABLE (*Mustela zibellina*). See MARTEN, vol. xv. p. 584, and FUR, vol. ix. p. 736.

SABLES D'OLONNE, a seaport town of France, the chef-lieu of an arrondissement of the department of La Vendée, is situated on the Atlantic seaboard in 46° 30′ N. lat., 300 miles southwest of Paris by the railway for Tours and La-Roche-sur-Yon. The town stands between the sea on the south and the port on the north, while on the west it is separated by a channel from the suburb of La Chaume, built at the foot of a range of dunes 65 feet high, which terminates southwards in the rocky peninsula of L'Aiguille (the Needle), defended by Fort St. Nicholas. To the north of Sables extend salt-marshes and oyster-parks, stocked from Auray or Cape Breton, and yielding 6,000,000 to 8,000,000 oysters per annum. The port of Sables, consisting of a tidal basin and a wet-dock, is accessible only to vessels of from 350 to 400 tons, and is dangerous when the winds are from the southwest. The entrance is shown by six lights; a seventh lighthouse, that of the Barges, a mile out at sea to the west, has a height of 80 feet and is visible for 17 to 18 nautical miles. In 1882 145 vessels (62,073 tons) entered and 146 vessels (61,037 tons) cleared. The staple articles of trade are grain, wine, cattle, timber, salt, tar, fish, building stone, manures; 400 boats are engaged in the sardine fishery. The beautiful smoothly sloping beach, a mile in length, is much frequented by bathers. It is lined by an embankment which serves as a promenade and drive, and is bordered by hotels, villas, and cafés. The population in 1881 was 9769, that of the commune 10,420.

Founded by Basque or Spanish sailors, Sables was the first place in Poitou invaded by the Normans in 817. Louis XI., who went there in 1472, granted the inhabitants various privileges, improved the harbor, and fortified the entrance. Captured and recaptured during the Wars of Religion, the town afterwards became a nursery of hardy sailors and privateers, who harrassed the Spaniards and afterwards the English. In 1696 Sables was bombarded by the combined fleets of England and Holland. Hurricanes have more than once caused grievous damage to town and harbor.

SACCATOO. See SOKOTA.

SACCHETTI, FRANCO (*c.* 1335-*c.* 1400), Italian novelist, was the son of Benci di Uguccione, surnamed "Buono," of the noble and ancient Florentine family of the Sacchetti (comp. Dante, *Par.*, c. xvi.), and was born at Florence about the year 1335. While still a young man he achieved repute as a poet, and he appears to have travelled on affairs of more or less importance as far as to Genoa, Milan, and "Ischiavonia." When a sentence of banishment was passed upon the rest of the house of Sacchetti by the Florentine authorities in 1380 it appears that Franco was expressly exempted, "per esser tanto uomo buono," and in 1383 he was one of the "eight," discharging the office of "prior" for the months of March and April. In 1385 he was chosen ambassador to Genoa, but preferred to go as podestà to Bibbiena in Casentino. In 1392 he was podestà of San Miniato, and in 1396 he held a similar office at Faenza. In 1398 he received from his fellow-citizens the post of captain of their then province of Romagna, having his residence at Portico. The date of his death is unknown; most probably it occurred about 1400 though some writers place it as late as 1410.

Sacchetti left a considerable number of *sonnetti, canzoni, ballate, madrigali*, etc., which have never been printed, but which are still extant in at least one MS. in the Laurentian library of Florence. His *Novelle* were first printed in 1724, from the MS. in the same collection, which, however, is far from complete. They were originally 300 in number, but only 258 in whole or in part now survive. They are written in pure and elegant Tuscan, and, based as they are for the most part on real incidents in the public and domestic life of Florence, they are valuable for the light they throw on the manners of that age, and occasionally also for the biographical facts preserved in them. But in no other respect do they come up to the corresponding compositions of his friend Boccaccio. Some of them, it need hardly be said, are very coarse—a feature not compensated for by the moralizings almost invariably appended—and many more are dull and pointless, leaving the impression, as Sismondi has remarked, that in that century of artistic advance the art of conversation had remained far behind the others.

SACCHI, ANDREA (*c.* 1600–1661), a leading painter of the later Roman school, was born in Rome in 1600, or perhaps as early as 1598. His father, Benedetto, a painter of undistinguished position, gave him his earliest instruction in the art; Andrea then passed into the studio of Albani, of whom he was the last and the most eminent pupil, and under Albani he made his reputation early. The painter of Sacchi's predilection was Raphael; he was the jealous opponent of Pietro da Cortona, and more especially of Bernini. In process of time he became one of the most learned designers and one of the soundest colorists of the Roman school. He went to Venice and to Lombardy to study Venetian color and the style of Correggio; but he found the last-named master unadaptable for his own proper methods in art, and he returned to Rome. Sacchi was strong in artistic theory, and in practice slow and fastidious; it was his axiom that the merit of a painter consists in producing, not many middling pictures, but a few and perfect ones. His works have dignity, repose, elevated yet natural forms, severe but not the less pleasing color, a learned treatment of architecture and perspective; he is thus a painter of the correct and laudable academic order, admired by connoisseurs rather than by ambitious students or the large public. His principal painting, often spoken of as the fourth best easel-picture in Rome—in the Vatican Gallery—is St. Romuald relating his Vision to Five Monks of his Order. The pictorial *crux* of dealing with these figures, who are all in the white garb of their order, has often been remarked upon; and as often the ingenuity and judgment of Sacchi have been praised in varying the tints of these habits according to the light and shade cast by a neighboring tree. The Vatican Gallery contains also an early painting of the master, —the Miracle of St. Gregory, executed in 1624; a mosaic of it was made in 1771 and placed in St. Peter's. Other leading examples are the Death of St. Anna, in S. Carlo ai Catinari; St. Andrew, in the Quirinal; St. Joseph, at Capo alle Case; also, in fresco, a ceiling

in the Palazzo Barberini—Divine Wisdom—reckoned superior in expression and selection to the rival work of Pietro da Cortona. There are likewise altar-pieces in Perugia, Foligno, and Camerino. Sacchi, who worked almost always in Rome, left few pictures visible in private galleries: one, of St. Bruno, is in Grosvenor House. He had a flourishing school: Nicholas Poussin and Carlo Maratta were his most eminent scholars; Luigi Garzi and Francesco Lauri were others, and Sacchi's own son Giuseppe, who died young, after giving very high hopes. This must have been an illegitimate son, for Andrea died unmarried. This event took place in Rome in 1661.

SACCHINI, Antonio Maria Gasparo (1734–1786), musical composer, of the Italian school, was born at Pozzuoli, 23d July, 1734, and educated under Durante at the Conservatorio di San Onofrio at Naples. His first serious opera was produced at Rome in 1762, and was followed by many others, nearly all of which were successful. In 1769 he removed to Venice; and in 1772 he visited London, where, notwithstanding a cruel cabal formed against him, he achieved a brilliant success, especially in his four new operas, *Tamerlano*, *Lucio Vero*, *Nitetti e Perseo*, and *Il Gran Cid*. Ten years later he met with an equally enthusiastic reception in Paris, where his *Rinaldo* was produced under the immediate patronage of Queen Marie Antoinette, to whom he had been recommended by the emperor Joseph II. But neither in England nor in France did his reputation continue to the end of his visit. He seems to have been everywhere the victim of bitter jealousy. Even Marie Antoinette was not able to support his cause in the face of the general outcry against the favor shown to foreigners; and by her command, most unwillingly given, his last opera and undoubted masterpiece, *Œdipe à Colone*, was set aside in 1786 to make room for Lemoine's *Phèdre*,—a circumstance which so preyed upon his mind that he died of chagrin, 7th October, 1786.

Sacchini's style was rather graceful than elevated, and he was deficient both in creative power and originality. But the dramatic truth of his operas, more especially the later ones, is above all praise, and he never fails to write with the care and finish of a thorough and accomplished musician. *Œdipe* was extremely successful after his death, and has since been performed at the Académie nearly 600 times. The last performance of which any record has reached us took place in 1844.

SACHEVERELL, Henry (1674–1724), an English church and state politician of extreme views, was born in 1674, the son of Joshua Sacheverell, rector of St. Peter's, Marlborough, who at his death left a large family in poverty. Henry Sacheverell matriculated at Magdalen College, Oxford, 28th August, 1689, and was demy of his college from 1689 to 1701, and fellow from 1701 to 1713. Addison, another Wiltshire lad, entered at the same college two years earlier, but was also elected a demy in 1689; he inscribed to Sacheverell in 1694 his account of the greatest English poets. Sacheverell took his degree of B.A. in 1693, and became M.A. in 1696 and D.D. in 1708. His first preferment was the small vicarage of Cannock in Staffordshire; but he leapt into notice when holding a preachership at St. Saviour's, Southwark. His famous sermons on the church in danger from the neglect of the Whig ministry to keep guard over its interests were preached, the one at Derby, 14th August, the other at St. Paul's Cathedral, 5th November, 1709. They were immediately reprinted, the latter being dedicated to the lord mayor and the former to the author's kinsman, George Sacheverell, high sheriff of Derby for the year; and, as the passions of the whole British population were at this period keenly exercised between the rival factions of Whig and Tory, the vehement invectives of this furious divine on behalf of an ecclesiastical institution which supplied the bulk of the adherents of the Tories made him their idol. The Whig ministry, then slowly but surely losing the support of the country, were divided in opinion as to the propriety of prosecuting this zealous parson. Somers was against such a measure; but Godolphin, who was believed to be personally alluded to in one of these harangues under the nickname of "Volpone," urged the necessity of a prosecution, and gained the day. The trial lasted from 27th February to 23d March, 1710, and the verdict was that Sacheverell should be suspended for three years and that the two sermons should be burnt at the Royal Exchange. This was the decree of the state, and it had the effect of making him a martyr in the eyes of the populace and of bringing about the downfall of the ministry. Immediately on the expiration of his sentence 13th (April, 1713) he was instituted to the valuable rectory of St. Andrew's, Holborn, by the new Tory ministry, who despised the author of the sermons, although they dreaded his influence over the mob. He died at the Grove, Highgate, on 5th June, 1724.

Ample information about his life and trial will be found in Hearne's *Diaries*, Bloxam's *Register of Magdalen*, iii. 98–110, and Hill Burton's *Queen Anne*, vol. ii. Mr. Madan of the Bodleian Library has compiled a Sacheverell bibliography.

SACHS, Hans (1494–1576), the most eminent German poet of the 16th century, was born at Nuremberg on the 5th November, 1494. His father was a tailor, and Hans was trained to the same calling. Before beginning his apprenticeship, however, he was educated at the Latin school of Nuremberg. Having finished his "Lehrjahre" as a shoemaker, he began his "Wanderjahre" in 1511, and worked at his craft in many towns, including Ratisbon, Passau, Salzburg, Leipsic, Lübeck, and Osnabrück. In 1516 he returned to Nuremberg, where he remained during the rest of his life, working steadily at his business, and devoting his leisure time to literature. He married in 1519, and after his wife's death he married again in 1561. He died on 19th January, 1576.

Sachs was much respected by his fellow-citizens, and acquired great fame as a poet. Early in life he received instruction in the principles and rules of the "Meistergesang," and at Munich in 1513 he completed his study of "the charming art." Afterwards he wrote many poems in the formal manner of the "Meistersinger," but to these efforts he attributed so little importance that he did not include them in his own collection of his works. Among his best writings are his hymns, in which he gave expression to the highest spiritual aspirations of the age of the Reformation. He was one of the most ardent adherents of Luther, and in 1523 wrote in his honor the poem beginning, "Die wittenbergisch Nachtigall, Die man jetz höret überall." This poem attracted much attention and was of great service to Luther. Sachs also wrote in verse many fables, parables, tales, and dialogues. Of his dramatic poems, the most remarkable are his *Shrove Tuesday Plays*, in each of which he offers a lively representation of an action without any attempt at exact portraiture or at a profound appreciation of motives. Works of this kind were popular before Sachs's time, but he gave them fresh vitality by his humor and fancy. Sachs had extraordinary fertility of imagination, and none of his German contemporaries approached him in his mastery of the forms of literary expression which were then known. He wrote thousands of poems, and in his lifetime a large number of them were printed in three volumes; after his death two additional volumes appeared; and in recent times many volumes of his works in manuscript have been discovered. From about the middle of the 17th century, when German writers of verse became as a rule mere imitators of foreign models, Sachs was almost forgotten, until interest in his work was revived by Goethe; and many selections from his writings have since been published. A complete edition, prepared by A. von Keller, has been issued by the Literary Society of Stuttgart. A biography of Sachs by M. Solomon Ranisch was published in 1765, and there are later biographies by J. L. Hoffman (1847), Weller (1868), and Lützelberger (1874).

SACKING and SACK MANUFACTURE. Sacking is a stout close-woven fabric, properly of flax, but now very largely made of jute. The chief centres of the manufacture are Dundee and Forfar in Scotland. Sacks, however, are made of many qualities and from

different fibres, according to the purposes to which they are devoted. A large proportion of flour sacks, those particularly of American origin, are made of stout cotton. Numerous attempts have been made to manufacture seamless sacks; but none have met with success. The invention of a sewing-machine for the "overhead" seaming of sacks has been successfully solved in the machine of Laing and other inventors.

SACO, a city of the United States, in York county, Maine, on the left or north bank of the Saco river, opposite Biddeford, 9 miles from the sea and 100 from Boston by the Boston and Maine Railroad. The water-power furnished by the river, which here falls 55 feet, is utilized by various cotton-factories, machine-shops, lumber-mills, etc. Originally included in Biddeford, but separately incorporated in 1762 as Pepperellborough, Saco received its present name in 1805 and was made a city in 1867. The population was 5755 in 1870 and 6389 in 1880.

SACRAMENT. The Latin word *sacramentum*, meaning "an oath," is most commonly used by classical writers to denote the military oath of allegiance; for its technical application in legal phraseology see ROMAN LAW, vol. xx. p. 699. In the earliest ecclesiastical Latin traces of the old military meaning are still present; thus Tertullian (*Ad Mart.*, 3) writes, "We were called to the warfare of the living God in our very response to the sacramental words [in baptism]"; but the main import of the word has entirely changed, it being used simply as the equivalent of the Greek *μυστήριον*. Thus even in the Vulgate we still have the "sacrament of godliness" (1 Tim. iii. 16), "of the seven stars" (Rev. i. 20), "of the woman and the beast" (Rev. xvii. 7); but in earlier Latin versions the word also occurred in numerous other places where "mysterium" is now found (*e.g.*, Rom. xvi. 25; 1 Cor. xiii. 2). In addition to its general sense the word *μυστήριον* not unnaturally soon came to have for Christians a more special meaning as denoting those external rites of their religion, solemn, instructive, and more or less secret, which had most analogy with the MYSTERIES (*q.v.*) of paganism. No attempt, however, was at first made to enumerate or to define these. Tertullian speaks of the sacrament of baptism and the Eucharist, Cyprian of "either sacrament," meaning baptism and confirmation, and many others, following Eph. v. 22 (see Vulgate), of the sacrament of marriage, but all with the utmost vagueness. Augustine's definition of the word was little more explicit, but for centuries it was all the Western Church had, and for even a longer period it continued to be a sufficiently adequate expression of the Oriental view also. According to him a sacrament is "the visible form of invisible grace," or "a sign of a sacred thing." The sacraments he principally has in view are those of baptism and the Lord's Supper, but with so wide a definition there was nothing to prevent him from using the word (as he freely does) in many other applications. The old Sacramentaries or liturgical books, which can in some cases be carried back as far as to the 8th century, in like manner contain prayers and benedictions, not only for the administration of the Eucharist and of baptism, but also for a variety of other rites, such as the blessing of holy water and the dedication of churches. In the *De sacramentis Christianæ fidei* of Hugh of St. Victor (d. 1141), no fewer than thirty sacraments are enumerated, divided into three classes, baptism and the Lord's Supper occupying a first place. What proved to be an important new departure was taken by Peter Lombard (d. 1164), in the 4th book of his *Sentences*, which treats "of sacraments and sacramental signs." There for the first time are enumerated the seven sacraments (baptism, confirmation, the Eucharist, penance, extreme unction, order, matrimony), which were afterwards formally recognized by the Church of Rome at the councils of Florence (1439) and of Trent; and there also for the first time it was expressly recognized that not all signs of sacred things can be regarded as sacraments, but only those which are the form of invisible grace in such a sense as to represent it and bring it about ("ut ipsius imaginem gerat et causa existat"). This "differentia" of the sacrament, properly so called, became the basis of all subsequent scholastic discussion and authoritative decree in the Western church, and even, though of course indirectly, in the Eastern also. The main points in the Tridentine doctrine are these: the sacraments have the power of conferring grace *ex opere operato* on the recipients who do not resist it ("non ponentibus obicem"); for their validity, however, there must be in the minister the intention of doing that which the church does. Though all are in a sense necessary, they are not so with equal directness for each individual, nor are they alike in dignity. The two principal sacraments are baptism and the Lord's Supper. All were instituted by Christ. Three of them (baptism, confirmation, order) impart an indelible "character," and therefore cannot be repeated. For the teaching of the Greek Church compare vol. xi. pp. 141, 142. The churches of the Reformation, while retaining the current doctrine that sacraments were "effectual signs of grace and God's good will" "ordained by Christ," reduced their number to two, the remaining five being excluded partly because direct evidence of their institution by Christ was wanting, and partly because "they have not any visible sign or ceremony ordained of God." For further details on the individual sacraments the reader is referred to the separate articles (BAPTISM, EUCHARIST, etc.).

SACRAMENTO, a city of the United States, the capital of California and the county seat of Sacramento county, 135 miles by rail northeast of San Francisco on the east bank of the Sacramento river, which at this point receives the American river and becomes navigable for large steamboats. The site is only 15 feet above low water of the river, or 30 above sea-level, and as the river sometimes rises 20 feet the city was originally subject to destructive floods. Those of 1850, 1852, and 1853, however, led to the raising of the level of the principal streets and buildings in the business quarter by 5 feet, and to the construction of strong levees or embankments, from 4 to 20 feet high for 2 miles along the Sacramento and 3 along the American river. Further measures of the same kind were adopted after the disaster of 1861, which almost rendered the city bankrupt; and the level of the principal districts is now 8 feet above the river. The shops and stores in the city are mostly brick, but the dwelling-houses generally only of wood. The State capitol, commenced in 1861 and completed at a cost of $2,500,000, is one of the finest buildings of its kind in the States; it stands in the heart of the city in the midst of a park of 50 acres. The other public buildings—the State printing-office and armory, the agricultural hall, the Oddfellows' hall, the hospital, the grammar-school, etc.—are comparatively unimportant. Besides the State library (36,000 volumes) there are two other public libraries in the city. The number of industrial establishments has recently been rapidly increasing; they comprise the extensive workshops of the Central Pacific Railroad, a woollen-mill, carriage-factories, plough-factories, marble-works, breweries, potteries, glue-works, etc. The population was 6820 in 1850, 13,785 in 1860, 16,283 in 1870 (6202 foreigners, 1370 Chinese), and 21,420 in 1880 (7048 foreigners, 1781 Chinese).

In 1841 John Augustus Sutter (b. 1803), a Swiss military officer, obtained a grant of land at the junction of the Sacramento and American rivers, and made a settlement which he called New Helvetia. The discovery of gold on his property in 1848 changed the whole history of California. Sutter's Fort, as the spot was popularly called, became the site of a mining town, which was made the capital of the State in 1854, and obtained a city charter in 1863. The name of Sacramento was first applied to the place in the advertisement for the sale of ground-lots in 1848.

SACRIFICE. The Latin word *sacrificium*, from which we have the English "sacrifice," properly means an action within the sphere of things sacred to the gods, so that "sacrificial" and "hierurgic" are synonymous, and, strictly speaking, cover the whole field of sacred ritual. By the Romans, as by all ancient or primitive nations, the gods were habitually approached with gifts, and the presentation of the gift, being the central feature in every ordinary act of worship, is regarded as the sacrifice proper. In all parts of the world, moreover, for reasons which will appear by and by, the stated gifts by which the gods are honored in private worship or public feasts are drawn from the stores on which human life is supported,—fruits, grain, wine, oil, the flesh of animals, and the like. All gifts of this kind, which are not merely presented to the god but consumed in his service, fall under the notion of sacrifice, while permanent votive offerings of treasure, lands, temples, images, or the like, not forming part of any stated ritual, are excluded. But again, where we find a practice of sacrificing honorific gifts to the gods, we usually find also certain other sacrifices which resemble those already characterized inasmuch as something is given up by the worshippers to be consumed in sacred ceremony, but differ from them inasmuch as the sacrifice—usually a living victim—is not regarded as a tribute of honor to the god, but has a special atoning or mystic significance. The most familiar case of this second species of sacrifice is that which the Romans distinguished from the *hostia honoraria* by the name of *hostia piacularis*. In the former case the deity accepts a gift; in the latter he demands a life. The former kind of sacrifice is offered by the worshipper on the basis of an established relation of friendly dependence on his divine lord; the latter is directed to appease the divine anger, or to conciliate the favor of a deity on whom the worshipper has no right to count. The precise scope of sacrifices not merely honorific will appear more clearly in the sequel; for the history of religion this second kind of sacrifice has a very peculiar importance, as may be judged from the fact that the ordinary metaphorical use of "sacrifice" in English answers not to the notion of a "gift" but to that of "reluctant surrender."[1]

Honorific Sacrifices naturally hold the chief place in all natural (as opposed to positive) religions that have reached the stage in which orthodox ritual is differentiated from sorcery (comp. PRIEST, vol. xix. p. 745), and in which the relations between the gods and their worshippers are conceived as being of a fixed and habitually friendly character, so that the acts by which a continuance of divine favor can be secured are known by well-established tradition and regularly practiced with full confidence in their efficacy. Religions of this type unite the god to a definite circle of worshippers forming a natural unity, so that every man's birth or political and social status determines at once what god he is called upon to worship and may confidently look to for help. Religions of this sort, therefore, are mainly tribal or national, and the deity is regarded as a king, or, if there are several gods worshipped by the same circle, they are lords and ladies and are naturally to be honored in the same way as earthly grandees. Thus among the Hebrews, whose early institutions afford a typical example of a national religion, the fundamental rule is that no one is to appear before Jehovah empty-handed (Exod. xxiii., 15), just as it would be indecent (and in the East is still indecent) to approach a king or great man without some present, however trifling. In like manner Homer teaches that gods and kings alike are persuaded by gifts. A special request will naturally be accompanied by a special gift proportioned to the occasion or by a vow to be fulfilled when the prayer is heard; but apart from this the general good-will whether of god or king falls to be acknowledged and secured by offerings renewed from time to time by way of tribute or homage. Thus in Hebrew the word *minha* means alike "gift," "tribute," and "sacrificial oblation," especially an oblation of agricultural produce. For in a simple agricultural society payments in kind, whether to a divine or to a human lord, would naturally consist for the most part of the fruits of the soil; and with this it agrees that not only in Canaan but among the Greeks there is evidence that cereal oblations had a great place in early ritual, though they afterwards became second in importance to animal sacrifices, which yielded a more luxurious sacrificial banquet, and also, as we shall see, derived a peculiar significance from the shedding of the victim's blood. In almost all nations we find that the chief sacrificial feasts are associated with the harvest and the vintage, or, where pastoral life predominates, are regulated by the time at which the flocks bear their young (comp. PASSOVER); at these seasons tribute of firstfruits and firstlings is paid to the gods of the good things which they themselves have given to the inhabitants of their land. This conception of sacrifice may go with very various views of the nature of the gods and of religion. It may go with the idea that the god has need of the worshipper and his gifts just as the worshipper has need of the god and his help, and thus with a matter-of-fact business-like people like the Romans religion may become very much a sort of bargain struck with the gods. But, on the other hand, it is quite possible that sacrifices may continue to be offered by men who have ceased to believe that the deity has any need of what man can give, simply because such gifts are in ordinary life the natural expression of respect and homage and no fitter and more expressive way of giving utterance to the same feelings towards the gods has been devised. Thus the Hebrews continued to offer sacrifices to Jehovah long after they knew that "if He were hungry He would not tell man, for the world was His and the fulness thereof." But when this standpoint is reached sacrifice becomes a merely conventional way of expressing religious feeling; the ritual becomes a simple affair of tradition, which may, as in the Levitical legislation, be based on an express divine command; and those who are not content with the authority of tradition as a sufficient proof that the gods love to be honored in this way take refuge in some allegorical explanation of the ceremonial. In general, however, we find an extraordinary persistence of the notion that sacrifices do in some way afford a physical satisfaction to the deity. If they do not feed him, he is at least gratified by their odor. Neither the Greek philosophers nor the Jewish rabbins ever quite got rid of this idea.

But in fact the notion that the more ethereal elements of the sacrifice rise to heaven, the seat of the gods, in the savory smoke that ascends from the sacrificial flame can in certain instances be shown to be connected with a later development of sacrifice. Among the Semites, for example, sacrifices were not originally burned. The god was not seated aloft, but was present at the place of sacrifice, inhabiting a sacred stone (a baetylium, beth-el, or "house of god"), which answered at once to the later idol and the later altar. That the god was thought by the heathen Semites to inhabit the sacred stone, or in other cases a sacred tree, is expressly recorded of several Arabian sanctuaries, and it cannot be doubted that this was the general view wherever there was a *massēba* (sacred cippus) or an *ashera* (sacred pole or tree). And in these cases the gift of the worshipper was not, in the more primitive cults, consumed by fire, but the sacred stone was daubed with oil or blood, libations of milk, of blood, or of wine were poured forth beside it, cereal gifts were presented by being simply laid on the sacred ground, and slaugh-

[1] Apart from this metaphorical use the word "sacrifice" in English is often taken as synonymous with "victim," bloodless oblations being called rather by the vague word "offering." This usage corresponds to the practice of the Authorized Version, which commonly renders זבח ומנחה, *i.e.*, "victim and cereal oblation," by the words "sacrifice and offering," and uses the verb "to sacrifice" for the Hebrew זבח, "to slaughter a victim."

tered victims were left there to be devoured by wild beasts (Sprenger, *Leb. Moh.*, iii. 457), or even a human sacrifice was offered by burying the victim under the cippus. Sacrifices of this type are found not only throughout the Semitic field but in all parts of the world; they belong to the same category with the Hebrew show-bread and the Roman *lectisternia*. In later times the food spread on the tables of the god is eaten by his ministers, the priests, to whom he is supposed to make over the enjoyment of the banquet; but this is a refinement on the original usage. In older times the gods themselves were held to partake of these gifts of food, just as the venerable dead were fed by the meat and drink placed or poured out upon their tombs. In the religions of savages both gods and the dead have very material needs, among which the need of nourishment has the first place; and just as we learn from the story of Periander and Melissa (Herod., v. 92) that among the Greeks of the 7th century B.C. it was a new idea that the dead could make no use of the gifts buried with them unless they were etherealized by fire, so also the fact that among the Greeks, especially in old times, sacrifices to water-gods were simply flung into the river, or the sea, and sacrifices to underground gods were buried, indicates that it is a secondary idea that the gods were too ethereal to enjoy a sacrifice through any other sense than that of smell. Even the highest antique religions show by unmistakable signs that in their origin sacrifices were literally "the food of the gods." In Israel the conception against which the author of Psalm l. protests so strongly was never eliminated from the ancient technical language of the priestly ritual, in which the sacrifices are called אלהים לחם, "food of the deity" (Lev. xxi. 8, 17, 21); and among the Greeks we find not only such general expressions that as the gods "feast on hecatombs" (*Il.*, ix. 531) but even that particular gods bear special surnames, such as "the goat-eater," the "ram-eater," "Dionysus the eater of raw (human) flesh" (*αἰγοφάγος, κριοφάγος, ὠμηστής*).

A sacrifice, therefore, is primarily a meal offered to the deity. In some of the cases already noticed, and in the case of holocausts or whole burnt-offerings, the sacrificial gift is entirely made over to the god; but ordinarily the sacrifice is a feast of which gods and worshippers partake together. If all sacrifices are not convivial entertainments, at least the tendency is to give to all feasts, nay to all meals, a sacrificial character by inviting the gods to partake of them (Athenæus, v. 19). Thus the Roman family never rose from supper till a portion of the food had been laid on the burning hearth as an offering to the Lares (Serv., *Ad Æn.*, i. 730; Ovid, *Fast.*, ii. 633); and a similar practice was probably followed in early Greece.[1] At all events the slaughter of an animal (which gave the meal a more luxurious and festal character, animal food being not in daily use with the mass of the agricultural populations of the Mediterranean lands) seems to have been always sacrificial in early Greece, and even in later times St. Paul assumes that the flesh sold in the shambles would often consist of *εἰδωλόθυτα*. Among the Semites sacrifice and slaughter for food are still more clearly identified; the Hebrews use the same word for both, and the Arabian invocation of the name of Allah over every beast killed for food is but the relic of a sacrificial formula. The part of the gods in such sacrificial meals was often very small, the blood alone (Arabia), or the fat and the thighs (*Il.*, i. 460), or small parts of each joint (*Od.*, xiv. 427), or the blood, the fat, and the kidneys (Lev. iii.). When the sacrifice was offered by a priest, he also naturally received a portion, which, properly speaking, belonged to the deity and was surrendered by him to his minister, as is brought out in the Hebrew ritual by the ceremonial act of waving it towards the altar (Lev. vii. 29 *sq.*). The thigh, which in Homeric sacrifice is burned on the altar, belongs in the Levitical ritual to the priest, who was naturally the first to profit by the growth of a conviction that the deity himself did not require to be fed by man's food.

[1] See the discussion in Buchholz, *Homer, Realien*. II. ii. 213 *sq.*

The conception of the sacrifice as a banquet in which gods and men share together may be traced also in the accessories of sacred ritual. Music, song, garlands, the sweet odor of incense, accompany sacrifice because they are suitable to an occasion of mirth and luxurious enjoyment. Wine, too, "which cheereth gods and men" (Judges ix. 13,) was seldom lacking in the vine-growing countries; but the most notable case where the sacrificial feast has the use of an intoxicant (or narcotic) as its chief feature is the ancient *soma* sacrifice of the old Aryans, where the gods are honored by bowls of the precious draught which heals the sick, inspires the poet, and makes the poor believe that he is rich.

The sacrificial meal, with the general features that have been described, may be regarded as common to all the so-called nature-religions of the civilized races of antiquity,—religions which had a predominantly joyous character, and in which the relations of man to the gods were not troubled by any habitual and oppressive sense of human guilt, because the divine standard of man's duty corresponded broadly with the accepted standard of civil conduct, and therefore, though the god might be angry with his people for a time, or even irreconcilably wroth with individuals, the idea was hardly conceivable that he could be permanently alienated from the whole circle of his worshippers,—that is from all who participated in a certain local (tribal or national) cult. But when this type of religion began to break down the sacrificial ritual underwent corresponding modifications. Thus we find a decline of faith in the old gods accompanied, not only by a growing neglect of the temples and their service, but also by a disposition to attenuate the gifts that were still offered, or to take every opportunity to cheat the gods out of part of their due,—a disposition of which Arabia before Mohammed affords a classical example. But, again, the decline of faith itself was not a mere product of indifference, but was partly due to a feeling that the traditional ritual involved too material a conception of the gods, and this cause, too, tended to produce modifications in sacrificial service. The Persians, for example (Herod., i. 132; Strabo, xv. p. 732), consecrated their sacrifices with liturgical prayers, but gave no part of the victim to the deity, who "desired nothing but the life (or soul) of the victim." This, indeed, is the Roman formula of piacular as distinct from honorific offerings (Macrob., iii. 5, 1), and might be taken as implying that the Persians had ceased to look on sacrifices as gifts of homage; but such an explanation can hardly be extended to the parallel case of the Arab sacrifices, in which the share of the deity was the blood of the victim, which according to antique belief contained the life. For among the Arabs blood was a recognized article of food, and the polemic of Ps. l. 13 is expressly directed against the idea that the deity "drinks the blood of goats." And the details given in Strabo make it tolerably clear that Persian sacrifice is simply an example of the way in which the material gift offered to the deity is first attenuated and then allegorized away as the conception of the godhead becomes less crassly material. But on the other hand it is undoubtedly true that under certain conditions the notion of piacular sacrifice shows much greater vitality than that of sacrificial gifts of homage. When a national religion is not left to slow decay, but shares the catastrophe of the nation itself, as was the case with the religions of the small western Asiatic states in the period of Assyrian conquest, the old joyous confidence in the gods gives way to a sombre sense of divine wrath, and the acts by which this wrath can be conjured become much more important than the ordinary traditional gifts of homage. To this point we must return by and by.

It appears, then, that in the old national nature-religions the ordinary exercises of worship take the form of meals offered to the gods, and usually of banquets at which gods and worshippers sit down together, so that the natural bond of unity between the deity and his subjects or children is cemented by the bond of "bread and salt"—salt is a standing feature in the sacrifices of many races (comp. Lev. ii. 13)—to which ancient and unsophisticated peoples attach so much importance. That the god is habitually willing to partake of the banquet offered to him is taken for granted; but, if anything has occurred to alienate his favor, he will show it by his conduct at the feast, by certain signs known to experts, that indicate his refusal of the offered gift. Hence the custom of inspecting the *exta* of the victim, watching the behavior of the sacrificial flame, or otherwise seeking an omen which proves that the sacrifice is accepted, and so that the deity may be expected to favor the requests with which the gift is associated.[1]

In the religions which we have been characterizing all the ordinary functions of worship are summed up in these sacrificial meals; the stated and normal intercourse between gods and men has no other form. God and worshippers make up together a society of *commensals*, and every other point in their reciprocal relations is included in what this involves. Now, with this we must take the no less certain fact that throughout the sphere of the purely sacrificial religions the circle of common worship is also the circle of social duty and reciprocal moral obligations. And thus the origin of sacrificial worship must be sought in a stage of society when the circle of commensals and the circle of persons united to each other by sacred social bonds were identical. But all social bonds are certainly developed out of the bond of kindred, and it will be generally admitted that all national religions are developments or combinations of the worship of particular kins. It would seem, therefore, that the world-wide prevalence of sacrificial worship points to a time when the kindred group and the group of commensals were identical, and when, conversely, people of different kins did not eat and drink together.

At first sight it might appear that this amounts to the proposition that all religious and civil societies of antiquity have the family as their type, and that the type of sacrifice is such a family meal as is found among the Romans. And this view would seem to be favored by the frequent occurrence among ancient peoples of the conception that the deity is the father (progenitor and lord) of his worshippers, who in turn owe filial obedience to him and brotherly duty to one another. But in the present stage of research into the history of early society it is by no means legitimate to assume that the family, with a father at its head, is the original type of the circle of commensals. It is impossible to separate the idea of commensality from the fact so constantly observed in primitive nations, that each kindred has certain rules about forbidden food which mark it off from all other kindreds. And in a very large proportion of cases kindred obligations, religion, and laws of forbidden food combine to divide a child from his father's and unite him to his mother's kin, so that father and sons are not commensals. It is noteworthy that family meals are by no means so universal an institution as might be imagined *a priori*. At Sparta, for example, men took their regular meals not with their wives and children but in *syssitia* or *pheiditia;* and a similar organization of nations in groups of commensals which are not family groups is found in other places (Crete, Carthage, etc.). The marked and fundamental similarity between sacrificial worships in all parts of the globe makes it very difficult to doubt that they are all to be traced back to one type of society, common to primitive man as a whole. But the nearest approximation to a primitive type of society yet known is that based not on the family but on the system of totem stocks; and as this system not only fulfils all the conditions for the formation of a sacrificial worship, but presents the conception of the god and his worshippers as a circle of commensals in its simplest and most intelligible form, it seems reasonable to look to it for additional light on the whole subject. In totemism and in no other system laws of forbidden food have a direct religious interpretation and form the principal criterion by which the members of one stock and religion are marked off from all their neighbors. For the totem is usually an animal (less often a plant); the kindred is of the stock of its totem; and to kill or eat the sacred animal is an impiety of the same kind with that of killing and eating a tribesman. To eat the totem of a strange stock, on the other hand, is legitimate, and for one totem group to feast on the carcase of a hostile totem is to express their social and religious particularism in the most effective and laudable way, to honor their own totem and to cast scorn on that of the enemy. The importance attached to the religious feast of those who have the same laws about food, and are therefore habitual commensals, is more intelligible on this system than on any other.

Though the subject has not been completely worked out, there is a good deal of evidence, both from social and from religious phenomena, that the civilized nations of antiquity once passed through the totem stage (see FAMILY and MYTHOLOGY); it is at least not doubtful that even in the historical period sacred animals and laws of forbidden food based on the sacredness of animals, in a way quite analogous to what is found in totemism, were known among all these nations. Among the Egyptians the whole organization of the local populations ran on totem lines, the different villages or districts being kept permanently apart by the fact that each had its own sacred animal or herb, and that one group worshipped what another ate. And the sacrificial feast on the carcase of a hostile totem persisted down to a late date, as we know from Plutarch (*Is. et Osir.*, p. 380; comp. Alex. Polyh., ap. Eus., *Præp. Ev.*, lx. p. 432; Diod. Sic., i. 89). Among the Semites there are many relics of totem religion; and, as regards the Greeks, so acute an observer as Herodotus could hardly have imagined that a great part of Hellenic religion was borrowed from Egypt if the visible features of the popular worship in the two countries had really belonged to entirely different types. To suppose that the numerous associations between particular deities and corresponding sacred animals which are found in Greece and other advanced countries are merely symbolical is a most unscientific assumption; especially as the symbolic interpretation could not fail to be introduced as a harmonizing expedient where, through the fusion of older deities under a common name (in connection with the political union of kindreds), one god came to have several sacred animals. But originally even in Greece each kin had its own god or in later language its hero; so in Attica the Crioeis have their hero Crius (Ram), the Butadæ have Butas (Bullman), the Ægidæ have Ægeus (Goat), and the Cynidæ Cynus (Dog). Such heroes are real totem ancestors; Lycus, for example, had his statue in wolf form at the Lyceum. The feuds of clans are represented as contests between rival totems: Lycus the wolf flees the country before Ægeus the goat, and at Argos, where the wolf-god (Apollo Lycius) was introduced by Danaus, the struggle by which the sovereignty of the Danaids was established was set forth in legend and picture as following on the victory of a wolf (representing Danaus) over a bull (representing the older sovereignty of Gelanor); see Paus., ii. 19, 3 *sq.* That Apollo's sacrifices were bulls and rams is therefore natural enough; at the sanctuary of the wolf-Apollo at Sicyon indeed legend preserved the memory of a time when flesh was actually

[1] Hence in Roman ritual there is no inspection of the *exta* where the sacrifice is piacular, and so does not involve a meal offered to the deity.

set forth for the wolves, as totem-worshippers habitually set forth food for their sacred animals,—though by a touch of the later rationalism which changed the wolf-god into Apollo the wolf-slayer (Lycoctonus) the flesh was said to have been poisoned by Apollo's direction in a way that even theological experts did not understand (Paus., ii. 9, 7). Such clear traces of the oldest form of sacrifice are necessarily rare, but the general facts that certain animals might not be sacrificed to certain gods, while on the other hand each deity demanded particular victims, which the ancients themselves explained in certain cases to be hostile animals, find their natural explanation in such a stage of religion as has just been characterized. The details are difficult to follow out, partly because most worships of which we know much were syncretistic, partly because the animals which the gods loved and protected were in later times often confused with the victims they desired, and partly because piacular and mystical sacrifices were on principle (as we shall see by and by) chosen from the class of victims that might not be used for the feasts of the gods. A single example, therefore, must here suffice to close this part of the subject. At Athens the goat might not be offered to the Athena on the Acropolis. Now according to legend Athena's worship was made Panathenaic by the Ægidæ or goat clan, and Athena herself was represented clad in the ægis or goat-skin, an attribute which denotes that she too was of the goat kin or rather had been taken into that kin when her worship was introduced among them.[1]

Generally speaking, then, the original principle on which a sacrificial meal is chosen is that men may not eat what cannot be offered to their god (generalized in later syncretism to the rule that men may not eat things that can be offered to no god; Julian, *Orat.*, v. p. 176 C.); and that, conversely, acceptable offerings are the things which are eaten by predilection by that divine animal which in later times became the sacred symbol of the anthropomorphic god, or else victims are to be chosen which are sacred among a hostile tribe. The two principles may often coincide. Fierce mountain tribes who live mainly by harrying their neighbors in the plain will be wolves, lions, bears, while their enemies will naturally worship bulls, sheep, goats, like the Troglodytes on the Red Sea, who "gave the name of parent to no human being but to the bull and the cow, the ram and the ewe, because from them they had their daily nourishment" (Strabo, xvi. 4); and thus in cases like that of Argos the ultimate shape of the ritual may throw important light on the character of the early population. When by conquest or otherwise two such originally hostile nations are fused the opposing animal symbols will ultimately be found in friendly association: *e.g.*, Artemis (in her various forms) is associated both with carnivora and with stags or domestic animals. The former is the original conception, as her sacrifices show. She is therefore, like the wolf-Apollo, originally the deity of a wild hunting tribe, or rather various carnivorous deities of such tribes have coalesced in her.

Human Sacrifices.—From these observations the transition is easy to those human sacrifices which are not piacular. It is perfectly clear in many cases that such sacrifices are associated with cannibalism, a practice which always means eating the flesh of men of alien and hostile kin. The human wolves would no more eat a brother than they would eat a wolf, but to eat an enemy is another matter. Naturally enough traces of cannibalism persist in religion after they have disappeared from ordinary life, and especially in the religion of carnivorous gods.[2] Thus it may be conjectured that the human sacrifices offered to the wolf-Zeus (Lycæus) in Arcadia were originally cannibal feasts of a wolf tribe. The first participants in the rite were according to later legend changed into wolves (Lycaon and his sons); and in later times, as appears by comparing Plato (*Rep.*, viii. 15) with Pausanias (viii. 2), at least one fragment of the human flesh was placed among the sacrificial portions derived from other victims, and the man who ate it was believed to become a were-wolf. All human sacrifices where the victim is a captive or other foreigner may be presumed to be derived from cannibal feasts; but a quite different explanation is required for the cases, which are by far more numerous among people no longer mere savages, in which a father sacrifices his child or a tribe its fellow-tribesman. This case belongs to the head of piacular sacrifices.

Piacular Sacrifices.—Among all primitive peoples there are certain offences against piety (especially bloodshed within the kin) which are regarded as properly inexpiable; the offender must die or become an outlaw. Where the god of the kin appears as vindicator of this law he demands the life of the culprit; if the kinsmen refuse this they share the guilt. Thus the execution of a criminal assumes the character of a religious action. If now it appears in any way that the god is offended and refuses to help his people, it is concluded that a crime has been committed and not expiated. This neglect must be repaired, and, if the true culprit cannot be found or cannot be spared, the worshippers as a whole bear the guilt until they or the guilty man himself find a substitute. The idea of substitution is widespread through all early religions, and is found in honorific as well as in piacular rites; the Romans, for example, substituted models in wax or dough for victims that could not be procured according to the ritual, or else feigned that a sheep was a stag (*cervaria ovis*) and the like. In all such cases the idea is that the substitute shall imitate as closely as is possible or convenient the victim whose place it supplies; and so in piacular ceremonies the god may indeed accept one life for another, or certain select lives to atone for the guilt of a whole community, but these lives ought to be of the guilty kin, just as in blood-revenge the death of any kinsman of the manslayer satisfies justice. Hence such rites as the Semitic sacrifices of children by their fathers (see MOLOCH), the sacrifice of Iphigeneia and similar cases among the Greeks, or the offering up of boys to the goddess Mania at Rome *pro familiarium sospitate* (Macrob., i. 7, 34). In the oldest Semitic cases it is only under extreme manifestations of divine wrath that such offerings are made (comp. Porph., *De Abst.*, ii. 56), and so it was probably among other races also; but under the pressure of long-continued calamity, or other circumstances which made men doubtful of the steady favor of the gods, piacular offerings might easily become more frequent and ultimately assume a stated character, and be made at regular intervals by way of precaution without waiting for an actual outbreak of divine anger. Thus the Carthaginians, as Theophrastus relates, annually sprinkled their altars with "a tribesman's blood" (Porph., *De Abst.*, ii. 28). But in advanced societies the tendency is to modify the horrors of the ritual either by accepting an effusion of blood without actually slaying the victim, *e.g.*, in the flagellation of the Spartan lads at the altar of Artemis Orthia (Paus., iii. 16, 7; comp. Eurip., *Iph. Taur.*, 1470 *sq.*; 1 Kings xviii. 28), or by a further extension of the doctrine of substitution; the Romans, for example substituted puppets for the human sacrifices to Mania, and cast rush dolls into the Tiber at the yearly atoning sacrifice on the Sublician bridge. More usually, however, the life of an animal is accepted by the god in place of a human life. This explanation of the origin of piacular animal sacrifices has often been disputed,

[1] The religious meaning of wearing the skin of an animal is identification with the animal. Examples will appear below; compare also the were-wolf superstitions (vol. xv. pp. 90-91), where the same symbolism occurs. So too Pausanias (x. 31, 10) describes a representation of the bear-heroine Callisto reclining on a bear-skin couch.

[2] In the Roman empire human sacrifice was practiced at not a few shrines down to the time of Hadrian; for examples the reader may refer to Porphyry, *De Abstin.*, ii. 27, 54 *sq.*, and to Clem. Alex., *Coh. ad Gentes*, p. 27.

mainly on dogmatic grounds and in connection with the Hebrew sin-offerings; but it is quite clearly brought out wherever we have an ancient account of the origin of such a rite (*e.g.*, for the Hebrews, Gen. xxii. 13; the Phœnicians, Porph., *De Abst.*, iv. 15; the Greeks and many others, *ibid.*, ii. 54 *sq.*; the Romans, Ovid, *Fasti*, vi. 162). Among the Egyptians the victim was marked with a seal bearing the image of a man bound, and kneeling with a sword at his throat (Plut., *Is. et Os.*, chap. xxxi.). And often we find a ceremonial laying of the sin to be expiated on the head of the victim (Herod., ii. 39; Lev. iv. 4 compared with xvi. 21).

In such piacular rites the god demands only the life of the victim, which is sometimes indicated by a special ritual with the blood (as among the Hebrews the blood of the sin-offering was applied to the horns of the altar, or to the mercy-seat within the vail), and there is no sacrificial meal. Thus among the Greeks the carcase of the victim was buried or cast into the sea, and among the Hebrews the most important sin-offerings were burnt not on the altar but outside the camp (city), as was also the case with the children sacrificed to "Moloch." Sometimes, however, the sacrifice is a holocaust on the altar (2 Kings, iii. 27), or the flesh is consumed by the priests. The latter was the case with certain Roman piacula, and with those Hebrew sin-offerings in which the blood was not brought within the vail (Lev. vi. 25 *sq.*). Here the sacrificial flesh is seemingly a gift accepted by the deity and assigned by him to the priests, so that the distinction between a honorific and a piacular sacrifice is partly obliterated. But this is not hard to understand; for just as a blood-rite takes the place of blood-revenge in human justice, so an offence against the gods may in certain cases be redeemed by a fine (*e.g.*, Herod., ii. 65) or a sacrificial gift. This seems to be the original meaning of the Hebrew *āshām* (trespass-offering), which was a kind of atonement made partly in money (Lev., v. 15 *sq.*), but accompanied (at least in later times) by a sacrifice which differed from the sin-offering, inasmuch as the ritual did not involve any exceptional use of the blood. The ordinary sin-offerings in which the priests ate the flesh may be a compound of the *āshām* and the properly piacular substitution of life for life. The two kinds of atonement are mixed up also in Micah vi. 6 *sq.*, and ultimately all bloody sacrifices, especially the whole burnt-offering (which in early times was very rare but is prominent in the ritual of the second temple), are held to have an atoning efficacy (Lev. i. 4, xvii. 11). There is, however, another and mystical sense sometimes associated with the eating of sin-offerings, as we shall see presently.

The most curious developments of piacular sacrifice take place in the worship of deities of totem type. Here the natural substitute for the death of a criminal of the tribe is an animal of the kind with which the worshippers and their god alike count kindred; an animal, that is, which must not be offered in a sacrificial feast, and which indeed it is impious to kill. Thus Hecate was invoked as a dog (Porph., *De Abst.*, iii. 17), and dogs were her piacular sacrifices (Plut., *Qu. Rom.*, iii.). And in like manner in Egypt the piacular sacrifice of the cow-goddess Isis-Hathor was a bull, and the sacrifice was accompanied by lamentations as at the funeral of a kinsman (Herod., ii. 39, 40). This lamentation at a piacular sacrifice is met with in other cases, *e.g.*, at the Argean festival at Rome (Marquardt, *Röm. Staatsverw.*, iii. 192), and is parallel to the marks of indignation which in various atoning rituals it is proper to display towards the priest who performs the sacrifice. At Tenedos, for example, the priest was attacked with stones who sacrificed to Bacchus a bull-calf, the affinity of which with man was indicated by the mother-cow being treated like a woman in childbed and the victim itself wearing the cothurnus. As the cothurnus was proper to Bacchus, who also was often addressed in worship and represented in images as a bull, the victim here is of the same race with the god (Æl., *H.N.*, xii. 34; Plut., *Qu. Gr.*, xxxv.) as well as with the worshippers. In such rites a double meaning was suggested: the victim was an animal kindred to the sacrificers, so that his death was strictly speaking a murder, for which, in the Attic Diipolia, the sacrificial axe cast away by the priest was tried and condemned (Paus., i. 24, 4), but it was also a sacred animal sharing the nature of the god, who thus in a sense died for his people. The last point comes out clearly in the annual sacrifice at Thebes, where a ram was slain and the ram-god Amen clothed in his skin. The worshippers then bewailed the ram and buried him in a sacred coffin (Herod., ii. 42). Thus the piacular sacrifice in such cases is merged in the class of offerings which may be called sacramental or mystical.

Mystical or Sacramental Sacrifices.—That the mysteries of races like the Greeks and Egyptians are sprung from the same circle of ideas with the totem mysteries of savage tribes has been suggested in MYTHOLOGY, vol. xvii. p. 158, with which the reader may compare Mr. Lang's book on *Custom and Myth;* and examples of sacramental sacrifices have been adduced in the same article (p. 157) and in MEXICO, vol. xvi. p. 220. In Mexico the worshippers ate sacramentally paste idols of the god, or slew and feasted on a human victim who was feigned to be a representative of the deity. The Mexican gods are unquestionably developed out of totems, and these sacraments are on one line with the totem mysteries of the ruder Indian tribes in which once a year the sacred animal is eaten, body and blood. Now according to Julian (*Orat.*, v. p. 175) the mystical sacrifices of the cities of the Roman empire were in like manner offered once or twice a year and consisted of such victims as the dog of Hecate, which might not be ordinarily eaten or used to furnish forth the tables of the gods. The general agreement with the American mysteries is therefore complete, and in many cases the resemblance extends to details which leave no doubt of the totem-origin of the ritual. The mystic sacrifices seem always to have had an atoning efficacy; their special feature is that the victim is not simply slain and burned or cast away but that the worshippers partake of the body and blood of the sacred animal, and that so his life passes as it were into their lives and knits them to the deity in living communion. Thus in the orgiastic cult of the bull Bacchus the worshippers tore the bull to pieces and devoured the raw flesh. These orgies are connected on the one hand with older practices, in which the victim was human (Orpheus legend, Dionysus Ὠμηστής), and on the other hand with the myth of the murder of the god by his kinsman the Titans, who made a meal of his flesh (Clem. Al., *Coh. ad Gentes*, p. 12). Similar legends of fratricide occur in connection with other orgies (the Corybantes; see Clement, *ut supra*); and all these various elements can only be reduced to unity by referring their origin to those totem habits of thought in which the god has not yet been differentiated from the plurality of sacred animals and the tribesmen are of one kin with their totem, so that the sacrifice of a fellow-tribesman and the sacrifice of the totem animal are equally fratricides, and the death of the animal is the death of the mysterious protector of the totem kin. In the Diipolia at Athens we have seen that the slaughter of the sacred bull was viewed as a murder, but "the dead was raised again in the same sacrifice," as the mystic text had it; the skin was sewed up and stuffed and all tasted the sacrificial flesh, so that the life of the victim was renewed in the lives of those who ate of it[1] (Theophr., in Porph., *De Abst.*, ii. 29 *sq.*).

Mystic sacrifices of this sacramental type prevailed also among the heathen Semites, and are alluded to in Isa. lxv. 4 *sq.*, lxvi. 3, 17; Zech. ix. 7; Lev. xix. 26, etc.,[2]

[1] In the same way the Issedones honored their parents by eating their dead bodies (Herod., iv. 26). The life was not allowed to go out of the family.

[2] For details see W. R. Smith, *Kinship and Marriage in Early Arabia*, p. 309.

from which passages we gather that the victim was eaten with the blood. This feature reappears elsewhere, as in the piacular swine-offerings of the Fratres Arvales at Rome, and possesses a special significance inasmuch as common blood means in antiquity a share in common life. In the Old Testament the heathen mysteries seem to appear as ceremonies of initiation by which a man was introduced into a new worship, *i.e.*, primarily made of one blood with a new religious kinship, and they therefore come into prominence just at the time when in the 7th century B.C. political convulsions had shaken men's faith in their old gods and led them to seek on all sides for new and stronger protectors. The Greek mysteries too create a close bond between the *mystæ*, and the chief ethical significance of the Eleusinia was that they were open to all Hellenes and so represented a brotherhood wider than the political limits of individual states. But originally the initiation must have been introduction into a particular social community; Theophrastus's legend of the origin of the Diipolia is expressly connected with the adoption of the house of Sopatrus into the position of Athenian citizens. From this point of view the sacramental rites of mystical sacrifice are a form of blood-covenant, and serve the same purpose as the mixing of blood or tasting of each other's blood by which in ancient times two men or two clans created a sacred covenant bond. In all the forms of blood-covenant, whether a sacrifice is offered or the veins of the parties opened and their own blood used, the idea is the same: the bond created is a bond of kindred, because one blood is now in the veins of all who have shared the ceremony. The details in which this kind of symbolism may be carried out are of course very various, but where there is a covenant sacrifice we usually find that the parties eat and drink together (Gen. xxxi. 54), and that the sacrificial blood, if not actually tasted, is at least touched by both parties (Xen., *Anab.*, ii. 2, 9), or sprinkled on both and on the altar or image of the deity who presides over the contract (Exod., xxiv. 6, 7).[1] A peculiar form which meets us in various places is to cut the animal in twain and make those who swear pass between the parts (Gen. xiii. 9 *sq.*; Jer. xxxiv. 18 *sq.*; Plut., *Qu. Rom.*, iii., etc.). This is generally taken as a formula of imprecation, as if the parties prayed that he who proved unfaithful might be similarly cut in twain; but, as the case cited from Plutarch shows that the victim chosen was a mystic one, it is more likely that the original sense was that the worshippers were taken within the mystic life.

Even the highest forms of sacrificial worship present much that is repulsive to modern ideas, and in particular it requires an effort to reconcile our imagination to the bloody ritual which is prominent in almost every religion which has a strong sense of sin. But we must not forget that from the beginning this ritual expressed, however crudely, certain ideas which lie at the very root of true religion, the fellowship of the worshippers with one another in their fellowship with the deity, and the consecration of the bonds of kinship as the type of all right ethical relation between man and man. And the piacular forms, though these were particularly liable to distortions disgraceful to man and dishonoring to the godhead, yet contained from the first germs of eternal truths, not only expressing the idea of divine justice, but mingling it with a feeling of divine and human pity. The dreadful sacrifice is performed not with savage joy but with awful sorrow, and in the mystic sacrifices the deity himself suffers with and for the sins of his people and lives again in their new life.

(W. R. S.)

The Idea of Sacrifice in the Christian Church.

There can be no doubt that the idea of sacrifice occupied an important place in early Christianity. It had been a fundamental element of both Jewish and Gentile religions, and Christianity tended rather to absorb and modify such elements than to abolish them. To a great extent the idea had been modified already. Among the Jews the preaching of the prophets had been a constant protest against the grosser forms of sacrifice, and there are indications that when Christianity arose bloody sacrifices were already beginning to fall into disuse; a saying which was attributed by the Ebionites to our Lord repeats this protest in a strong form, "I have come to abolish the sacrifices; and if ye do not cease from sacrificing the wrath of God will not cease from you" (Epiph., xxx. 16). Among the Greeks the philosophers had come to use both argument and ridicule against the idea that the offering of material things could be needed by or acceptable to the Maker of them all. Among both Jews and Greeks the earlier forms of the idea had been rationalized into the belief that the most appropriate offering to God is that of a pure and penitent heart, and among them both was the idea that the vocal expression of contrition in prayer or of gratitude in praise is also acceptable. The best instances of these ideas in the Old Testament are in Psalms l. and li., and in Greek literature the striking words which Porphyry quotes from an earlier writer, "We ought, then, having been united and made like to God, to offer our own conduct as a holy sacrifice to Him, the same being also a hymn and our salvation in passionless excellence of soul" (Euseb., *Dem. Ev.*, 3). The ideas are also found both in the New Testament and in early Christian literature: "Let us offer up a sacrifice of praise to God continually, that is, the fruit of lips which make confession to His name" (Heb. xiii. 15); "That prayers and thanksgivings, made by worthy persons, are the only perfect and acceptable sacrifices I also admit" (Just. Mart., *Trypho*, c. 117); "We honor God in prayer, and offer this as the best and holiest sacrifice with righteousness to the righteous Word" (Clem. Alex., *Strom.*, vii. 6).

But among the Jews two other forms of the idea expressed themselves in usages which have been perpetuated in Christianity, and one of which has had a singular importance for the Christian world. The one form, which probably arose from the conception of Jehovah as in an especial sense the protector of the poor, was that gifts to God may properly be bestowed on the needy, and that consequently alms have the virtue of a sacrifice. Biblical instances of this idea are—"He who doeth alms is offering a sacrifice of praise" (Ecclus. xxxv. 2); "To do good and to communicate forget not, for with such sacrifices God is well pleased" (Heb. xiii. 16); so the offerings sent by the Philippians to Paul when a prisoner at Rome are "an odor of a sweet smell, a sacrifice acceptable, well pleasing to God" (Phil. iv. 18). The other form, which was probably a relic of the conception of Jehovah as the author of natural fertility, was that part of the fruits of the earth should be offered to God in acknowledgment of His bounty, and that what was so offered was especially blessed and brought a blessing upon both those who offered it and those who afterwards partook of it. The persistence of this form of the idea of sacrifice constitutes so marked a feature of the history of Christianity as to require a detailed account of it.

In the first instance it is probable that among Christians, as among Jews, every meal, and especially every social meal, was regarded as being in some sense a thank-offering. Thanksgiving, blessing, and offering were coördinate terms. Hence the Talmudic rule, "A man shall not taste anything before blessing it" (*Tosephta Berachoth*, c. 4), and hence St. Paul's words, "He that eateth, eateth unto the Lord, for he giveth God thanks" (Rom. xiv. 6; comp. 1 Tim. iv. 4). But the most important offering was the solemn oblation in the assembly on the Lord's day. A precedent for making such oblations elsewhere than in the

[1] In Greek ritual the identity of the covenant sacrifice with mystico-piacular rites is clearly brought out by the animals chosen and by other features in the ritual. See Schoemann, *Gr. Alt.*, p. 248 *sq.*

temple had been afforded by the Essenes, who had endeavored in that way to avoid the contact with unclean persons and things which a resort to the temple might have involved (Jos., *Antiq.*, xviii. 1, 5), and a justification for it was found in the prophecy of Malachi, "In every place incense is offered unto My name and a pure offering; for My name is great among the Gentiles, saith the Lord of hosts" (Mal. i. 11, repeatedly quoted in early Christian writings, *e.g.*, *Teaching of the Twelve Apostles*, c. 14; Just. Mart., *Trypho*, c. 28, 41, 116; Irenæus, iv. 17, 5).

The points in relation to this offering which are clearly demonstrable from the Christian writers of the first two centuries, but which subsequent theories have tended to confuse, are these: (1) It was regarded as a true offering or sacrifice; for in the *Teaching of the Twelve Apostles*, in Justin Martyr, and in Irenæus it is designated by each of the terms which are used to designate sacrifices in the Old Testament. (2) It was primarily an offering of the fruits of the earth to the Creator; this is clear from both Justin Martyr and Irenæus, the latter of whom not only explicitly states that such oblations are continued among Christians but also meets the current objection to them by arguing that they are offered to God not as though He needed anything but to show the gratitude of the offerer (Iren., iv. 17, 18). (3) It was offered as a thanksgiving partly for creation and preservation and partly for redemption; the latter is the special purpose mentioned (*e.g.*) in the *Teaching of the Twelve Apostles;* the former is that upon which Irenæus chiefly dwells; both are mentioned together in Justin Martyr (*Trypho*, c. 41). (4) Those who offered it were required to be not only baptized Christians but also "in love and charity one with another"; there is an indication of this latter requirement in the Sermon on the Mount (Matt. v. 23, 24, where the word translated "gift" is the usual LXX. word for a sacrificial offering, and is so used elsewhere in the same Gospel, viz., Matt. viii. 4, xxiii. 19), and still more explicitly in the *Teaching*, c. 14, "Let not any one who has a dispute with his fellow come together with you (*i.e.*, on the Lord's day) until they have been reconciled, that your sacrifice be not defiled." This brotherly unity was symbolized by the kiss of peace. (5) It was offered in the assembly by the hands of the president; this is stated by Justin Martyr (*Apol.*, i. 65, 67), and implied by Clement of Rome (*Ep.*, i. 44, 4).

Combined with this sacrifice of the fruits of the earth to the Creator in memory of creation and redemption, and probably always immediately following it, was the sacred meal at which part of the offerings were eaten. Such a sacred meal had always, or almost always, formed part of the rites of sacrifice. There was the idea that what had been solemnly offered to God was especially hallowed by Him, and that the partaking of it united the partakers in a special bond both to Him and to one another. In the case of the bread and wine of the Christian sacrifice, it was believed that, after having been offered and blessed, they became to those who partook of them the body and blood of Christ. This "communion of the body and blood of Christ," which in early writings is clearly distinguished from the thank-offering which preceded it, and which furnished the materials for it, gradually came to supersede the thank-offering in importance, and to exercise a reflex influence upon it. In the time of Cyprian, though not before, we begin to find the idea that the body and blood of Christ were not merely partaken of by the worshippers but also offered in sacrifice, and that the Eucharist was not so much a thank-offering for creation and redemption as a repetition or a showing forth anew of the self-sacrifice of Christ. This idea is repeated in Ambrose and Augustine, and has since been a dominant idea of both Eastern and Western Christendom. But, though dominant, it has not been universal; nor did it become dominant until several centuries after its first promulgation. The history of it has yet to be written. For, in spite of the important controversies to which it has given birth, no one has been at the pains to distinguish between (i.) the theories which have been from time to time put forth by eminent writers, and which, though they have in some cases ultimately won a general acceptance, have for a long period remained as merely individual opinions, and (ii.) the current beliefs of the great body of Christians which are expressed in recognized formularies. A catena of opinions may be produced in favor of almost any theory; but formularies express the collective or average belief of any given period, and changes in them are a sure indication that there has been a general change in ideas.

It is clear from the evidence of the early Western liturgies that, for at least six centuries, the primitive conception of the nature of the Christian sacrifice remained. There is a clear distinction between the sacrifice and the communion which followed it, and that which is offered consists of the fruits of the earth and not of the body and blood of Christ. Other ideas no doubt attached themselves to the primitive conception of which there is no certain evidence in primitive times, *e.g.*, the idea of the propitiatory character of the offering, but these ideas rather confirm than disprove the persistence of those primitive conceptions themselves.

All Eastern liturgies, in their present form, are of later date than the surviving fragments of the earlier Western liturgies, and cannot form the basis of so sure an induction; but they entirely confirm the conclusions to which the Western liturgies lead. The main points in which the pre-mediæval formularies of both the Eastern and the Western Churches agree in relation to the Christian sacrifice are the following. (1) It was an offering of the fruits of the earth to the Creator, in the belief that a special blessing would descend upon the offerers, and sometimes also in the belief that God would be propitiated by the offerings. The bread and wine are designated by all the names by which sacrifices are designated (*sacrificia*, *hostiæ*, *libamina*, and at least once *sacrificium placationis*), and the act of offering them by the ordinary term for offering a sacrifice (*immolatio*). (2) The offering of bread and wine was originally brought to the altar by the person who offered it, and placed by him in the hands of the presiding officer. In course of time there were two important changes in this respect: (*a*) the offerings of bread and wine were commuted for money, with which bread and wine were purchased by the church-officers; (*b*) the offerings were sometimes handed to the deacons and by them taken to the bishop at the altar, and sometimes, as at Rome, the bishop and deacons went round the church to collect them.[1] (3) In offering the bread and wine the offerer offered, as in the ancient sacrifices, primarily for himself, but inasmuch as the offering was regarded as having a general propitiatory value he mentioned also the names of others in whom he was interested, and especially the departed, that they might rest in peace. Hence, after all the offerings had been collected, and before they were solemnly offered to God, it became a custom to recite the names both of the offerers and of those for whom they offered, the names being arranged in two lists, which were known as diptychs. Almost all the old rituals have prayers to be said "before the names," "after the names." It was a further and perhaps much later development of the same idea that the good works of those who had previously enjoyed the favor of God were invoked to give additional weight to the prayer of the offerer. In the later series of Western rituals, beginning with that which is known as the *Leonine Sacramentary*, this practice is almost universal. (4) The placing of the bread and wine upon the altar was

[1] Of this proceeding an elaborate account exists in the very interesting document printed by Mabillon in his *Museum Italicum* as "Ordo Romanus I.;" the small phials of wine which were brought were emptied into a large bowl, and the loaves of bread were collected in a bag.

followed by the kiss of peace. (5) Then followed the actual offering of the gifts to God (*immolatio missæ*). It was an act of adoration or thanksgiving, much longer in Eastern than in Western rituals, but in both classes of rituals beginning with the form "Lift up your hearts," and ending with the Ter Sanctus or Trisagion.[1] The early MSS. of Western rituals indicate the importance which was attached to this part of the liturgy by the fact of its being written in a much more ornate way than the other parts, *e.g.*, in gold uncial letters upon a purple ground, as distinguished from the vermilion cursive letters of the rest of the MS. With this the sacrifice proper was concluded. (6) But, since the divine injunction had been "Do this in remembrance of Me," the sacrifice was immediately followed by a commemoration of the passion of Christ, and that again by an invocation of the Holy Spirit (*epiclesis*) that He would make the bread and wine to become the body and blood of Christ. Of this invocation, which is constant in all Eastern rituals, there are few, though sufficient, surviving traces in Western rituals.[2] Then after a prayer for sanctification, or for worthy reception, followed the Lord's Prayer, and after the Lord's Prayer the communion.

In the course of the 8th and 9th centuries, by the operation of causes which have not yet been fully investigated, the theory which is first found in Cyprian became the dominant belief of Western Christendom. The central point of the sacrificial idea was shifted from the offering of the fruits of the earth to the offering of the body and blood of Christ. The change is marked in the rituals by the duplication of the liturgical forms. The prayers of intercession and oblation, which in earlier times are found only in connection with the former offering, are repeated in the course of the same service in connection with the latter. The designations and epithets which are in earlier times applied to the fruits of the earth are applied to the body and blood. From that time until the Reformation the Christian sacrifice was all but universally regarded as the offering of the body and blood of Christ. The innumerable theories which were framed as to the precise nature of the offering and as to the precise change in the elements all implied that conception of it. It still remains as the accepted doctrine of the Church of Rome. For, although the council of Trent recognized fully the distinction which has been mentioned above between the Eucharist and the sacrifice of the mass, and treated of them in separate sessions (the former in Session xiii., the latter in Session xxii.), it continued the mediæval theory of the nature of the latter. The reaction against the mediæval theory at the time of the Reformation took the form of a return to what had no doubt been an early belief,—the idea that the Christian sacrifice consists in the offering of a pure heart and of vocal thanksgiving. Luther at one period (in his treatise *De Captivitate Babylonica*) maintained, though not on historical grounds, that the offering of the oblations of the people was the real origin of the conception of the sacrifice of the mass; but he directed all the force of his vehement polemic against the idea that any other sacrifice could be efficacious besides the sacrifice of Christ. In the majority of Protestant communities the idea of a sacrifice has almost lapsed. That which among Catholics is most commonly regarded in its aspect as an offering and spoken of as the "mass" is usually regarded in its aspect as a participation in the symbols of Christ's death and spoken of as the "communion." But it may be inferred from the considerable progress of the Anglo-Catholic revival in most English-speaking countries that the idea of sacrifice has not yet ceased to be an important element in the general conception of religion. (E. HA.)

[1] The elements of the form are preserved exactly in the liturgy of the Church of England.

[2] It is found, *e.g.*, in the second of Mone's masses from the Reichenau palimpsest, and in Mabillon's *Missale Gothicum*, No. 12; it is expressly mentioned by Isidore of Seville as the sixth element in the Eucharistic service, *De Offic. Eccles.*, i. 15.

SACRILEGE. The robbery of churches was in Roman law punishable with death. There are early instances of persons having suffered death for this offence in Scotland. In England at common law benefit of clergy was denied to robbers of churches. The tendency of the later law has been to put the offence of sacrilege in the same position as if the offence had not been committed in a sacred building. Thus breaking into a place of worship at night, says Lord Coke, is burglary, for the church is the mansion-house of Almighty God. The Larceny Act of 1861 punishes the breaking into or out of a place of divine worship in the same way as burglary, and the theft of things sacred in the same way as larceny. The breaking or defacing of an altar, crucifix, or cross in any church, chapel, or church-yard is an offence punishable with three months' imprisonment on conviction before two justices, the imprisonment to be continued unless the offender enter into surety for good behavior at quarter sessions (1 Mary, sess. 2, *c.* 3).

SACRO BOSCO, JOHANNES DE, or JOHN HOLYWOOD, astronomical author, died 1244 (or 1256) as professor of mathematics at the university of Paris. Nothing else is known about his life. He wrote a treatise on spherical astronomy, *Tractatus de Sphera Mundi*, first printed at Ferrara in 1472, and reprinted, generally with copious notes and commentaries, about sixty times until the end of the 17th century. About the year 1232 he wrote *De anni ratione seu ut vocatur vulgo computus ecclesiasticus*, in which he points out the increasing error of the Julian calendar, and suggests a remedy which is nearly the same as that actually used under Gregory XIII. three hundred and fifty years later.

SACY, ANTOINE ISAAC, BARON SILVESTRE[3] DE (1758–1838), the greatest of French Orientalists and the founder of the modern school of Arabic scholarship, was the second son of a Parisian notary, and was born at Paris on 21st September, 1758. From the age of seven years, when he lost his father, he was educated in more than monastic seclusion in the house of his pious and tender mother. Designed for the civil service, he studied jurisprudence, and in 1781 got a place as counsellor in the *cour des monnaies*, in which he continued till, in 1791, he was advanced to be a commissary-general in the same department. De Sacy had a natural turn for business and liked variety of work, while he seems to have had little or no need of absolute repose. He had successively acquired all the Semitic languages while he was following the usual course of school and professional training, and while he was engaged in the civil service he found time to make himself a great name as an Orientalist by a series of publications which, beginning with those Biblical subjects to which his education and sympathies naturally directed his first Semitic studies, gradually extended in range, and already displayed the comprehensive scholar who had chosen the whole Semitic and Iranian East for his domain.[4] The works of these early years do not show the full maturity of his powers; his chief triumph was an effective commencement of the decipherment of the Pahlaví inscriptions of the Sasanian kings (1787–91). It was the French Revolution which gained De Sacy wholly for letters. As a good Catholic and a staunch royalist he felt constrained in 1792 to retire from the public service, and lived in close seclusion in a cottage near Paris till in 1795 he was called to be professor of Arabic in the newly founded school of living Eastern languages. The years of retirement had not been fruitless; they were in part devoted to

[3] His father's name was Silvestre, the addition De Sacy he took as a younger son after a fashion then common with the Parisian *bourgeoisie*.

[4] A communication to Eichhorn on the Paris MS. of the Syro-Hexaplar version of IV. Kings formed the basis of a paper in the latter's *Repertorium*, vol. vii. (1780). This was De Sacy's literary début. It was followed by text and translation of the letters of the Samaritans to Jos. Scaliger (*ibid.*, vol. xiii., 1783) and by a series of essays on Arabian and Persian history in the *Recueil* of the Academy of Inscriptions and in the *Notices et Extraits*.

the study of the religion of the Druses, which continued to occupy him throughout life and was the subject of his last and unfinished work, the *Exposé de la Religion des Druzes* (2 vols., 1838). Nevertheless, when called to be a teacher, he felt that he had himself much to learn. Since the death of Reiske Arabic learning had been in a backward state, the standard of philological knowledge was low, and the books for students extremely defective. De Sacy set himself with characteristic thoroughness to complete his own knowledge and supply the lacking helps to others, and he accomplished this task on such a scale, with such width of range, precision of thought, and scrupulous attention to details, that he became the founder of a wholly new school and the father of all subsequent Arabists. His great text-books, the *Grammaire Arabe* (2 vols., 1st ed. 1810, 2d ed. 1831) and the *Chrestomathie* (3 vols., 1st ed. 1806, 2d ed. 1826–31), together with its supplement, the *Anthologie Grammaticale* (1829), are works that can never become obsolete; the luminous exposition of the grammar and the happy choice of the pieces in the chrestomathy—all inedita—with the admirable notes, drawn from an enormous reading in MS. sources, make them altogether different from ordinary text-books. The whole powers of a great teacher, the whole wealth of knowledge of an unrivalled scholar, are spent with absolute singleness of purpose for the benefit of the learner, and the result is that the books are equally delightful and instructive to the student and to the advanced scholar. A comparison of the first and second editions shows how much toil and research it cost the author to raise his own scholarship to the level which, thanks to his work, has become the starting-place for all subsequent ascents of the Arabian Parnassus.

De Sacy's place as a teacher was threatened at the outset by his conscientious refusal to take an oath of hatred to royalty. He tendered his resignation both as professor and as member of the Institute; but he was allowed to continue to teach, and rejoined the Institute on its reorganization in 1803. In 1805 he made the only considerable journey of his life, being sent to Genoa on a vain search for Arabic documents supposed to lie in the archives of that city. In 1806 he added the duties of Persian professor to his old chair, and from this time onwards—as, in spite of his royalist opinions, he was ready to do public service under any stable government—his life, divided between his teaching, his literary work, and a variety of public duties, was one of increasing honor and success, broken only by a brief period of retreat during the Hundred Days. He found time for everything: while his pen was ever at work on subjects of abstruse research, he was one of the most active leaders in all the business which the French system throws on the *savans* of the capital, especially as perpetual secretary of the Academy of Inscriptions (from 1832); in 1808 he entered the *corps législatif;* and in 1832, when quite an old man, he became a peer of France and was regular in the duties of the chamber.[1] In 1815 he became rector of the university of Paris, and after the second restoration he was active on the commission of public instruction. Of the *Société Asiatique* he was one of the founders, and when he was inspector of Oriental types at the royal printing press he thought it his duty to read a proof of every book printed in Arabic and Persian. With this he maintained a vast correspondence and was accessible not only to every one who sought his advice on matters of learning and business but to all the poor of his quarter, who came to him as a member of the *bureau* of charity. Yet he was neither monk nor hermit: he enjoyed society and was happy in forty-eight years of married life and in the care of a large family. Though small and to appearance of delicate frame, De Sacy enjoyed unbroken health and worked on without sign of failing powers till two days before his death (21st February, 1838), when he suddenly fell down in the street and never rallied.

De Sacy wrote so much that a list even of his larger essays, mostly communicated to the Academy or in the *Notices et Extraits*, is impossible in this place, while his lesser papers and reviews in the *Allg. Bib. f. biblische Litteratur*, the *Mines de l'Orient*, the *Magasin Encyclopédique*, the *Journal des Savants* (of which he was an editor), and the *Journal Asiatique* are almost innumerable. Among the works which he designed mainly for students may be classed his edition of Harîrî (1822, 2d edition by Reinaud, 1847, 1855), with a selected Arabic commentary, and of the *Alfiya* (1833), and his *Calila et Dimna* (1816),—the Arabic version of that famous collection of Buddhist animal tales which has been in various forms one of the most popular books of the world. De Sacy's inquiry into the wonderful history of these tales forms one of his best services to letters and a good example of the way in which he always made his work for the benefit of learners go hand in hand with profound research. Of his continued interest in Biblical subjects he gave evidence in his memoir on the Samaritan Arabic version of the Pentateuch (*Mém. Acad. des Inscr.*, vol. xlix.), and in the Arabic and Syriac New Testaments edited for the British and Foreign Bible Society; among works important for Eastern history, besides that on the Druses already named, may be cited his version of Abd-Allatîf, *Relation Arabe sur l'Égypte*, and his essays on the *History of the Law of Property in Egypt* since the Arab conquest (1805–18). And, in conclusion, it must not be forgotten that his oral teaching was not less influential than his writings, and that, except Ewald, almost all Arabists of chief note in the first half of this century, in Germany as well as in France, were his personal pupils. Of the brilliant series of teachers who went out from his lecture-room one or two veterans still survive, and Professor Fleischer's elaborate notes and corrections to the *Grammaire Arabe* (*Kleinere Schriften*, vol. i., 1885) may be regarded as the latest tribute to the memory of the great master by a disciple who is now the patriarch of living Arabists.

(W. R. S.)

SACY, Isaac Louis Le Maître de (1613–1684), a figure of some prominence in the literary annals of Port Royal (*q.v.*), and after the death of St. Cyran (1643) and Singlin (1664) the leading confessor and "director" of the Jansenists in France, was born in Paris on 29th March, 1613. He was closely connected with the Arnauld family, his true surname being Le Maître and that of Saci or Sacy which he afterwards assumed a mere anagram of Isaac, his Christian name. He studied philosophy and belles-lettres at the Collége de Calvi-Sorbonne, and afterwards, under the influence of St. Cyran (see Duvergier de Hauranne), his spiritual director, joined his eldest brother Antoine Le Maître at Port Royal des Champs. Here he threw himself heartily into the life of the place, devoting himself specially to teaching and the preparation of school-books, his chief productions in this class being expurgated editions of Martial and Terence and a translation of Phædrus. In 1650 he was ordained to the priesthood, and in 1654 he entered the field of theological controversy with a brochure entitled *Enluminures de l'Almanach des Jésuites intitulé la Déroute et la Confusion des Jansénistes*, of which it is enough to say that, if the Jesuit attack was in execrable taste, neither was the reply in keeping with the finer ethical tone of Port Royal. From 1661, after the breaking up of the Petites Écoles, he lived more or less in concealment in Paris until May, 1666, when he was thrown into the Bastile, where he remained till November, 1668. During his imprisonment he occupied himself with the completion of a new version of the New Testament, known as the *Nouveau Testament de Mons* (1667), and the remainder of his life was largely devoted to a similar translation of the Old Testament, based chiefly on the Vulgate, with *Éclaircissements*. These began to appear in 1672 and were continued down to the end of the minor prophets. As De Sacy knew nothing of Hebrew, this version is of no value as a contribution to scholarship, and in style it is more artificial and labored than those which had preceded it. From 1668 till his death on 4th January 1684, he lived partly in Paris, partly at Port Royal des

[1] The title of baron he received from Napoleon in 1813.

[2] [Heinrich Leberecht F. (born 1801), Oriental professor at Leipsic in 1835, commentator on Abulfeda and the Koran.—Am. Ed.]

Champs, and partly at Pomponne, the seat of his cousin, the marquis de Pomponne. He was buried at Port Royal des Champs.

In addition to the works already mentioned, he published, under the pseudonym of the "Sieur de Beuil," a French translation of the *De Imitatione Christi* (1662). He also translated Chrysostom's *Homilies on Matthew*. See Sainte-Beuve, *Port Royal*, bk. ii. chaps. 17, 18 (ed. 1878).

SADDLERY embraces the industries connected with the harnessing and controlling of all beasts of draught and burden. The materials used in harnessing the various creatures so employed and the modifications of harness necessary to suit their structure, temperament, and duties are, of course, exceedingly varied. In a restricted sense saddlery is principally a leather trade, and has to do with the harnessing of the horse. The craft has been recognized and established in England as a separate trade since the 13th century, when the London Saddlers' Company received its charter of incorporation from Edward I. There is evidence also of its early prosperity at Birmingham, where it grew to an importance which it still retains, the principal seat of the saddlery trade being now at Walsall near Birmingham, which is practically a saddlers' town. The trade divides itself into two branches, brown saddlery and black saddlery. The former is concerned with saddle-making and the cutting and sewing of bridles, reins, and all other uncolored leatherwork. The saddle is the most important article on the brown saddler's list. It consists of the tree or skeleton, on which the leather is stretched, the seat, the skirts, and the flaps. The tree is commonly made of beech strengthened with iron plates. The whole leather-work ought to be of pig-skin, but often the seat alone is of that material, the other parts being imitation, cleverly grained by means of electro-deposit copper casts from the surface of real pig-skin. There are many varieties of saddles, such as racing, military, hunting, and ladies' saddles, etc. A racing saddle may weigh not more than two or three pounds, while a cavalry saddle will be four times heavier. The saddle-maker has to consider the ease and comfort of both horse and rider. The saddle must fit closely and evenly to the curvature of the horse's back without tendency to shift, and it ought to offer as far as possible a soft and elastic seat for the rider. The black saddler is concerned with the harness of carriage, cart, and draught horses generally. The skill of the tradesman in this department is displayed in designing and arranging harness most favorable for the proper distribution of the load, and for bringing into use the muscles of the animal without chafing or fraying the skin. Much of the usefulness and comfort of a horse depends on the accurate and proper fit of its harness. The collar and traces and the saddle are the important features of draught harness, the former being the pieces through which the draught is effected, while dead weight is borne through the saddle. The portions of saddlery by which the horseman controls and guides the horse are the bridle and bit and the reins. Into the many devices connected with these and other parts of harness for curbing horses, for breaking them of evil habits, and for adding to the security of the equestrian and carriage traveller, we cannot here enter (compare HORSEMANSHIP, vol. xii. p. 202). Saddlers' ironmongery forms an important feature of the trade. It embraces the making of buckles, chains, cart-gearing, stirrups, spurs, bits, hames, etc. The ornamental metal-work of carriage-harness is either electro-plated in silver or of solid polished brass.

SADDUCEES (צְדוּקִים, *i.e.*, Zadokites), the party of the priestly aristocracy under the later Hasmonæans. The Sadducees were essentially a political party opposed to the Pharisees or party of the Scribes, and their position and history have therefore already been discussed in ISRAEL, vol. xiii. p. 433 *sq.* The common view that Sadducæism was essentially a philosophico-religious school is due partly to Josephus but mainly to later Jewish tradition, which never could realize the difference between a nation and a sect, and fancied that the whole history of Israel was made up of such scholastic controversies as engrossed the attention of later times. The theological tenets of the Sadducees as they appear in the New Testament and in Josephus had a purely political basis. They detested the doctrine of the resurrection and the fatalism of the Pharisees because these opinions were used by their adversaries to thwart their political aims. The aristocracy suffered a great loss of position through the subjection of Judæa to a foreign power; but it was useless to urge political schemes of emancipation on those who believed with the Pharisee that Israel's task was to endure in patience till Jehovah redeemed the nation, and the resurrection rewarded those who had lived and died in bondage. In matters of ritual the Sadducees were naturally conservative, and their opposition to the unwritten traditions, from which they appealed to Scripture, is simply one phase of their opposition to Pharisaic innovations; for the traditions were the invention of the Pharisees and the written law represented old practice. When the Sadducees had lost all political importance their opposition to Pharisaism necessarily became more and more an affair of the schools rather than of practical life, but the Sadducees of the schools are only the last survival of what had once been a great political party.

SÁ DE MIRANDA, FRANCISCO DE (1495–1558), Portuguese poet, was born of noble family on 27th October, 1495, at Coimbra, where also he received his education. He afterwards travelled in Spain and Italy, and held for some time a post at the court of John III. of Portugal. He died on his own property at Tapada near Ponte do Lima on 15th March, 1558. Besides eight eclogues (six in Spanish and two in Portuguese), he wrote two comedies in Portuguese, —*Os Estrangeiros* and *Os Vilhalpandos*. See PORTUGAL (Literature), vol. xix. p. 571, and SPAIN (Literature).

SA'DÍ, generally called MUṢLIḤ-UDDÍN, but more correctly MUSHARRIF-UDDÍN B. MUṢLIḤ-UDDÍN, the greatest didactic poet and the most popular writer of Persia, was born about 1184 (580 A.H.) in Shíráz, where his father, 'Abdalláh, a man of practical religion and good common sense, who impressed upon his son from early childhood the great maxims of doing good and fearing nobody, was in the service of the Turkoman race of the Salgharides or Atábegs of Fárs. The fifth ruler of this dynasty, Sa'd b. Zengí, who ascended the throne in 1195 (591 A.H.), conceived a great affection for young Musharrif-uddín and enabled him, after the premature death of his father, to pursue his studies in the famous medreseh of Baghdád, the Nizámiyyah, where he remained about thirty years (1196–1224). Strict college discipline and severe theological studies repressed for a long time the inborn cheerfulness and joviality of his nature; but his poetical genius, which rapidly developed, kept alive in him, amid all the privations of an austere life, the elasticity of youth, and some of his "early odes," in which he praises the pleasures of life and the sweetness of love, were no doubt composed during his stay in Baghdád. At any rate his literary fame had already spread about 1210 (606 A.H.) as far as Káshgar in Turkistán, which the young poet (who in honor of his patron had assumed the name of Sa'dí) visited in his twenty-sixth or twenty-seventh year. After mastering all the dogmatic disciplines of the Islamitic faith he turned his attention first to practical philosophy, and later on to the more ideal tenets of Ṣúfic pantheism, under the spiritual guidance of the famous sheikh Shiháb-uddín 'Umar Suhrawardí (died 1234; 632 A.H.). Between 1220 and 1225 he paid a visit to a friend in Ispahán, went from there to Damascus, and returned to Ispahán just at the time of the inroads of the Mongols, when the Atábeg Sa'd had been deposed by the victorious ruler of Kirmán, Ghiyáth-uddín

(1223). Sadly grieved by the misfortune of his generous patron and disgusted with the miserable state to which Persia had been reduced, Sa'dí started in 1224 or 1225 on his way to India, thus entering on the second period of his life—that of his wanderings (1225–1255). He proceeded *via* Balkh, Ghazní, and the Punjab to Gujrát, on the western coast of which he visited the famous shrine of Síwa in Pattan-Sumanát, and met with a remarkable adventure. Having seen the statue of the god lifting up its hands to heaven every morning at sunrise, he discovered that a priest, hidden behind the image, wrought the miracle by means of a cord; but, being caught in the very act of watching the performance, he had no alternative but to hurl his pursuer into a deep well and to escape at full speed,—not, however, until he had smashed the detested statue. After a prolonged stay in Delhi, where he acquired the knowledge of Hindústání which he afterwards turned to account in several of his poems —just as a number of excellent Arabic kaṣídas bear witness to his fluency in that idiom which he had learnt in Baghdád—he sailed for Yemen. In San'á, the capital of Yemen, the loss of a beloved child (when he had married is not known) threw him into deep melancholy, from which only a new adventurous expedition into Abyssinia on the opposite African shore and a pilgrimage to Mecca and Medina could again rouse him. Thence he directed his steps towards Syria and lived as a renowned sheikh for a considerable time in Damascus, which he had once already visited. There and in Baalbec he added to his literary renown that of a first-rate pulpit orator. Specimens of his spiritual addresses are preserved in the five homilies (on the fugitiveness of human life, on faith and fear of God, on love towards God, on rest in God, and on the search for God) which usually form the second risálah or prose treatise in Sa'dí's complete works. At last weary of Damascus he withdrew into the desert near Jerusalem and led a solitary wandering life, till one day he was taken captive by a troop of Frankish soldiers, brought to Tripoli, and condemned to forced labor in the trenches of the fortress. After enduring countless hardships, he was eventually rescued by a rich friend in Aleppo, who paid his ransom, and moreover gave him his daughter in marriage. But Sa'dí, unable to live with his quarrelsome wife, set out on new travels, first to North Africa and then through the length and breadth of Asia Minor and the adjoining countries. Not until he had passed his seventieth year did he return to Shíráz (about 1255; 653 A. H.). Finding the place of his birth tranquil and prosperous under the wise rule of Abúbakr b. Sa'd, the son of his old patron (1226–1260; 623–658 A. H.), the aged poet took up his permanent abode, interrupted only by repeated pilgrimages to Mecca, in a little hermitage outside the town, in the midst of a charming garden and devoted the remainder of his life to Súfic contemplation and poetical composition. Sa'dí died at Shíráz in 1292 (691 A. H.) according to Ḥamdalláh Mustaufí (who wrote only forty years later), or in December, 1291 (690 A. H.), at the age of 110 lunar years.

The experience of the world gained during his travels, his intimate acquaintance with the various countries he had visited, his insight into human character, its grandeur and its littleness, which a thirty years' intercourse with men of all ranks and of many nationalities had fully matured, together with an inborn loftiness of thought and the purest moral standard, made it easy for Sa'dí to compose in the short space of three years his two masterpieces, which have immortalized his name, the *Bústán* or "Fruit-garden" (1257) and the *Gulistán* or "Rose-garden" (1258), both dedicated to the reigning Atábeg Abúbakr. The former, also called *Sa'dínáma*, is a kind of didactic epopee in ten chapters and double-rhymed verses, which passes in review the highest philosophical and religious questions, not seldom in the very spirit of Christianity, and abounds with sound ethical maxims and matchless gems of transcendental speculation. The latter is a prose work of a similar tendency in eight chapters, interspersed with numerous verses and illustrated, like the *Bústán*, by a rich store of clever tales and charming anecdotes; it discusses more or less the same topics as the larger work, but has acquired a much greater popularity in both the East and the West, owing to its easier and more varied style, its attractive lessons of practical wisdom, and its numerous bon-mots. But Sa'dí's *Díwán*, or collection of lyrical poetry, far surpasses the *Bústán* and *Gulistán*, at any rate in quantity, whether in quality also is a matter of taste. Other minor works are the Arabic *kaṣídas*, the first of which laments the destruction of the Arabian caliphate by the Mongols in 1258 (656 A. H.); the Persian *kaṣídas*, partly panegyrical, partly didactical; the *maráthí*, or elegies, beginning with one on the death of Abúbakr and ending with one on the defeat and demise of the last caliph, Musta'sim; the *mulamma'át*, or poems with alternate Persian and Arabic verses, of a rather artificial character; the *tarjí'át*, or refrain-poems; the *ghazals*, or odes; the *ṣáhibiyyah* and *muḳatta'át*, or moral aphorisms and epigrams; the *rubá'iyyát*, or quatrains; and the *mufradát*, or distichs. Sa'di's lyrical poems possess neither the easy grace and melodious charm of Ḥáfiẓ's songs nor the overpowering grandeur of Jelál-uddín Rúmí's divine hymns, but they are nevertheless full of deep pathos and show such a fearless love of truth as is seldom met with in Eastern poetry. Even his panegyrics, although addressed in turn to almost all the rulers who in those days of continually changing dynasties presided over the fate of Persia are free from that cringing servility so common in the effusions of Oriental economiasts.

The first who collected and arranged his works was 'Alí b. Ahmad b. Bísutún (1326–1334; 726–734 A. H.). The most exact information about Sa'dí's life and works is found in the introduction to Dr. W. Bacher's *Sa'dí's Aphorismen und Sinngedichte*, Strasburg, 1879 (a complete metrical translation of the epigrammatic poems), and in the same author's "Sa'dí Studien," in *Z. D. M. G.*, xxx. pp. 81–106. Sa'dí's *Kulliyyát* or complete works have been edited by Harington, Calcutta, 1791–95 (with an English translation of some of the prose treatises and of Daulat Shah's notice on the poet, of which a German version is found in Graf's *Rosengarten*, Leipsic, 1846, p. 229 *sq.*); for the numerous lithographed editions, see Rieu's *Pers. Cat. of the Brit. Mus.*, ii. p. 596. The *Bústán* has been printed in Calcutta (1810 and 1828), as well as in Lahore, Cawnpore, Tabriz, etc.; a critical edition with Persian commentary was published by K. H. Graf at Vienna in 1850 (German metrical translations by the same, Jena, 1850, and by Schlechta-Wssehrd, Vienna, 1852; English translation by W. Clarke, London, 1879; French translation by Barbier de Meynard, Paris, 1880). The best editions of the *Gulistán* are by A. Sprenger (Calcutta, 1851) and by Platts (London, 1874); the best translations into English by Eastwick (1852) and by Platts (1873); into French by Defrémery (1858); into German by Graf (1846); see also S. Robinson's *Persian Poetry for English Readers*, 1883, pp. 245–366. Select kaṣídas, ghazals, elegies, quatrains, and distichs have been edited, with a German metrical translation, by Graf, in the *Z. D. M. G.*, ix. p. 92 *sq.*, xii. p. 82 *sq.*, xiii. p. 445 *sq.*, xv. p. 541 *sq.*, and xviii. p. 570 *sq.* On the Súfic character of Sa'dí in contrast to Ḥáfiẓ and Jelál-uddín Rúmí, comp. Ethé, "Der Sûfismus und seine drei Hauptvertreter," in *Morgenländische Studien*, Leipsic, 1870, pp. 95–124.

(H. E.)

SADLER, Sir Ralph (1507–1587), English statesman, was the son of Henry Sadler, steward to the proprietor of the manor of Gillney, near Great Hadham, Hertfordshire, and was born at Hackney in Middlesex in 1507. While a mere child he obtained a situation in the family of Thomas Cromwell, earl of Essex. Through him he was introduced to Henry VIII., who conferred on him various appointments and employed him in connection with the dissolution of the monasteries, in the rich spoils of which he was a large sharer. So much was the king impressed by Sadler's ability and address that he made choice of him for his subsequent important negotiations with Scotland. In 1537 he was sent thither to strengthen the English interest; in 1539–40 he was commissioned to persuade the Scottish king James V. to cast off the supremacy of the pope; in 1541 he went back to enforce the same counsel; and in 1542 he was appointed to settle the proposed match between Edward prince of Wales and Mary the infant queen of Scots. Although not successful in any of these missions, he continued to retain the full confidence of the king, who, in recognition of his zealous services, conferred on him in 1543 the honor of knighthood. On Henry's death in 1547 Sadler's name was found in the royal will as one of the councillors to the sixteen nobles who were entrusted with the guardianship of the young king. In the same year he was appointed treasurer to the army sent against Scotland, and for his great services in rallying the repulsed cavalry he was created a knight-banneret on the battle-field of Pinkie. During the reign of

Mary he lived in retirement on his estate near Hackney; but on the accession of Elizabeth in 1558 he came once more into a sphere of active employment. He immediately became a member of parliament for the county of Hertford and a privy councillor. Not long afterwards his strong Protestant sympathies and his acquaintance with Scottish affairs recommended him as a fit person to be employed by Elizabeth in her intrigues with the Scottish lords of the congregation against Queen Mary. In 1584 he was appointed keeper of Mary queen of Scots in the castle of Tutbury; but on account of "age and infirmity" he was permitted to resign his charge some time before the death of the queen. His last service was to repair to Scotland to pacify the king's indignation on account of Mary's death. He died after his return home at Standon in Hertfordshire, 30th March, 1587.

The *Letters and Negotiations* of Sir Ralph Sadler were published at Edinburgh in 1720, and a more complete collection under the title *State Papers and Letters of Sir Ralph Sadler*, with a life by Sir Walter Scott, in 1809. *The Memoir of the Life and Times of Sir Ralph Sadleir, by his Descendant Major F. Sadleir Stoney*, appeared in 1877.

SADOLETO, Jacopo (1477–1547), Italian humanist and churchman, was born at Modena in 1477, and, being the son of a noted jurist, was designed for the same profession. He gave himself, therefore, to humanistic studies and acquired reputation as a Latin poet, his best-known piece being one on the group of Laocoon. Passing to Rome, he obtained the patronage of Cardinal Carafa and adopted the ecclesiastical career. Leo X. chose him as his secretary along with Peter Bembo, and in 1517 made him bishop of Carpentras. Sadoleto had a remarkable talent for affairs and approved himself a faithful servant of the papacy in many difficult negotiations under successive popes, especially as a peacemaker; but he was no bigoted advocate of papal authority, and the great aim of his life was to win back the Protestants by peaceful persuasion—he would never countenance persecution—and by putting Catholic doctrine in a conciliatory form. Indeed his chief work, a *Commentary on Romans*, though meant as a prophylactic against the new doctrines, gave great offence at Rome and Paris. Sadoleto was a diligent and devoted bishop and always left his diocese with reluctance even after he was made cardinal (1536). His piety and tolerant spirit, combined with his reputation for scholarship and eloquence and his diplomatic abilities, give him a somewhat unique place among the churchmen of his time. He died in 1547. His collected works appeared at Mainz in 1607, and include, beside his theologico-irenical pieces, a collection of *Epistles*, a treatise on education (first published in 1533), and the *Phædrus*, a defence of philosophy, written in 1538.

SÆMUND. See Edda, vol. vii. p. 564, and Iceland, vol. xii. p. 660.

SAFES. A safe is any repository in which valuable property is guarded against risk of loss by fire or from the attacks of thieves. The protection of valuable documents and possessions was only imperfectly effected in the charter-rooms of old mansions and in the iron-bound oaken chests and iron coffers of the Middle Ages; but these in their day represented the strong rooms and safes of modern times. The vast increase in realized wealth and the complication of financial and banking operations necessitate in our days the greatest attention to the safe guarding of securities and property. The ingenuity of inventors has, within practicable limits, effected much in safe-making; but the cunning of thieves has increased in proportion to the obstacles to be overcome and to the value of the booty at which they aim. No safe can be held to be invulnerable; for, whatever human ingenuity can put together and close, the same ingenuity can tear down and open. An impregnable safe would indeed be a source of greater danger than of security to its owner, for, were the key or other means of access lost or rendered unworkable, the contents of the safe would of necessity be irrecoverable. The efficiency of a safe, therefore, does not depend on absolute impregnability, but on the nature of the obstacles it presents to successful attack, and to the generally unfavorable conditions under which such attacks are made. It is common to make safes both thief and fire-resisting, and the conditions necessary for the one object to a certain extent conduce to the attainment of both; but for many purposes security from the one danger alone is requisite.

The devices for baffling thieves are numerous. The safe must in the first place be made heavy and unwieldy, or otherwise it must be so fixed that it can only be carried away with the utmost difficulty. Next, the greatest obstacles to obtaining illegitimate access must be presented. To prevent fracturing a tough metal must be used in the construction, and to resist penetration by drilling metal of great hardness must be interposed. These conditions are commonly met by making the outer casing of the safe of boiler plate, backed by a lining of hard steel, over which is an inner lining of thin boiler plate, the three layers being securely bolted together by screws from within. By some makers a layer of hard metal is poured, in a fluid state, between the outer and inner casing; others case-harden one surface; and there are numerous additional devices for securing the combination of hardness and toughness. To prevent wrenching of joints, the two sides with top and bottom of the outer shell are sometimes made out of a single plate welded at the joint, and the back and front are then attached to that shell by angle irons screwed from within. The frame upon which the door hangs and into which the bolts shoot is made of great strength, with special precautions to prevent the wrenching off of the door by means of crowbars or wedges. In an ordinary safe the massive bolts, three or four in number, shoot only at the front, and fixed dogs or sham bolts fit into slots at the back or hinged side. This arrangement is sufficient to keep the door closed independent of hinges, which are merely the pivot on which the door turns. In all Chubb's safes bolts shoot both to front and back; and in the higher quality of that and of every other good maker bolts shoot on every side,—front, back, top, and bottom. Ordinarily the bolts shoot straight into the slot as in an ordinary lock; but, to defy wrenching, additional grip is secured by Chatwood, who makes a bolt with a clutch or projection, which falls into a recess in the slot and thus holds against any direct wrench. In Chubb's finer safes the bolts shoot diagonally all round, so that in each face of the door they go in two different directions. Safe bolts are shot not by the key, as in an ordinary lock, but by the door handle, and the key simply secures them in their position. By this arrangement, patented by Mr. Charles Chubb in 1835, a series of the most ponderous bolts can be secured in locked position by a small key which can be carried in the vest pocket. The lock of a safe must be a careful piece of mechanism, not subject to derangement, unpickable, and gunpowder-proof. The portion of the door on which it is fastened is generally provided with extra precautions against drilling. A safe being well made and securely locked remains vulnerable through the medium of the key, which may be surreptitiously obtained either for direct use or to form a mould by which false keys can be cut. On this account, keyless locks and time locks are coming into great favor in America. In keyless permutation locks, such as those of Hall, Sargent, Yale and Dalton, the bolts can be withdrawn only after an indicator has been successively set against a combination of numbers arranged before the closing of the door; and in the time lock of these inventors the safe can only be opened at any hour to which the time controller is set before closing. Electrical arrangements have also been attached to safes by which signals are conveyed to any spot when a safe so guarded is unlawfully interfered with.

It is much easier to render a safe fire-proof than to guard it against burglary. It requires nothing more than a calculation of the intensity and duration of any fire to which it is likely to be exposed, and the provision of a sufficient lining of fire-resisting material. What is principally used is a mixture of some absorbent medium—such as sawdust, powdered gypsum or cement, or infusorial earth with ground alum. Asbestos, silicate cotton, mica, and other non-conductors are also used; and by some makers sealed tubes of alkaline salts are distributed through the absorbent material. These burst when exposed to high heat and their contents saturate the surrounding substance. A carefully packed shell of not less than 3½ inches of the fire-resisting medium should line the interior of every fire-proof safe; but in many cheap safes a quantity of brick dust is the only fire-resisting medium.

Where an ordinary safe provides insufficient accommodation the strong room takes its place. Such an apartment, being generally in the basement of a building, presents no special difficulties to make it proof against fire and thieves. Thickness of walls, built by preference of hard brick laid in cement, and liberal use of cement within the walls, as well as at the floor and over the arched roof, give strength against both fire and burglars. The interior of a strong room is generally lined with boiler-plate, and, in addition to the massive steel and iron door, it has an inner wrought-iron grill-door, which secures the vault during business hours and permits the ventilation of the apartment. Within such a strong room extra strong chambers or separate safes may be placed, and in this way precautions may be indefinitely multiplied.

The most complete examples of safe and strong-room arrangements are afforded by the public safes or safe-deposits erected in most of the great cities of America and in London. The premises of the National Safe Deposit Company in London consists of a large isolated building in Queen Victoria Street. The building, which is fire-proof, covers and surrounds the great safe vault or citadel, which is sunk in the ground to a depth of 45 feet. The vault itself, founded on a bed of concrete 20 feet in thickness, has walls, 3 feet thick, of hard blue brick laid in cement, with an external lining of fire-brick, and is lined internally with cast-iron plates 4½ inches thick chilled on one side, the plates having embedded in them a network of strong interlaced wrought-iron bars. The vault is divided into four tiers or stories with eight separate compartments in each, which, after business hours, are closed with doors raised and lowered by hydraulic power. These doors, which each weigh four tons, are built up, 12 inches thick, of combinations of hard and tough metal to resist fracture and drilling, and when they are raised for business purposes the entrance to each compartment is protected by a massive wrought-iron grill. Within the thirty-two compartments there is space for about 20,000 safes of various sizes, which are let to owners of valuables, each renter having the sole control of the safe hired by him. Additional security is obtained by the patrol of armed watchmen, and generally it may be said that in the institution precautions have been carried almost to the pitch of perfection, if indeed they have not been pushed to needless excess. (J. PA.)

SAFETY LAMP. See COAL, vol. vi. p. 68 *sq.*

SAFFÁRIDS, a Persian dynasty of the 9th century. See MOHAMMEDANISM, vol. xvi. p. 609.

SAFFI (Asafi), a seaport of Morocco, with 6000 inhabitants, some commerce, and a famous shrine, the House of the Seven Sleepers, frequented by Moslem and Jewish pilgrims. See vol. xvi. p. 857.

SAFFLOWER, or BASTARD SAFFRON (*Carthamus tinctorius*), belongs to the natural order *Compositæ*; its flowers form the basis of the safflower dye of commerce. The plant is a native of the East Indies, but is cultivated in Egypt and to some extent in Southern Europe. To obtain the dyeing principle—carthamine—the flowers are first washed to free them from a soluble yellow coloring matter they contain; they are then dried and powdered, and digested in an alkaline solution in which pieces of clean white cotton are immersed. The alkaline solution having been neutralized with weak acetic acid, the cotton is removed and washed in another alkaline solution. When this second solution is neutralized with acid, carthamine in a pure condition is precipitated. Dried carthamine has a rich metallic green color; it forms a brilliant but fugitive scarlet dye for silk, but is principally used for preparing toilet rouge. In 1884 there were imported into the United Kingdom 1794 tons of safflower, valued at £7109 [$34,549.74], almost the whole of which came from the East Indies.

SAFFRON (Arab. *za'farān*) is manufactured from the dried stigmas and part of the style of the saffron crocus, a cultivated form of *Crocus sativus*, L., the precise origin of which is unknown; for, though some of the wild forms (var. *Thomasii*, *Cartwrightianus*) are also employed for the manufacture of saffron, they differ in character from the cultivated type and are somewhat restricted in geographical range, while the cultivated form extends with little or no change through nearly ninety degrees of longitude (Spain to Kashmir) and twenty-five degrees of latitude (England to Persia). It is invariably sterile, unless artificially fertilized with the pollen of some of the wild varieties. The purple flower, which blooms late in autumn, is very similar to that of the common spring crocus, and the stigmas, which are protruded from the perianth, are of a characteristic orange-red color. The Egyptians, though acquainted with the bastard safflower (see preceding article), do not seem to have possessed saffron; but it is named in Canticles iv. 14 among other sweet-smelling herbs. It is also repeatedly mentioned (κρόκος) by Homer, Hippocrates, and other Greek writers; and the word "crocodile" was long supposed to have been derived from κρόκος and δειλός, whence we have such stories as that "the crocodile's tears are never true save when he is forced where saffron groweth" (Fuller's *Worthies*). It has long been cultivated in Persia and Kashmir, and is supposed to have been introduced into China by the Mongol invasion. It is mentioned in the Chinese materia medica (*Pun tsaou*, 1552–78). The chief seat of cultivation in early times, however, was the town of Corycus (modern Korghoz) in Cilicia, and from this central point of distribution it may not improbably have spread east and west. According to Hehn, the town derived its name from the crocus; Reymond, on the other hand, with more probability, holds that the name of the drug arose from that of the town. It was cultivated by the Arabs in Spain about 961, and is mentioned in an English leech-book of the 10th century, but seems to have disappeared from western Europe till reintroduced by the crusaders. According to Hakluyt, it was brought into England from Tripoli by a pilgrim, who hid a stolen corm in the hollow of his staff. It was especially cultivated near Hinton in Cambridgeshire and in Essex at Saffron Walden (*i.e.*, Saffron Woods, not Saffron Walled-in, as the canting crest of the town would imply), its cultivators being called "crokers." This industry, though very important in the 15th century, when English saffron commanded the highest prices on the Continent, appears to have died out about 1768.

Saffron was used as an ingredient in many of the complicated medicines of early times. According to Gerard "the moderate use of it is good for the head and maketh the sences more quicke and lively. It shaketh off heavie and drowsy sleep and maketh a man mery." It appears to be really a stimulant and antispasmodic, though its powers are slight. It is scarcely ever employed by modern pharmacists unless for the mere coloration of other tinctures, or at most as a cordial adjunct to other medicines. That it was very largely used in cookery is evidenced by many writers; thus Laurenbergius (*Apparatus Plantarum*, 1632) makes the large assertion "In re familiare vix ullus est telluris habitatus angulus ubi non sit croci quotidiana usurpatio aspersi vel incocti cibis." The Chinese used also to employ it largely, and the Persians and Spaniards still mix it with their rice. As a per-

fume it was strewn in Greek halls, courts, and theatres, and in the Roman baths. The streets of Rome were sprinkled with saffron when Nero made his entry into the city.

It was, however, mainly used as a dye, It was a royal color in early Greek times, though afterwards perhaps from its abundant use in the baths, and as a scented salve, it was especially appropriated by the hetairæ. In ancient Ireland a king's mantle was dyed with saffron, and even down to the 17th century the "lein-croich," or saffron-dyed shirt, was worn by persons of rank in the Hebrides. In mediæval illumination it furnished, as a glaze upon burnished tinfoil, a cheap and effective substitute for gold. The sacred spot on the forehead of a Hindu pundit is also partly composed of it. Its main use in England was to color pastry and confectionery,—hence "I must have saffron to color the Warden pies" (*Winter's Tale*, act iv. sc. 2),—and it is still often added to butter and cheese. One grain of saffron rubbed to powder with sugar and a little water imparts a distinctly yellow tint to ten gallons of water. This coloring power is due to the presence of polychlorite, a substance whose chemical formula appears to be $C_{48}H_{60}O_{18}$, and which may be obtained by treating saffron with ether, and afterwards exhausting with water. Under acids it yields the following reaction:

$$\underset{\text{Polychlorite.}}{C_{48}H_{60}O_{18}} + H_2O = 2(\underset{\text{Crocin.}}{C_{16}H_{18}O_6}) + \underset{\text{Essential Oil.}}{C_{10}H_{14}O} + \underset{\text{Sugar.}}{C_6H_{12}O_6}.$$

Crocin, according to Watts, *Dict. of Chem.*, has a composition of $C_{29}H_{42}O_{15}$ or $C_{58}H_{42}O_{30}$. This crocin is a red coloring matter, and it is surmised that the red color of the stigmas is due to this reaction taking place in nature.

At present saffron is chiefly cultivated in Spain, France, Sicily, on the lower spurs of the Apennines, and in Persia and Kashmir. The ground has to be thoroughly cleared of stones, manured, and trenched, and the corms are planted in ridges. The flowers are gathered at the end of October, in the early morning, just when they are beginning to open after the night. The stigmas and a part of the style are carefully picked out, and the wet saffron is then scattered on sheets of paper to a depth of 2 or 3 inches; over this a cloth is laid, and next a board with a heavy weight. A strong heat is applied for about two hours so as to make the saffron "sweat," and a geutler temperature for a further period of twenty-four hours, the cake being turned every hour so that every part is thoroughly dried. It is calculated that the stigmas of about 4300 flowers are required to give an ounce of saffron; but the experiments of Chappellier indicate a possibility of greatly increasing the yield by the cultivation of monstrous forms.

The drug has naturally always been liable to great adulteration in spite of penalties, the severity of which suggests the surviving tradition of its sacred character. Thus in Nuremberg a regular saffron inspection was held, and in the 15th century we read of men being burned in the market-place along with their adulterated saffron, while on another occasion three persons convicted of the same crime were buried alive. Grease and butter are still very frequently mixed with the cake and shreds of beef dipped in saffron water are also used. Good saffron is distinguished by its deep orange-red color; if it is light yellow or blackish, it is bad or too old. It should also have a peculiar and rather powerful odor, and a bitter pungent taste. If oily it is probably adulterated with butter or grease.

See Flückiger and Hanbury, *Pharmacographia*, and Maw, *Monograph of the genus Crocus*, upon which the preceding account is essentially based; also Pereira, *Materia Medica*, and the pharmacopœias.

SAFFRON WALDEN, a market-town and municipal borough of Essex, England, is finely situated near the Cam in a valley surrounded by hills, on a branch of the Great Eastern Railway, 44 miles north-northeast of London and 14 south of Cambridge. It has a somewhat ancient appearance and possesses good streets and a spacious market-place. Of the old castle, dating probably from before the Conquest, the keep and a few other portions still remain. The church of St. Mary the Virgin, a beautiful specimen of the Perpendicular style, dating from the reign of Henry VII., but frequently repaired and restored, contains the tomb of Lord Audley, chancellor to Henry VIII. There is an Edward VI. grammar-school, for which new buildings have recently been erected. Amongst the modern public buildings are the corn exchange (1848) and the new town-hall (1879). The town possesses a museum, a literary institute, and a horticultural society. The benevolent institutions include the hospital and the Edward VI. almshouses. In the neighborhood is the fine mansion of Audley End, built by Thomas, first earl of Suffolk, in 1603 on the ruins of the abbey, converted in 1190 from a Benedictine priory founded by Geoffrey de Mandeville in 1136. The town is an important centre of agricultural industry and has large corn, cattle, and sheep markets. Brewing and malting are carried on. The population of the municipal borough (area, 7416 acres) in 1871 was 5718, and in 1881 it was 6060.

The original name of the town was Wealdenberg, and when it received a grant of a market in the time of Geoffrey de Mandeville it was called Cheping Walden. The substitution of the prefix Saffron is accounted for by the former culture of Saffron (*q.v.*) in the neighborhood. The town has existed for more than 500 years as a guild, and the government is now vested in a mayor, four aldermen, and twelve councillors.

SAGAN, a manufacturing town in Prussian Silesia, situated on the Bober, a tributary of the Oder, lies 60 miles south-southeast of Frankfort-on-the-Oder and 102 miles southeast of Berlin. It contains the handsome palace of the dukes of Sagan, several interesting churches, a Roman Catholic gymnasium, and a large Gothic hospital, named after its founder, the duchess Dorothea (1793–1862). The leading industry of the town is cloth-weaving, with wool and flax spinning; it has also some trade in wool and grain. The population in 1880 was 11,373.

The mediate principality of Sagan, formed in 1397 out of a portion of the duchy of Glogau, has several times changed hands by purchase as well as by inheritance. One of its most famous possessors was Wallenstein, who held it for seven years before his death in 1634. Bought by Prince Lobkowitz in 1646, the principality remained in his family until 1786, when it was sold to Peter, duke of Courlaud, whose descendant, the duke of Talleyrand-Périgord and Valençay in France, now owns it. The area of the principality is about 467 square miles, and its population is about 65,000.

SAGAR, or Saugor, a British district of India, situated in the extreme northwest of the Central Provinces, and comprised between 23° 4′ and 24° 27′ N. lat., and between 78° 6′ and 79° 12′ E. long., with a total area of 4005 square miles. It is bounded on the N. by the Lálitpur district of the Northwestern Provinces and the native states of Bijáwar, Panná, and Charkhári; on the E. by Panná and Damoh district; on the S. by Narsinhpur district and the native state of Bhopal; and on the W. also by Bhopal. Ságar district is an extensive, elevated, and in parts tolerably level plain, broken in places by low hills of the Vindhyan sandstone. It is traversed by numerous streams, chief of which are the Sunar, Beás, Dhupan, and Bina, all flowing in a northerly direction towards the valley of the Ganges. In the southern and central parts the soil is black, formed by decaying trap; to the north and east it is a reddish-brown alluvium. Iron ore of excellent quality is found and worked at Hirapur, a small village in the extreme northeast. The district contains several densely wooded tracts, the largest of which is the Ramna teak forest preserve in the north. Roads are the only means of communication; of these the total length is 134 miles, 50 being returned as first class. The climate is moderate; the average temperature is 75°, and the average rainfall is about 46 inches.

By the census of 1881 the population numbered 564,950 (294,795 males and 270,155 females). Hiudus numbered 498,071, Mohammedans 25,396, Buddhists and Jains 16,432,

Christians 1034, and aboriginals 19,144. The only town except the capital (see below) with a population exceeding 10,000 is Garhakota, which contains 11,414 inhabitants. Of the total area only 1396 square miles are cultivated, and of the portion lying waste 1220 are returned as cultivable. Wheat forms the principal crop, which is produced in large quantities all over the district; other products are food grains, rice, oil-seeds, cotton, and sugar-cane. Cattle and buffaloes are bred to a large extent both for draught and carriage, and also for dairy purposes, especially for the manufacture of ghee. The revenue of Ságar district in 1883–84 amounted to £68,376 [$332,307.36], of which the land-tax contributed £44,429 [$215,924.94].

By a treaty concluded with Baji Rao in 1818, the greater part of the present district was made over to the British. During the mutiny of 1857 the whole district was in the possession of the rebels, excepting the town and fort in which the Europeans were shut up for eight months, till relieved early in the following year by Sir Hugh Rose. The rebels were totally defeated and order was again restored by March, 1858. Ságar was formed into a separate district of the Central Provinces in 1861.

SAGAR, principal town and headquarters of the above district situated in 23° 50′ N. lat. and 78° 49′ E. long., is well built with wide streets and stands on the borders of a small but beautiful lake, and has military cantonments. Ságar is the entrepôt of the salt trade with Rájputána, and carries on a large trade with Mírzápur district in the Northwestern Provinces, importing sugar and other grocery, besides English cloth. The population of the town in 1881 was 44,416 (males 22,556, females 21,860).

SAGE, Le. See Le Sage.

SAGHALIN, or Sakhalin, is the name improperly given to a large elongated island in the North Pacific, lying between 45° 57′ and 54° 24′ N. lat. and 141° 30′ and 144° 50′ E. long., off the coast of Russian Manchuria. Its proper name is *Karaftu* or *Karafuto*. It is separated from the mainland by the narrow and shallow Strait of Tartary, which often freezes in winter in its narrower part, and from Yezo (Japan) by the Strait of La Pérouse. This island (670 miles long, 20 to 150 broad, with an area of 24,560[1] square miles), about equal in size to Belgium and Holland together, must be considered as a continuation of the mountains bordering the Manchurian littoral. Its orography is still imperfectly known. The present maps represent it as formed of two parallel ridges, running north and south and reaching from 2000 to 4000 or 5000 feet (Mounts Berniget and Ktöuspal) high, with two or more wide depressions, not exceeding 600 feet above the sea. The general configuration of the littoral and the island, however, renders it more probable that there are three chains running southwest to northeast, forming continuations of those of the mainland. The geological structure of the island is also imperfectly known. A few crystalline rocks are found at several capes; Cretaceous limestones containing a rich and specific fauna of gigantic ammonites occur at Dui; and Tertiary conglomerates, sandstones, marls, and clays, folded by subsequent upheavals, are widely spread. The clays, which contain layers of good coal and a rich fossil vegetation, show that during the Miocene period Saghalin was part of a continent which comprised both north Asia, Alaska, and Japan, and enjoyed a much warmer climate than now. The Pliocene deposits contain a mollusc fauna more arctic than the present, and probably indicating that the connection between the Pacific and Arctic Oceans was broader than now. Only two rivers, the Tym and the Poronai, are worthy of mention. The former, 250 miles long, and navigable by rafts and light boats for 50 miles from its mouth, flows north and northeast with numerous (about 100) rapids and shallows, in a wild valley suitable only for fishing or hunting settlements, and enters the Sea of Okhotsk at the Bay of Nyi. The Poronai flows north and then south to the Gulf of Patience, a wide bay on the southeast coast. Three other small streams enter the wide semicircular Gulf of Aniva at the southern extremity of the island.

Owing to the cooling influence of the Sea of Okhotsk, the climate is very cold. At Dui the average yearly temperature is only 33.0° Fahr. (January, 3.4°; July, 61.0°), 35.0° at Kusunai, and 37.6° at Aniva (January, 9.5°; July, 60.2°). A dense covering of clouds for the most part shuts out the rays of the sun; while the cold current issuing from the Sea of Okhotsk, aided by northeast winds, in summer brings immense ice-floes to the east coast. The whole of the island is covered with dense forests (mostly coniferous). The Ayan fir (*Abies ayanensis*), the Saghalin pichta, and the Daurian larch are the chief trees; and the upper parts of the mountains have the Siberian rampant cedar (*Cembra pumila*) and the Curilian bamboo (*Arundinaria kurilense*), 4 feet high and half an inch thick. Birch, both European and Kamchatkan (*B. alba* and *B. Ermani*), elder, poplar, elm, wild cherry (*Prunus padus*), *Taxus baccata*, and several willows are mixed with the Conifers; while farther south the maple, the ash, and the oak, as also the Japanese *Panax ricinifolium* and the Amur cork (*Philodendron amurense*), make their appearance. The number of phanerogamous species known reaches 590 and may reach 700, of which only 20 are peculiar to Saghalin, the remainder belonging to the Amur and partly to the Japanese flora. The fauna of Saghalin closely resembles that of the Amur region, and in fact the Siberian. Bears, foxes, and sables are still numerous, as also the reindeer in the north and the antelope; and tigers are occasionally met with in the south. The avi-fauna is the common Siberian; and the rivers are exceedingly rich in fish, especially species of salmon (*Oncorhynchus*), which make their way up the rivers in vast numbers to spawn. The lower marine fauna, explored by Schrenck, is also rich, while numerous whales, not in high esteem with whalers, are met with on the sea coast. Otarias, seals, and dolphins are a source of profit.

Saghalin has been inhabited since at least the Neolithic Stone Age. Flint implements, exactly like those of Siberia and Russia, have been found at Dui and Kusunai in great numbers, as well as polished hatchets (of trap, diorite, and argillaceous schists)—also like the European ones—primitive pottery with decorations like those of Olonetz, and stone weights for nets. Afterwards came a population to whom bronze was known; they have left their traces in earthen walls and kitchen-middens (in the Bay of Aniva). The present inhabitants consist of some 2000 Gilyaks, 2500 Ainos, 500 Oroks, as many Japanese, and about 6000 Russians. The Gilyaks, who do not differ from those of the Amur, inhabit the northern part of the island. They support themselves by fishing and partly by hunting, but suffer from competition with the Japanese, who take possession of the best fishing-grounds. The Oroks of Tungus origin, resemble the Orotchons of the Amur; they live by hunting. The Ainos, who are still the subject of much discussion among ethnologists, are the aborigines of the island; they are closely akin to the Curilians, and, like these, differ from all other Mongolian races by their luxuriance of hair and beard. They now inhabit only the south part of the island, and have been brought into a condition of slavery by the Japanese, by whom they have been driven out of Yezo and Nippon, in both of which they were the aborigines. The Japanese have several colonies on Saghalin and force the Ainos to fish and collect seaweed for exportation. They send their ships to the south part of the island and have colonies there, and also on the east coast, at the mouth of the Tym. The Russians began to settle permanently on Saghalin in 1857; and, though next year posts were established in the southern part of the island, it still continued to belong to Japan, which definitely ceded it to Russia in 1875. A scheme having been lately formed for colonizing the island with convicts, several thousands have been transported thither, especially to Dui (Alexandrovsk), where they are employed in coal mining (annual output from 3000 to 30,000 cwts.), or make some attempt at agriculture; they are either kept in the Alexandrovsk prison, or permitted to build houses and to settle with their families. These efforts towards colonization, however, encounter great difficulties from the quality of the soil, the cultivable patches

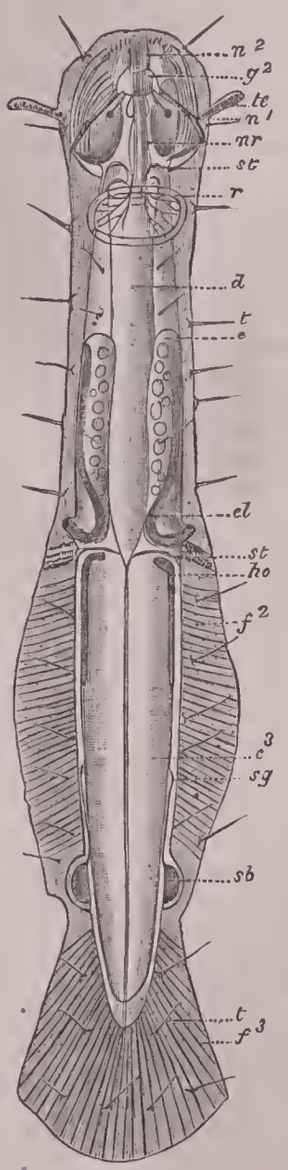
[1] [Keith Johnston gives 47,500 sq. m. as the area, or twice that of Holland and Belgium.—Am. Ed.].

occurring here and there in the marshy valley of the Duika river on the upper course of the Tym, and in the bays of Patience and Aniva. The only crops that thrive are various kinds of kitchen produce. The Russian settlements are at Dui on the west coast, Malo-Tymovsk and Rykovsk on the upper Tym, Korsakoff and Muravieff on the Bay of Aniva.

History.—Saghalin, which was under Chinese dominion until the present century, became known to Europeans from the travels of Martin Gerrits in the 17th century, and still better from those of La Pérouse (1787) and Krusenstern (1805), who described large parts of its coast. Both, however, regarded it as a mere appendage of the continent, and were unaware of the existence of the Strait of Tartary, which was discovered a few years later by a Japanese, Mamia Rinso, whose discovery is embodied in Siebold's *Nippon*. The Russian navigator Nevelskoi, in 1849, definitively established the existence and navigability of this strait; since that time the Russian expeditions of Boshnyak (1851) and Rimskiy-Korsakoff (1853) continued the explorations, and in the latter year a Russian post was temporarily established at Aniva Bay. L. Schrenck in 1855–56, and MM. Schmidt, Glehn, Brylkin, and Shebunin in 1860, explored the geology, fauna, flora, and ethnology of the island; M. Lopatin in 1867 explored, on foot, the east coast; MM. Dobrotvorsky published (1869 and onwards) interesting data as to the inhabitants, and M. Polyakoff was entrusted in 1881–82 with a detailed exploration, and returned with rich ethnological and zoological collections, with regard to which only preliminary reports have as yet been published. (P. A. K.)

SAGINAW, a city of the United States, capital of Saginaw county, Michigan, lies on an elevated plateau about 30 feet above the water on the left bank of the Saginaw river, which falls into Saginaw Bay on Lake Huron, about 18 miles lower down. It is a railway junction of some importance, 100 miles northwest of Detroit, is connected with East Saginaw[1] by a street railway, and can be reached by the largest vessels that ply on the lake. The upper branches of the river are also available for boat traffic throughout a considerable district. Saw-mills, planing-mills, and salt-works are the principal industrial establishments. The population was 7460 in 1870 and 10,525 in 1880. The city charter dates from 1859, the first settlement from 1822.

SAGITTA. The name "Sagitta" was given by Martin Slabber in 1775 to a small marine worm which is now known as the type of a distinct group, the *Chætognatha* (Leuckart). The group comprises two genera (*Sagitta* and *Spadella*) and a considerable number of species; they are small transparent pelagic animals, varying in length from a few lines up to two inches, and are universally distributed. The body (see Fig.) is elongated and furnished with a tail and lateral fins, which are prolongations of the chitinous cuticle; the head is provided with a great number of variously shaped chitinous setæ. The body is divided by transverse septa into three distinct segments: the first septum is placed just behind the head (*st*), the second (*st*) about the middle of the body, separating the ovaries and testes. The body-cavity is likewise separated into right and left halves by a continuous vertical mesentery, which suspends the gut. The alimentary canal is a simple straight tube of uniform structure passing from the mouth to the anus, which is placed ventrally and at the second transverse septum; the alimentary tube is ciliated and is unprovided with glands of any kind. The body-wall is composed of (1) an outer layer of epidermis, which secretes the chitinous cuticle already referred to,—the thickness of the epidermis varying from five or six cells in the region of the head to a single layer of cells in the "fins"; (2) a delicate structureless supporting lamella; (3) a layer of longitudinal muscles. These last have a peculiar arrangement and structure: they are disposed in four bands, two dorsal and two ventral, the action of which is evidently favorable to producing the onward movements of the creature. The muscular fibres, which are transversely striated, are arranged in a series of lamellæ whose direction is perpendicular to the longitudinal axis of the body. Projections inward of the supporting lamella bear on either side a single row of muscular fibres; a similar muscular structure occurs in the *Nematoidea* and in many *Oligochæta*. In the anterior region of the body the muscular layer is differentiated into special muscles for the movement of the setæ. (4) The body-cavity is lined by a delicate peritoneal epithelium closely applied to the muscular layer of the body-wall and to the gut. The nervous system consists of a cerebral ganglion and a large ventral ganglion—the two united by commissures which pass round the gut; both ganglia are embedded in the epidermis. This primitive condition of the nervous system is retained in other lowly organized worms (*e.g.*, *Polygordius*). The ventral ganglion is connected with an intra-epidermic nervous plexus which surrounds the whole body. Eyes are present, besides a number of tactile cells upon the outer surface of the body; anteriorly is a ring-shaped structure (*r*) which is supposed to be olfactory in function. The generative organs consist of ovaries and testes, which are united in the same individual; the ovaries (*e*), placed anterior to the testes, are furnished with oviducts, which appear to terminate in a cæcal extremity. The testes (*ho*) are placed behind the second septum; they are each furnished with a vas deferens opening on to the exterior and into the body-cavity by a ciliated funnel. For embryology, see Balfour, *Comparative Embryology*, vol. i. p. 303.



Spadella cephaloptera (Busch).

St, septa dividing body-cavity transversely; g^2, cerebral ganglia; n^1, commissure uniting this with ventral ganglion (not shown in fig.); n^2, nerve uniting cerebral ganglia with small ganglia on head; *nr*, olfactory nerve; *d*, alimentary canal; *r*, olfactory organ; *te*, tentacle; *t*, tactile hairs springing from surface of body; *e*, ovary; *el*, oviduct; *ho*, testes; *sg*, vas deferens; f^2, f^3, lateral and caudal fins; *sb*, seminal pouch. The eyes are indicated as black dots behind the cerebral ganglia.

In spite of the detailed knowledge which we now possess of the structure and development of the *Chætognatha*, the systematic position of the group remains a matter of the greatest uncertainty. That they are an archaic group is shown by their hermaphroditism, by the primitive condition of the nervous system, and by the persistence of the vertical mesentery among other characters; in all these points and in others they agree with such primitive *Annelida* as *Protodrilus* and *Polygordius*. On the other hand, their similarity to the *Nematoidea* has been dwelt upon; the disposition of the muscles is the same in both groups, and the *Gordiaceæ* have the gut suspended by a dorsal and ventral mesentery in the same fashion as has been described above in *Sagitta;* the *Chætognatha* differ, however, from the *Nematoidea* in the important fact of their segmentation. On the whole it appears that the *Chætognatha* are best regarded as a special phylum equivalent to such groups as *Annelida*, *Platyhelminthes*, *Nematoidea*, but having no special relation to any one of them.

SAGO is a food-starch prepared from a deposit in the trunk of several palms, the principal source being sago palm. *Metroxylon Rumphii* (Mart.), and *M. læve* (Mart.). These palms are natives of the East Indian Archipelago, the sago forests being especially extensive

[1] The two places have since the above was written been consolidated. Joint population was 29,511 in 1880 and 46,322 in 1890.

in the island of Ceram. The trees flourish only in low marshy situations, seldom attaining a height of thirty feet, with a thick-set trunk. They attain maturity as starch-yielding plants at the age of about fifteen years, when the stem is gorged with an enormous mass of spongy medullary matter, around which is an outer rind consisting of a hard dense woody wall about two inches thick. When the fruit is allowed to form and ripen, the whole of this starchy core disappears, leaving the stem a mere hollow shell; and the tree immediately after ripening its fruit dies. When ripe the palms are cut down, the stems divided into sections and split up, and the starchy pith extracted and grated to a powder. The powder is then kneaded with water over a strainer, through which the starch passes, leaving the woody fibre behind. The starch settles in the bottom of a trough, in which it is floated, and after one or two washings it is fit for use by the natives for their cakes and soups. That intended for exportation is mixed into a paste with water and rubbed through sieves into small grains, from the size of a coriander seed and larger, whence it is known according to size, as pearl sago, bullet sago, etc. A large portion of the sago imported into Europe comes from Borneo, and the increasing demand has led to a large extension of sago-palm planting along the marshy river banks of Sarawak.

Various palms, in addition to the two above named, yield sago, but of an inferior quality. Among them may be mentioned the Gomuti palm (*Arenga saccharifera*), the Kittul palm (*Caryota urens*), the cabbage palm (*Corypha umbraculifera*), besides *Corypha Gebanga*, *Raphia flabelliformis*, *Phœnix farinifera*, and *Metroxylon filare*—all East Indian palms—and *Mauritia flexuosa* and *Guilelma speciosa*, two South American species. The imports of sago into the United Kingdom for 1884 amounted to 346,188 cwts., valued at £195,680 [$951,004.80], the whole of which, excepting less than 300 tons, is entered as coming from the Straits Settlements.

SAGUNTUM, an ancient city of Hispania, Tarraconensis, was situated near the mouth of the river Pallantias (Palancia). It was the centre of a fertile district and was a rich trading place in early times, but owes its celebrity to the desperate resistance it made to Hannibal (see vol. xi. p. 394–5). The Romans restored the city and made it a colony; later writers speak of its figs, which were esteemed at Rome, and of its earthenware, which enjoyed a certain reputation. The most important remains are those of the theatre.

The modern Sagunto or Murviedro (*muri veteres*), 18 miles by rail from Valencia on the line to Tarragona, is now about 3 miles from the sea; the population within the municipal boundaries was 6287 in 1877.

SAHARA is the great desert region which stretches across the continent of Africa eastwards from the Atlantic for a considerable distance on both sides of the Tropic of Cancer, and is generally distinguished by aridity of soil, absence of running water, dryness of atmosphere, and comparative scarcity of vegetable and animal life. The physical limits of this region are in some directions marked with great precision, as in part of Morocco and Algeria, where the southern edge of the Atlas range looks out on what has almost the appearance of a boundless sea, and forms, as it were, a bold coast-line, whose sheltered bays and commanding promontories are occupied by a series of towns and villages—Tisgi, Figîg, Laghouat, etc. In other directions the boundaries are vague, conventional and disputed. This is especially the case towards the south, where the desert sometimes comes to a close as suddenly as if it had been cut off with a knife, but at other times merges gradually and irregularly into the well-watered and fertile lands of the Sudan (Soudan). While towards the east the valley of the Nile at first sight seems to afford a natural frontier, the characteristics of what is usually called the Nubian or Arabian desert are so identical in most respects with those of the Sahara proper that some authorities extend this designation over the whole country to the shores of the Red Sea. The desert, indeed, does not end with Africa, but is prolonged eastwards through Arabia towards the desert of Sind. As the Nubian region has been described under the heading NUBIA (vol. xvii. p. 625), attention will in the present article be confined to the desert country west of the Nile valley. Even as thus defined the Sahara is estimated to have an area of 3,565,565 square miles, or nearly as much as all Europe minus the Scandinavian peninsula and Iceland; but, while Europe supports a population of 327,000,000, the Sahara probably does not contain more than 2,500,000,—a figure, however, which is sufficiently startling to those who think of it as an uninhabitable expanse of sand. The sea-like aspect of certain portions of the Sahara has given rise to much popular misconception, and has even affected the ideas and phraseology of scientific writers. Instead of being a boundless plain broken only by wave-like mounds of sand hardly more stable and little less dangerous than the waves of ocean, the Sahara is a region of the most varied surface and irregular relief, ranging in altitude from 100 feet below to some 5000 or 6000 or even it may be 8000 feet above the sea-level, and besides sand-dunes and oases, containing rocky plateaus, vast tracts of loose stones and pebbles, ranges of hills of the most dissimilar types, and valleys through which abundant watercourses must once have flowed.

See vol. i. Plate II.

The culminating points of the Sahara are probably the summits of the Ahaggar (Hoggar), a great mountain plateau, not inferior to the Alps in the area which it covers, crossing the Tropic of Cancer about 5° and 6° E. long., almost midway between the Atlantic and the valley of the Nile. In its central mass rise with red steep cliffs two peaks, Watellen and Hikena, which Duveyrier believes to be volcanic like those of Auvergne. The height of this country has not been ascertained by direct European observation, but may be gathered from the fact that according to the Tuareg the snow lies for three months of the year, from December to March. To the northwest, and separated from the Atakor-'n-Ahaggar by a wide plain, rises the Muydir plateau, lying nearly east and west for a distance of about 200 miles. Its northeastern extremity is extended towards Timassinin by the Irawen Mountains, which in their turn are separated by a narrow valley from the Tasili plateau (strictly Tasili of the Asjer or Asgar). This great plateau stretches southeast for 300 miles parallel with the Atakor-'n-Ahaggar (from which it is separated by the Amadghor and Adamar plains), and then the line of elevation is continued by low ridges to the Tummo or War Mountains, and so onwards to the highland country of Tibesti or Tu, whose highest point, Tusidde, is 7880 feet above the sea-level, while its southeastern eminences gradually die away in the direction of Wadai and Darfor (Darfur). About midway between Tibesti and the Niger rises the isolated mountain mass of Air or Asben, in which Dr. Erwin von Bary[1] discovered the distinct volcanic crater of Teginjir with a vast lava-bed down its eastern side. By some this country is assigned to the Sudan, as it lies within the limit of the tropical rains; but the districts farther south have all the characteristics of the desert. The low but extensive plateau of Adghagh lies between Air and the Niger. Away to the northeast, in the country of FEZZAN (*q.v.*), are the dark mountains of Jebel es-Sóda, which are continued southeast towards Kufra by the similar range of the Haruj; and in the extreme southwest at no great distance from the Atlantic is the hilly country of Adrar (Adever).

Nearly all the rest of the Sahara consists in the main of undulating surfaces of rock (distinguished as *hammada*), vast tracts of water-worn pebbles (*serir*), regions of sandy dunes (variously called *maghter*, *erg* or *areg*, *igidi* and in the east *rhart*), which, according to M. Pomel, occupy about one-ninth or one-tenth of

[1] *Zeitschrift für Erdkunde*, 1880.

the total area. The following is the general distribution of the dunes. From the Atlantic coast to the south of Cape Blanco a broad belt extends northeast for a distance of about 1300 miles, with a breadth varying from 50 to 300 miles. This is usually called the Igidi or Gidi, from the Berber word for dunes. Eastward it is continued to the south of Algeria and Tunis by the Western Erg and the Eastern Erg, separated by a narrow belt at Golea. To the south of the Eastern Erg (which extends as far north as the neighborhood of the Lesser Syrtis) the continuity of the sandy tract is completely broken by the Hammada al-Homra (or Red Rock Plateau), but to the south of this region lie the dunes of Edeyen, which, with slight interruptions, extend to Murzuk (Morzúk), to the south of the hammada of Murzuk the dunes of Murzuk stretch away southeast. Looked at in its entirety, this series of tracts may be called the northern zone ; it forms a kind of bow, with its extremities respectively at the Atlantic and the Libyan Desert and its apex in the south of Tunis. In the south are the Juf,[1] covering a vast area to the southeast of the middle portion of the Igidi, another area between the Adghagh plateau and the Tasili wan Ahaggar, and a third between Air and Tibesti. Away to the east in the Libyan Desert is a vast region of dunes of unascertained limits. It must be borne in mind that the sands do not entirely cover the areas assigned to them in the ordinary maps, which are of too small a scale to show the interchange of different kinds of surface. In the Eartern Erg especially the dunes lie in long lines in a north-northwest and south-southeast direction, presenting a gradual slope to windward and an abrupt descent to leeward. There they are generally about 60 or 70 feet high, but in other parts of the Sahara they are said to attain a height of upwards of 300 feet. The true dune sand is remarkable for the uniformity of its composition and the geometrical regularity of its grains, which measure less than .03937 inch.[2] While individually these appear crystalline or reddish yellow (from the presence of iron), they have in the mass a rich golden hue. According to M. Tissandier's examination, animal organisms, such as the microscopic shells of *Rhizopoda*, so abundant in sea-sand, are strikingly absent. Under the influence of the wind the surface of the dunes is subject to continual change, but in the mass they have attained such a state of comparative equilibrium that their topographic distribution may be considered as permanent, and some of them, such as Gern (Peak) al-Shúf and Gern Abd-al-Kader, to the south of Golea, have names of their own. The popular stories about caravans and armies being engulfed in the moving sands are quite apocryphal, but there is abundant evidence against the theory of M. Vatonne as to the dunes having been formed *in situ*. To understand their origin it is necessary to glance at the general geology of the Sahara, which, however, in this aspect is only known in detail to the south of Algeria and along the routes of the Rohlfs expedition (1873–74, Dr. Zittel) and that of Dr. Lenz (1880).

Granite, which along with gneiss and mica schists, seems to be the prevailing rock in the highlands of Air (Von Bary), comes to the surface more or less sporadically in the neigborhood of Al-Eglab and in the Adrar districts in the southwest. Gneiss and mica-schists are probably the main materials of the Ahaggar plateau. Volcanic rocks (basalt, etc.) form the mountain masses of Jebel es-Sóda and the Haruj ; in Air they break through the granite and other rocks in a very erratic fashion. Slates and quartzite (possibly Silurian, according to Lenz), which play so great a part in Senegambia, appear to the north of the Senegal, along the edge of the desert, and crop out again in Adrar, on the eastern borders of the Juf, and to the east of Wady Sus. An immense tract from Adrar northeast to the borders of Algeria seems to be occupied by Devonian and Carboniferous formations, the characteristic fossils of which frequently show on the surface ; farther east these rocks are covered by Cretaceous and Quaternary deposits, though they again appear in the Muydir and Tasili plateaus (M. Roche's report[3]). The development of the Cretaceous system is altogether one of the most striking features of the Saharan geology, its extreme limits being the coasts of the Atlantic and the Red Sea, and the area occupied by it in the Algerian Sahara alone being equal to the whole of France. In the Algerian Sahara the Cretaceous rocks are covered by no later sediments, with the exception of certain Quaternary deposits, but in the Libyan Desert Tertiary deposits are abundant, though, according to Zittel, there is no sharp distinction between Cretaceous and Tertiary, the one seeming (certain palæological characteristics apart) to pass gradually into the other. Eocene limestones, rich in nummulites and opporculines, stretch south and east from the oasis of Síwa and are well seen in the cliffs enclosing the depressed oasal areas which sink down to the Cretaceous rocks. To the south of Farafreh extends a vast tract of Nubian sandstone.

In all parts of the Sahara there is evidence of denudation carried out on a scale of unusual magnitude. The present surface of the desert has been exposed to the protracted wear and tear of the elements. But to determine the exact method by which the elements have done their work has hitherto proved beyond the power of science. The superficial observer is at once tempted to accept the theory of *submarine* denudation : the Sahara is still the "dried bed of a sea" in even such text-books as Professor Huxley's *Physiography* and Stanford's *Compendium of Geography*. The sand-dunes, the salt efflorescence and deposits, and the local occurrence of certain modern marine molluscs all go to help the hypothesis of a diluvial sea. But a more extensive acquaintance with Saharan characteristics shows that such a sea for the Sahara as a whole is impossible. The denudation must probably be explained as due to the combined action of fresh water and atmospheric agencies. Even at present the Sahara is not so destitute as has been supposed of fresh water. Though rain is one of the rarest phenomena of the lowlands, the mountains on its northern borders and the central highlands are both regions of precipitation, and discharge their surplus waters into the hollows. A glance at a good physical map of the Sahara shows in fact the skeleton of a regular river-system. From the north side of the Atakor-'n-Ahaggar, for instance, begins Wady Igharghar, which running northwards between the Tasili plateau and the Irawen Mountains, appears to lose itself in the sands of the Eastern Erg, but can be distinctly traced northwards for hundreds of miles. Its bed contains rolled fragments of lava and freshwater shells (*Cyrena* and *Planorbis*). In a line almost parallel to Wady Igharghar Wady Mya descends from the plateau of Tademayt, and shows the importance of its ancient current by deep erosion of the cretaceous rocks, in which a large number of left-hand tributaries have also left their mark. Away in the far east of the Libyan Desert Dr. Zittel discovered stalactite caves in the limestone. The question arises, What has become of the abuudant water-supply which filled the wadies and hollowed out the caves? Recent discoveries in the Algerian Sahara suggest that part of the water circulation has become subterranean. The streams from the Atlas which seem to be absorbed in the sands of the desert evidently finds a series of uuderground reservoirs or basins capable of being tapped by artesian wells over very extensive areas. As Olympiodorus (quoted by Photius) mentions that the inhabitants of the Sahara used to make excavations from 100 to 120 feet deep, out of which jets of pure water rose in columns, it is clear that this state of matters is (historically) of ancient date. Since 1856 the French engineers have carried on a series of borings which have resulted in the fertilizing of extensive tracts; between 1856 and 1879 155 wells were bored in the province of Constantine alone. In Wady Rir', which runs for 80 miles towards the southwest of the Shott Melrir (comp. *infra*), the water-bearing stratum is among permeable sands, which are covered to a depth of 200 feet by impermeable marls, by which the water is kept under pressure. The wells, varying much in their discharge and "head," give a total of 3.5 cubic meters [4.58 cu. yds.] per second at an average temperature of 52.1° Fahr. A similar artesian zone exists between Negussa and Wargla. Connections probably exist with subterranean water supplies in the mountains to the north. That in some way the water in the artesian reservoirs is kept aerated is shown by the existence below ground of fishes, crabs, and freshwater molluscs, all of which were ejected by the well called Mezer in Wady Rir'. Hitherto those subterranean basins have

[1] This name, meaning the "depression," has long been in use, but appears to be a misnomer; the lowest point in Lenz's route, which, however, only crossed the east end of the Juf, was 400 feet above the sea.

[2] See Rolland, in *Bull. de la Soc. géol. de France*, 1881, and *Revue Scientifique*, 1881.

[3] *Comptes Rendus, Acad. des. Sciences.*

been verified only in a comparatively limited area (the whole expanse of the Sahara being considered); but the same phenomena are probably repeated to some extent in other regions.[1] The oases are of course proofs of the presence of a steady supply of underground moisture, for vegetation under the Saharan climate is exceptionally thirsty.

Everything considered, it may therefore be assumed that the desert formerly possessed a surface circulation of water capable of aiding in the processes of disintegration, removal, and deposition. Since the water disappeared other agencies have been at work. The surface of the rocks, heated by the sun and suddenly chilled by rapid radiation over night, gets fractured and crumbled; elsewhere the cliffs have been scored and the sand thus formed is at once turned by the wind into an active instrument of abrasion. In many places it has planed the flat rocks of the hammada as smooth as ice. Elsewhere it has scored the vertical faces of the cliffs with curious imitations of glacial striation, and helped to undercut the pillar- or table-like eminences which, under the name of *gurs* or "witnesses," are among the most familiar products of Saharan erosion. The softer quartz rocks of the Quaternary and Cretaceous series (and according to Zittel especially the Nubian sandstone) have been made to yield the sand which, drifted and sifted by the winds, has taken on the form of dunes. The slightest breeze is enough to make the surface "smoke" with dust; and at times the weird singing of the sands, waxing louder and louder, tells the scientific traveller that the motion is not confined to the superficial particles.[2] How important a part the winds may play in the redistribution of the lighter particles is probably shown by the clouds of red dust which were noticed by Edrisi as frequently obscuring the Atlantic sky between Cape Verd and the American coast, and which have recently been referred by Dr. Gustav Heilemann to the African Sahara, whence Professor Tacchini also derives the similar clouds of dust observed in many parts of Italy (comp. Tchihatchef).

But even such a river-system as that supposed combined with all conceivable atmospheric agencies would only account for the minor phenomena of erosion. Dr. Zittel in dealing with the Libyan Desert finds it necessary to assume violent freshwater floods proceeding from the south, though, as he confesses, this only shifts the difficulty a stage further back, as it involves an enormous change of climate. To render such a change of climate a probable hypothesis various recent speculations combine; and Dr. Theobald Fischer and Dr. Oscar Fraas agree in believing that the desiccation has markedly increased in historic times. Evidence derived from ancient monuments combined with the statements of Herodotus and Pliny are held to prove that the elephant, the rhinoceros, and the crocodile existed in North African regions where the environment is now utterly alien, and on the other hand that the camel is a late introduction. Humboldt sought to attribute the desiccation of the desert region of Asia and Africa to the effects of the northeast trade-wind; but Dr. Lenz, who points out that in North Africa the wind seldom blows from the northeast but generally from the north or northwest[3] (the latter of course from the Atlantic, in the western parts, but further east from the European regions of precipitation), argues that one of the principal causes has been the destruction of the forests on the highlands. The dry winds from the Sahara are known in Europe as the Sirocco and the Föhn or Fön.

Botanically the Sahara is the meeting-ground of representatives of the "Mediterranean" and the "Tropical" floras which have managed to accommodate themselves to the peculiar climatic conditions. The line of demarcation between the two floral areas, almost coinciding in the west with the Tropic of Cancer and in the east dipping south towards the meridian of Lake Tchad, assigns by far the greater portion of the area to "Mediterranean" influences.[4] Uniformity, in spite of differences of altitude and soil, is a general characteristic of the vegetation, which outside of the oases consists mainly of plants with a tufty dry stiff habit of growth. The oases are the special home of the date-palm, of which there are about 4,000,000 in the Algerian oases alone. In company with this tree, without which life in the Sahara would be practically impossible, are grown apples, peaches, oranges, citrons, figs, grapes, pomegranates, etc. During the months from December to March wheat, barley, and other northern grain crops are successfully cultivated and in the hotter season rice, dukhn, durra, and other tropical products. Altogether the oasal flora has considerable variety; thirty-nine species are known from the Kufra group, forty-eight from the Aujila group.

Zoologically the Sahara is also a debatable territory, partly Mediterranean, partly Tropical. Apart from the domestic animals (camels, asses, etc., and very noticeably a black breed of cattle in Adrar), the list of fifteen mammals comprises the jerboa, the fennek or fox, the jackal, the sand rat (*Psammomys obesus*), the hare, the wild ass, and three species of antelope. In Borku, Air, etc., baboons, hyenas, and mountain sheep are not uncommon. Without counting migratory visitants, about eighty species of birds have been registered—the ostrich, the *Certhilauda deserti* or desert-lark (which often surprises the traveller with its song), *Emberiza Saharæ*, three species of *Dromolea*, *etc.* Tortoises, lizards, chamæleons, geckos, skinks, etc. of fifteen different species were collected by the single Rohlfs expedition of 1873–74; the serpents comprise the horned viper, *Psammophis sibilans*, *Cœlopeltis lacertina*, the python, and several other species. The edible frog also occurs. *Cyprinodon dispar*, a fish not unlike *Cyprinodon calaritanus*, is found in all the brackish waters of north Sahara and swarms in the lake of Síwa oasis. The brine-shrimp has been described in the article Fezzan.

The present population of the Sahara consists almost exclusively of Arabs, Berbers, and Negro tribes. The Berbers (Tuareg or Tuarik, etc.,) occupy the west central region almost exclusively, appear sporadically in the western, and stretch northwards into Morocco and Algeria; the Negro tribes form a compact block in the east central region northwards and northeastwards from Lake Tchad; and the Arabs are in possession of all the rest of the country. Politically the Sahara belongs partly to Morocco (Tafilet, etc.), partly to Algeria and Tunis (and thus to France), and partly to the Turkish empire (Tripolis, Egypt, etc). France especially has been steadily pushing south with the purpose of forming a junction ultimately with her colony on the Senegal. The spirit of independence among the Mohammedan populations has been crystallized and stimulated by the remarkable confraternity of Sidi Mohammed ben 'Ali es-Sennsi, founded about 1837, and now possessing about 120 convents or zawiga (mostly in the Saharan region), with its headquarters at Jerabub.[5] With this organization the French have already come into conflict in their southward progress. To establish their influence they propose the construction of a trans-Saharan railway and the opening up of the region to the south of Algeria and Tunis by the construction of an inland sea. According to M. Roudaire, the author and protagonist of this scheme, which is familiarly but deceptively styled the "flooding of the Sahara,"[6] it is possible by proper engineering works to create an inland sea to the south of Algeria and Tunis with an average depth of 78 feet and an area of 3100 square miles, or about fourteen times the size of the Lake of Geneva. A Government commission decided that the excavation of the necessary canal would not be difficult, and that, in spite of silting-up processes, the work would at least last 1000 to 1500 years. M. de Lesseps, M. Roudaire's principal supporter, visited the district in 1883 and reported that the canal would cost five years' labor and 150,000,000 francs [$28,950,000]. The scheme, which has met with persistent hostility on the part of M. Cosson and others, is based on the following facts. The Gulf of Gabes is separated by a ridge 13 miles across and 150 feet high from Shott al-Fejej, a depression which extends southwest into the Shott Jerid, which in its turn is separated from the Shott Rharsa only by a still narrower ridge. Shott Rharsa is succeeded westwards by a series of smaller depressions and beyond them lies the Shott Melrir, whose northwest end is not far from the town of Biskra. What we know about such inland seas as the Caspian and the Aral seems to cast serious doubt on the probability of any increase of the rainfall in the Sahara by the formation of Roudaire's sea.

The commerce of the Sahara is not inconsiderable. Among the more important trade routes are—(1) from Morocco to Cairo by Insalah and Ghadames, which is followed by the pilgrims of Western Africa bound for Mecca; (2) from Kuka to Murzuk and Tripolis; (3) from the Sudan to Tripolis by Air and Ghat; (4) from Timbuktu to Insalah, Ghadames, and Tripolis; (5) from Timbuktu to Insalah and thence to Algeria and Tunis; (6) from Timbuktu to Morocco. The two great products are dates and salt. Full details of the date trade will be found in Fischer's *Die Dattelpalme*, 1881. The principle sources of salt are the rock-salt deposits of the Juf (especially Taudeni), the lakes of Kufra, and the rock-salt and brine of Kawar (Bilma).

[1] See Rolland, "Le régime des eaux artésiennes de l'Oued Rir et du Bas Sahara," in *Comp. Rend. Acad. des Sc.* Sept., 1885.

[2] See Lenz's chapter on this phenomena.

[3] Comp Derrécagaix, "Le sud de la province d'Oran," in *Bull. de la Soc. de Géogr.*, Paris, 1873.

[4] Comp. Drude, *Florenreiche der Erde*, 1884; and Cosson, *Compendium Floræ Atlanticæ*, 1881, etc.

[5] See list in Duveyrier's paper, *Bull. de la Soc. de Géogr.*, 1884.

[6] In this connection it is enough to mention Mr. Mackenzie's scheme for flooding the Western Sahara; see *Flooding Sahara*, 1877, and Ravenstein, "The Western Sahara," in *Geog. Mag.*, 1876.

See, besides the works already quoted, Vatonne, *Mission de Ghadames*, 1863; Duveyrier, *Les Touaregs du Nord*, 1864; Ville *Explor. géologique du Mzab, etc.*, 1867; Pomel, *Le Sahara*, 1872; Rohlfs, *Quer durch Afrika* (1874), *Drei Monate im libyschen Wüste* (1875), and *Kufra* (1881); Largeau, *Le pays de Rirha-Ouargla*, 1879; Nachtigal, *Sáhárá und Súdán*, 2 vols., 1879; Rolland, "Le Crétacé du Sahara Septentrional" (with geological map of the Central Sahara) in *Bull. de la Soc. Géol. de France*, 1881; Roudaire, *Rapport sur la dernière exped. des Chotts*, 1881 (and other reports by the same author); Tchihatchef, "The Deserts of Africa and Asia," in *British Association Reports* (Southampton, 1882); Derrécagaix, "Explor. du Sahara: Les deux mission, du Lieut-Colonel Flatters," in *Bull. de la Soc. de Géogr.*, 1882; Lenz, *Timbuktu: Reise durch Marokko, etc.*, 1884; and Reclus, *Nouv. Géographie Univ.* xi., 1886, which contains an admirable *résumé*. (H. A. W.)

SAḤÁRANPUR, or SEHARUNPOOR, a British district of India, in the Meerut division of the lieutenant-governorship of the Northwestern Provinces. It lies between 29° 35′ and 30° 21′ N. lat., and between 77° 9′ and 78° 15′ E. long., and is bounded on the N. by the Siwálik Hills, separating it from the district of Dehra Dún, on the S. by the district of Muzaffarnagar, on the E. by the Ganges, and on the W. by the Jumna. Saháranpur forms the most northerly portion of the Doáb, or alluvial table-land, which stretches between the valleys of the Ganges and the Jumna. The Siwálik Hills rise precipitously on its northern frontier; at their base stretches a wild submontane tract, with much forest and jungle. Cultivation generally in this part is backward, the surface of the country being broken by wild and magnificent ravines. South of this tract, flanked on the east and west by broad alluvial plains, lies the Doáb, with fertile soil and good natural water-supply. This portion of the country is divided into parallel tracts by numerous streams from the Siwáliks, while the Eastern Jumna and the Ganges Canals, which traverse the district from north to south and issue from its northwest and northeast corners, cover the district with a network of irrigation channels. The only large rivers are the Ganges, which enters Saháranpur 180 miles from its source, by a well-marked gorge formed in the rock at Hardwár; and the Jumna, which debouches into the plain about 123 miles from its source, at a place called Khára. The district has abundant means of communication: the Sind, Punjab, and Delhi Railway traverses it for a distance of 42 miles, with stations at Deoband, Saháranpur, and Sarsáwa; and it has numerous roads, both metalled and unmetalled. The climate of Saháranpur is that of the Northwestern Provinces in general; at one season it is tropical, at another partially European. Its average annual rainfall is about 37 inches. Wild animals are plentiful, including the tiger, leopard, wild-cat, lynx, hyena, and wolf.

By the census of 1881 the population of Saháranpur numbered 979,544, (530,427 males and 449,117 females). By religion there were 653,272 Hindus, 317,535 Mohammedans, and 1793 Christians. Five towns had populations exceeding 10,000 each, namely, SAḤÁRANPUR (*q.v.*), Hardwár Union (28,106), Deoband (22,116), Rúrki (12,818), and Gangoh (12,089). Rúrki (Roorkee) is a town of considerable importance, situated in 29° 52′ 25″ N. lat. and 77° 55′ 40″ E. long. It is the headquarters of the Ganges Canal workshops and iron-foundry, with the Thomason Civil Engineering College, for the instruction of natives and others in practical engineering; it contains also an excellent meteorological observatory. Hardwár municipality, which lies 39 miles northeast of Saháraupur town, on the right bank of the Ganges, is the most frequented of all Hindu places of pilgrimage, and is largely used for the bathing festivals. Every twelfth year, when Jupiter is in Aquarius, a great fair or *kumbh-mela* is held, which attracts an immeuse number of people; as many as 3,000,000 attended in 1882.

Of a total area of 2221 square miles 1256 are cultivated and 331 are cultivable waste. Cereals form the principal products. The chief spring crops are wheat, barley pulses, and oil-seeds, and the staples of the rain crops are rice, joar, bajra, and vegetables; the cultivation of cotton and indigo is also carried on, the latter in much greater quantities since the introduction of canal irrigation has rendered its outturn less precarious than formerly. The commercial importance of the district depends mostly on its raw materials. It manufactures broadcloth, jewellery, and sweetmeats; among the articles produced at the Rúrki workshops are steam-engiues, pumps, printing presses, lathes, and mathematical instruments. The gross revenue of Saháranpur in 1883–84 amounted to £172,960 [$840,585.60], of which the land-tax coutributed £118,067 [$573,805.62].

During the later years of the Mogul empire Saháranpur was the scene of much strife and suffering on account of the perpetual raids of the Sikhs, but in 1785 the district under Ghulám Kádir enjoyed comparative tranquility. On his death the country fell into the hauds of the Mahrattas, but it was for a time occupied by the adveuturer George Thomas, until his death in 1802. It was afterwards overrun by Sikhs and Mahrattas, remaiuing practically in the hands of the former until their final defeat in November, 1804, when it passed under British rule. Several disturbances subsequeutly took place among the native chiefs; but from 1824 to 1857 nothing occured to disturb the peace of the district. The mutiny in this part was soon quelled.

SAḤÁRANPUR, principal town and administrative headquarters of the above district, is situated in 29° 58′ 15″ N. lat. and 77° 35′ 15″ E. long., on a small stream (the Damaula Nadi) in an open level country. Its height above the sea is over 900 feet. The town possesses a fine botanic garden, where early experiments were made in tea and cinchona culture. Amongst its buildings are an old Rohilla fort, used as a court-house, and a handsome Mohammedan mosque. A considerable trade is carried on in grain, sugar, molasses, and country cloth. The population in 1881 was 59,194 (31,506 males and 27,688 females).

SAIDA. See SIDON.

SAIGA. See ANTELOPE, vol. ii. p. 90.

SAIGON, the capital of French Cochin China, occupies an area of 1000 acres, on the right bank of the Saigon river or Don-nai (one of the streams that inosculate with the deltaic branches of the Me-kong), about 60 miles from the China Sea. In 1884 it was connected by rail with Mytho, 37 miles southwest on one of the branches of the Me-kong, with which it had obtained direct water-communication in 1877 by the opening of the Canal de Cho-gon. The present city

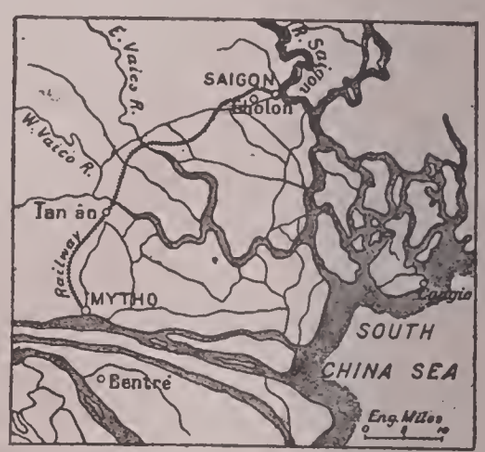


FIG. 1.—Map of Saigon District.

has been practically created since 1861, and its fine streets, boulevards, squares, and public buildings make it one of the most attractive towns in the East, as it was well planned and the plan not unworthily carried out. The town possesses a governor's palace or citadel (cost 12,000,000 francs) [$2,316,000], with a grand façade, a cathedral (1877; cost 2,500,000 francs) [$482,500], a palace of justice (1882), a chamber of commerce, a large military hospital, municipal gardens, and botanical gardens with collections of wild beasts. Among the educational institutions are the Collége Chasseloup-Laubat and the Collége d'Adran, the latter in memory of Bishop Piqueaux de Behaigne, whose tomb is in the vicinity of the town. There is a large arsenal with upwards of 100 European employés and a special establishment for the artillery with machine-shops and foundries. A floating-dock was constructed in 1868; a much larger one (cost 3,400,000 francs) [$656,200] sank in 1880–82 at its first trial and became a wreck. The population of Saigon in 1881 was 13,348. The Europeans, exclusive of the troops, num-

bered only 965 (913 French). The Chinese element was the strongest, and next came the Anamite. The municipality consists of fifteen members, of whom four are Anamites, the rest, including the mayor, being French. As a commercial centre Saigon is one of the principal towns in the colony, but most of the trade is really done at Cholon, 4 miles off on the Arroyo Chinois and Rach-lo-gom, but connected with Saigon by a steam tramway. Though it has its own local government and officials, Cholon is practically part of the capital. Chinese emigrants from Bien-hoa were its founders in 1778, and the Chinese still form half of its population and almost monopolize its trade. In 1881 it had 39,925 inhabitants (83 Europeans). Wide streets have been opened up through its original complexity of lanes and substantial quays constructed for miles along the Arroyo. A fine granite-paved market stands in the heart of the town. Rice is the great staple of the Saigon-Cholon trade, finding purchasers mainly at Hong-Kong, Java, and the Philippines. Other articles are black pepper, gamboge, and cocoanut oil. In 1883 8,648,243 piculs of rice, worth more than £2,000,000 [$9,720,000], were exported. In 1884, leaving out the Messageries Maritimes, 503 vessels (568,077 tons), of which 239 (253,871 tons were British), cleared from Saigon. Fig. 2 shows the relative positions of Saigon and Singapore.

FIG. 2.

Saigon was the native capital of Lower Cochin China and the residence of the governor of the southern provinces. In 1836 it was fortified for the emperor Gia Long by Colonel Ollivier. The French under Admiral Rigault de Genouilly captured it in 1858, and it was part of the territory ceded in 1861.[1] The importance of the old town may be judged by the vast mounds of brick and stone which still crowd the ancient necropolis on one of the two roads between Saigon and Cholon.

SAIL, SAILCLOTH, SAILMAKING. A sail is a sheet of canvas (or other material of the requisite flexibility and strength) by the action of the wind on which, when spread out or extended, a vessel is moved through the water. Sails are supported and extended by means of masts, yards, gaffs, booms, bowsprit—all technically termed "spars"—and stays or slanting ropes. In the first experiments for impelling vessels by sails the least complicated form, that of a single square sail erected on a single mast, was no doubt adopted. To the quadrangular the triangular sail would soon be added; and single sails of both these forms are known to have been used at very early periods. Subsequently the trapeziform and trapezoidal sails also came into use. As vessels increased in size, thereby requiring a greater surface of canvas to impel them, it became necessary to use not only more sails but also an increased number of masts; and the number and disposition of the several kinds of sails could be almost indefinitely varied according to the ideas of navigators, the services required of the vessels, the places in which they were employed, and the size of the crews. Thus a great variety of rig naturally arose. Leaving out of account the many nondescript styles adopted in the case of boats and small craft, all modern vessels may, for general purposes, be considered as belonging to one or other of the following categories: cutter, schooner, three-masted schooner, brigantine, brig, barquantine, barque, or full square-rigged ship; but the cardinal distinction is that by which they are classified as *square-rigged* or *fore-and-aft-rigged* (compare SEAMANSHIP and SHIP).

[1] [It was captured in 1859 and ceded by treaty in 1862. See vol. vi. p. 89.—AM. ED.]

These expressions can be easily explained by reference to any three-masted ship. The mast nearest the bow or head is known as the fore-mast, the next abaft or nearest the middle of the ship as the main-mast, and the third or that nearest the stern as the mizzen-mast. Each mast consists of several sections, that attached to the hull being called the lower or standing-mast, the next above that the top-mast, the next the top-gallant-mast, above which may rise a pole or royal-mast. On each of these masts, and at right angles with it, is a yard dominated "square," which is hung (slung) by the middle and balanced. These yards are named according to their situation, those placed on the fore and main standing-masts being called respectively the fore and main lower yards, that on the mizzen the cross-jack-yard; the yards on the top-masts are called the top-sail-yards, those on the top-gallant-masts the top-gallant-yards, and those on the royal-masts the royal-yards. To each of these yards a sail is *bent* or attached, taking its name from the yard; thus the principal sail upon the fore-lower-yard is called the fore-course or fore-sail; the next above, upon the fore-top-sail-yard, is the fore-top-sail; above which, upon the fore-top-gallant-yard, is the fore-top-gallant-sail; and above all, upon the fore-royal-yard, is the fore-royal. In like manner on the main-mast we have the main-course or main-sail, main-top-sail, main-top-gallant-sail, and the main-royal. Similar appellations are given to those on the mizzen-mast; in large merchant-ships, by means of a sky-sail-pole, a sail termed "sky-scraper" is sometimes set above the royals, but not so frequently as formerly. Such square sails can be placed at right angles to the direction of the keel of the ship, a position given to them when going before the wind; the same sails can also, by means of braces, be placed obliquely to the keel with a side wind, commonly termed by seamen "on a wind" or "by the wind." In addition to these there are sails between the masts, set either on gaffs (unbalanced) or on stays, also others beyond the extremities of the ship, extended principally by means of the bowsprit, which, in addition to supporting the fore-mast by a stay, also supports the jib and flying-jib-booms for extending the sails still farther forwards; the means for extending the after-sail are the driver or spanker-boom and the gaff. Sails extended or set on gaffs and on stays are called "fore-and-aft," and are generally or approximately in a vertical plane passing through the keel; but a certain degree of obliquity can be given them by easing off the sheet or aft lower corner of the sail. A ship fitted as above described would be termed "square-rigged," the square sails predominating both in importance and in number. A square-rigged line-of-battle ship would be supplied with the following description of sails[1]:

Square.	*Fore-and-Aft.*
Fore-course or fore-sail.	Flying-jib.
" top-sail.	Jib.
" top-gallant-sail.	Second Jib.
" royal.	Fore-gaff-sail.
Main-course or main-sail.	" try-sail (storm-sail).
" top-sail.	Main-gaff-sail.
" top-gallant-sail.	" try-sail (storm-sail).
" royal.	Mizzen-try-sail (storm-sail).
Mizzen-top-sail.	Spanker.
" top-gallant-sail.	Stay-sail-fore (storm-sail).
" royal.	" " top.
Studding-sail-fore.	
" " top.	
" " top-gallant.	
" sail-main-top-gallant.	

In the fore-and-aft-rig the principal sails are of course fore-and-aft; a cutter (vessel with one mast) when fully equipped carries the following:

[1] Some ships (merchant-liners) have two jibs, inner and outer, and their top-sails also in two parts, upper and lower or cap-top-sails, an arrangement which makes it easier to reduce or shorten sail; they also have a mizzen course (cross-jack) and carry several light stay-sails so as to catch every breath of wind.

Fore-and-Aft.	*Square.*
Jib-top-sail.	Square-sail (set flying).
Jib.	
Fore-sail.	
Boom-main-sail.	
Gaff-top-sail.	

The several sides of a sail have separate names applied to them, the upper part or side being known as the "head," the lower part as the "foot;" the sides in general are called "leeches," but the weather or side edge where the wind enters the sail, of any but a square-sail, is called the "luff," and the other edge the "after-leech." The two top corners are "earings," but the top corner of a jib, etc. (triangular, one corner only), is the "head"; the two bottom corners are in general "clews;" and the weather clew of a fore-and-aft-sail or of a course while set is the "tack."

The relative importance of particular sails in the working of a ship varies according to conditions of weather, and is a matter for the judgment of the officer in command. The following table, however, shows approximately what sails are commonly set "by the wind," presuming that the effect on the ship in relation to her stability is safe:

Winds as commonly distinguished.	Sails commonly set "by the wind."
Light airs	Courses, top-sails, top-gallant-sails, royals, spanker, jib, flying-jib, and all light sails.
Light winds	
Light breezes	
Moderate breezes..	
Fresh breezes.....	Royals and flying-jib taken in, in a sea way, to two reefs in the top-sails.
Strong breezes	Single-reefed top-sails, and top-gallant-sails, in much sea, two reefs in the top-sails to taking in top-gallant sails.
Moderate gales.....	Double-reefed top-sails to treble-reefed top-sails, reefed spanker and jib.
Fresh gales	Close-reefed top-sails, reefed courses, to taking in spanker, jib, fore and mizzen top-sail.
Strong gales.....	Reefed courses, close-reefed main-top-sail, fore-stay-sail, mizzen-try-sail, to taking in the main-sail.
Heavy gales.....	Close-reefed main-top-sail, storm stay-sails, to storm stay-sails or close-reefed main-top-sail only.
Storms.	

To the casual observer sails when spread and in use appear merely as so many large pieces of cloth; but some of them are of very considerable size: it is not at all unusual in full square-rigged ships for a main-course or main-sail to contain 1000 yards of canvas (24 inches wide), and a main-top-sail nearly as much, —the single suit for such a vessel comprising upwards of 10,000 yards. Courses and top-sails are made reducible; in the British navy they are reduced by means of reefs (two in courses, four in top-sails), each fitted with spilling, slab, and reef lines and becket, and toggles on the yard (reef-points throughout being now obsolete). In the merchant service double top-sails—upper and lower—are much in use on account of handiness in reducing sail; there is also "patent reefing gear," such as Cunningham's, which allows reefing to be done as much as possible from deck. The dimensions of masts and yards, quantity of canvas or area of sail, centre of gravity of each sail (from which the moment of sail is obtained and compared with the moment of stability), centre of effort of the sails, and other important calculations necessary in relation to the body of the vessel are made by constructors and naval architects.

Sailcloth is obtainable from any description of fibrous material capable of being woven into cloth, having sufficient compactness and closeness of texture, and possessing the requisite strength for sustaining the heavy pressure which sails often have to bear in severe weather. Several descriptions of fibre might be enumerated which would to a certain extent serve for sailcloth but for the absence of quality of endurance or resistance; hemp has been and is now occasionally used, as also a mixture of cotton and linen yarn, or cotton only,—especially in America; but in the United Kingdom FLAX (*q.v.*) is the usual staple material, since, when well manufactured, it possesses the qualities of flexibility and lightness, and, what is still more important, the element of strength in a very large degree.

The following points may be regarded as of primary importance for securing sailcloth or canvas of a superior quality and durability. Whatever flax is used, it is absolutely necessary that the "warp" and "weft" of the canvas be spun wholly from the "longs," be free from blacks and any mixture of short flax, well dressed or heckled, and that the yarn be well and evenly spun and properly twisted. Both warp and weft yarn should be twice boiled with the best American pot and pearl ashes, and carefully and thoroughly washed and cleansed. No acid, chloride of lime or other preparation of chlorine, nor any deleterious substance, should be used in any stage of the process, otherwise the integrity of the fibre will most probably be interfered with; the only advantage got is that the cloth looks much whiter, which for yachts and pleasure-boats is perhaps desirable, but for naval and mercantile uses is not at all necessary. The yarns are first boiled a sufficient length of time in a solution of the best American potash, in fixed proportions of ashes, green yarn, and water, then mill-washed (beating process), and subsequently carefully washed in a considerable stream of clear running water, and wrung. They are again boiled for a sufficient length of time in a solution of American pearl ashes, in due proportions of ashes, green yarn, and water, then carefully rinsed, or washed in a clear stream of water, carefully dried, and frequently shaken in the course of drying, so that the fibres of the flax may be equally stretched. These repeated boilings, etc., have the effect of cleansing, bleaching, softening, and removing all vegetable impurities which may be hanging about; no starch, tallow, paste, or weaver's dressing of any description should be used, otherwise the fabric will tend to mildew if allowed to remain damp for any time. Sailcloth is made in bolts, mostly 24 inches wide, but also 18 inches wide, and for yachting purposes frequently still less wide, upon the ground that the narrower the cloth the flatter and better will the sail stand to its work. It is generally made of eight different qualities, in respect of thickness, numbered 1 to 8 accordingly; the heavier numbers—Nos. 1, 2, and 3—are used for storm and other sails that have to do heavy work, the remaining numbers for the lighter descriptions of sail. The weight of each bolt of canvas 24 inches wide, from Nos. 1 to 6 inclusive for 39 yards in length and for Nos. 7 and 8 for 40 yards in length, is about as follows, viz., No. 1, 46 lb; No. 2, 43; No. 3, 40; No. 4, 36; No. 5, 33; No. 6, 30; No. 7, 27; No. 8, 25 lb. The weight of each bolt of narrower canvas is in proportion. The warp (or lengthwise) should consist of the following proportions of clean unstarched yarn, viz.:

No. 1	not less than	26 lb	16½ score	reed	660	double threads.
2	"	24 "	16½	"	660	"
3	"	22 "	16½	"	660	"
4	"	21 "	17	"	680	"
5	"	19 "	17	"	680	"
6	"	18 "	17	"	680	"
7	"	15 "	20	"	800	single threads.
8	"	14 "	20	"	800	"

As a rule about 40 yards in length may be considered as the average content of each bolt. Particular attention should be paid to the weaving, that the texture be struck sufficiently close, and the selvages be evenly and well manufactured; what is termed a slack selvage (that is, one selvage longer than the other) is not only awkward for the sailmaker, but unsatisfactory both in wear and appearance, the slack side showing itself puckered. Sailcloth made upon these conditions is very likely to be a good article; tests, however, can be applied, generally to strips 1 inch wide from Nos. 1 to 6 inclusive, and 1½ inch wide from Nos. 7 and 8. Weft and warp (24 inches in length) in each case are placed in a small testing machine, which has a dial plate with a spring underneath; vices are attached to grip the strips, one vice to the spring, the other in connection with a long screw with a handle; by turning this handle the vices are drawn asunder until the strip breaks, and the

hands on the dial-plate indicate the strain in pounds. The following is a fair test of strength for the various numbers of good sailcloth:

	Weft.	*Warp.*		*Weft.*	*Warp.*
No. 1	480 lb.	340 lb.	No. 5	370 lb.	260 lb.
2	460	320	6	350	250
3	440	300	7	390	330
4	400	280	8	380	310

It is not at all unusual, however, to find some sailcloth stand a strain considerably in excess of this. Freedom from blacks, twist and spun of the yarn, stiffening, calendering, &c., can be discovered by observation and a magnifying glass, excessive dressing by a little tincture of iodine.

Sailmaking is a very old branch of industry in connection with the navy and commerce, and it still continues to be important notwithstanding the enormous extent to which steam is now employed in navigation.

The operations of the sailmaker may be stated as follows: The dimensions of masts and yards and sail plan being supplied, the master sailmaker is enabled to determine the dimensions of each sail—after due allowance for stretching—in terms of cloth and depth in yards—if a square sail, the number of cloths in the head, number in the foot, and the depth in yards; if a fore-and-aft sail (triangular), the number of cloths in the foot, and the depth in yards of the luff or stay and of leech or after-leech; if a fore-and-aft sail (trapezium form), the number of cloths in the head, number in foot, and the depth of mast or luff and of after-leech. These particulars obtained, there is got out what is technically termed a "casting," which simply means the shape, length, etc., of each individual cloth in the sail. These figures are given to the cutter, who proceeds to cut out the sail cloth by cloth in consecutive order, numbering them 1, 2, 3, 4, etc.; the series of cloths thus cut out are handed over to the workman, who joins them together by carefully made double flat seams, sewn with twine specially prepared for the purpose, with about 120 stitches in a yard. In the heavy sails the seam is about an inch and a half in width and in the British navy stuck or stitched in the middle of the seam to give additional strength; the seams in the lighter sails are about an inch wide. The whole of the cloths are then brought together, and spread out, and the tabling (or hemming, so to speak) is turned in and finished off with about 72 stitches to a yard. Strengthening pieces or "linings" are affixed where considered necessary, in courses and top-sails, such pieces as reef-bands, middle-bands, foot-bands, leech-linings, bunt-line cloths; in top-sails (only) a top-lining or brim; in other and lighter sails such pieces as mast-lining clew and head, tack, and corner pieces; holes, such as head, reef, stay (luff), mast, cringle, bunt-line, etc., are also made where required, a grommet of line of suitable size being worked in them to prevent their being cut through. The next thing to be done is to secure the edges of the sail,—an important operation, as much depends upon this whether the sail will stand well and do its work efficiently. Bolt-rope, a comparatively soft laid rope made from the finer hemp yarn (Italian) is used for this purpose; in the British navy it ranges from 1 inch (increasing in size by quarter inches) up to 8 inches inclusive, the size selected for each part of a sail being determined by the amount of strain it will have to bear; it is then neatly sewn on with roping twine specially prepared, the needle and twine passing between and clear of every two strands of the rope in roping. Where slack sail has to be taken in, it is the practice to leave it to the judgment of the sail-maker; but where possible it is better to set up the rope by means of a tackle to a strain approximate to what it will have to bear when in use, and whilst on the stretch mark it off in yards, as also the edge of the sail in yards, so that by bringing the marks together in roping the sail will stand flat. In the British navy the largest size of rope sewn on to a sail is 6 inches; sizes above this are used for foot and clew ropes of top-sails and courses, being first wormed, parcelled (that is, wound round with strips of worn canvas), tarred, and served over with spun yarn; the foot of the sail is then secured to it by being marled in. Where two sizes of bolt-rope used in roping a sail have to be connected, it is effected by a tapered splice. Cringles (similar to the handle of a maund) formed by a strand of bolt-rope, mostly having a galvanized iron thimble in them as a protection, are then stuck where necessary, as at the corners. sides or leeches, mast or luff; they are required either for making stationary or hauling "taut" by tackle or otherwise certain parts of the sail when in use. Fore-and-aft sails, such as spankers, gaff-sails, and storm try-sails, are reduced in size by reef-points made of stout line (4 to 20 lb.), crow-footed in the middle, a hole being pierced through every seam; one-half of the point is passed through and the crow-foot sewn firmly to the sail; the number of reefs depends upon the size of the sail, and the reefs are placed parallel to the foot. The sails—now finished in respect of making—have to be fitted, that is, such ropes have to be attached to each of them as are necessary for proper use; such ropes may be summarily stated as follows: head-earings, robands, reef-earings, reef-lines, spilling and slab-lines, reef-tackle pendant, reef-points, bow-line bridles, bunt-line toggles, bunt-becket, leech-line strops and toggles, toggles in clews, sheet ropes, down-haul, lacings, head and stay, tack-rope (gaff top-sail), tack lashing, bending strops, matting, and gaskets.

The tools and appliances of a sailmaker are not very numerous: a bench about 7 feet long and 15 inches high, upon which he sits to perform the greater part of his work; palms for seaming and roping to fit the hand, made of hide lined with leather, a plate properly tempered being fixed in it having chambers to catch the head of the needle, thus acting as a thimble in forcing it through the several parts of canvas in seaming, and between the strands and through the canvas in roping; needles of various sizes, that for seaming being the smallest; and fids, spliciug, serving, and stretching knife, rubber, sail-hook, bobbin for twine, and sundry small articles. (E. JE.)

SAINFOIN (*Onobyrchis sativa*) is a low-growing perennial plant with a woody root-stock, whence proceed the stems, which are covered with fine hairs and bear numerous long pinnate leaves, the segments of which are elliptic. The flowers are borne in close pyramidal or cylindrical clusters on the end of long stalks. Each flower is about half an inch in length with lanceolate calyx-teeth shorter than the corolla, which latter is papilionaceous, pink, with darker stripes of the same color. The indehiscent pods or legumes are flattened from side to side, wrinkled, somewhat sickle-shaped and crested, and contain only a single seed. In Great Britain the plant is a native of the calcareous districts of the southern counties, but elsewhere it is considered as an escape from cultivation. It is native throughout the whole of central Europe and Siberia; but it does not seem to have been cultivated in Great Britain till 1651, when it was introduced from France or French Flanders, its French name being retained. It is grown as a forage plant, being especially well adapted for dry limestone soils. It has about the same nutritive value as lucerne, and is esteemed for milch cattle and for sheep in winter. Sinclair speaks in high terms of its value for this latter purpose.

SAINT. The New Testament writers have much to say about the relations of the "saints" (as members of the various churches are usually called) with their living contemporaries, but are comparatively reticent on their duties and privileges with regard to their departed brethren. Long before the close of the 4th century, however, certain very definite practices in the way of commemoration and invocation had sprung up, which ultimately found doctrinal expression in the authoritative documents alike of the Eastern and of the Western Church. (1) *Commemoration.*—Under FUNERAL RITES, MANES, etc., allusion has already been made to the ancient custom of visiting the tombs of deceased relatives at certain periods and there offering various gifts. With certain modifications, this practice was retained by the early Christians; they celebrated the Eucharist at or near the grave, laid oblations on the altar in the name of the departed, and in the precommunion prayer made supplication for the peace of their souls. Thus among the usages "originated by tradition, strengthened by custom, observed by faith," Tertullian (*De Cor. Mil.*, 3; comp. *De Exh. Cast.*, 11) mentions "the offerings we make for the dead as often as the anniversary comes round" (comp. SACRIFICE, p. 147). If such commemoration was usual in domestic circles, it was little likely to be omitted by Christian congregations in the case of those who had "spoken to them the word of God," least of all when the bishop had also been, as was so often the case, a martyr. In the very instructive document of the 2d century, preserved by Eusebius (*H. E.*, iv. 15), in which the martyrdom of POLYCARP (*q.v.*) is described, we are told that the followers of the martyr, having

taken up the bones, deposited them "where it was proper that they should be." "There also, as far as we can, the Lord will grant us to assemble and celebrate the natal day of his martyrdom in joy and gladness." Cyprian (*Ep.*, 36) exhorts that the days of death of those who have died in prison should be carefully noted for the purpose of celebrating their memory annually; and all the earliest extant liturgies contain commemorations of the departed. The names to be commemorated were written on the diptychs (see DIPTYCH). (2) *Invocation.*—It is not difficult to understand how a belief in the efficacy of the prayers of departed saints—especially of martyrs—should at an early date have taken a practical form. Martyrs were believed to pass into the immediate presence of God, and the supposed nature of their claims there is not dimly indicated in the document already referred to, which once and again speaks of Polycarp as "a noble victim selected from the flock," "a rich and acceptable sacrifice to God." The readers of Cyprian are familiar with the use made of the intercession of living "martyrs" by the lapsed to secure their reconciliation with the church; but positive evidence of the intercession of the dead being invoked for obtaining favor with God is not forthcoming so soon. Perhaps, indeed, Cyril of Jerusalem (*c.* 350) is the earliest author to make express allusion to the practice (*Cat. Myst.*, v. 9): "we commemorate . . . patriarchs, prophets, apostles, martyrs, . . . that God at their prayers and intercessions (πρεσβείαις) would receive our supplications." In the liturgies, however, the oblation still continued to be offerred "for all martyrs and confessors" as well as for others, and Augustine was the first to declare (*In Joann.*, Tract. 84) that "at the table of the Lord we do not commemorate martyrs in the same way that we do others who rest in peace so as to pray for them, but rather that they may pray for us that we may follow in their footsteps."

For the subsequent development of Catholic practice see the various church histories; compare also CANONIZATION, LITANY, RELICS, IMAGE WORSHIP, etc. Previous to the Reformation ecclesiastical legislation mainly sought to check the popular tendency towards something like polytheism. The Tridentine doctrine is "that the saints who reign along with Christ are to be honored and invoked, that they offer prayers for us, and that their relics are to be venerated." All the churches of the Reformation, on the other hand, while in one form or another commemorating "all thy servants departed this life in thy faith and fear," practically concur in the teaching of the Church of England (Art. xxii.), that "the Romish doctrine concerning . . . invocation of saints" is "a fond thing, vainly invented, and grounded upon no warranty of Scripture, but rather repugnant to the word of God."

ST. ALBANS, a city, municipal borough, and market town of Hertfordshire, England, is finely situated on an eminence above the river Ver, on the main line of the Midland Railway and on branches of the London and North-Western and the Great Northern lines, about 24 miles northwest of London and 5 miles west from Hatfield. The abbey or cathedral church, in some respects one of the most remarkable ecclesiastical buildings in England, is described below. St. Michael's church to the west of the town, within the site of the ancient Verulamium, was originally constructed in the 10th century partly out of the ruins of the town. Considerable portions of Norman building remain; the church contains the tomb of Lord Chancellor Bacon. St. Stephen's church, dating from the same period, contains some good examples of Norman architecture. St. Peter's church has been in great part rebuilt, but the nave of Early Perpendicular remains. The (restored) clock-house in the market-place was built by one of the abbots in the reign of Henry VIII. There is an Edward VI. grammar-school. The principal modern buildings are the corn exchange, the courthouse, the prison, the public baths, and the public library. There are a number of charities and benevolent institutions, including the hospital and dispensary, and the almshouses founded in 1734 by Sarah duchess of Marlborough. The principal industries are the manufacture of silk and straw-plaiting. There are also breweries and ironfoundries. The population of the municipal borough area 997 (acres, extended in 1879) in 1881 was 10,931; the population of the same area in 1871 was estimated at 8239.

Not only is the cathedral "a text-book of mediæval architecture from its beginning to its ending," but it "is still in style, material, and feeling that one among our great churches which most thoroughly carries us back to Old English and even to earlier days" (Freeman). Shortly after the execution of Britain's protomartyr, St. Alban, probably in 303, a church was built on the spot. In 793 Offa of Mercia, who professed to have discovered the relics of the martyr, founded in his honor a monastery for Benedictines, which became one of the richest and most important houses of that order in the kingdom. The abbots Ealdred and Ealmer at the close of the 10th century began to break up the ruins of the old Roman city of Verulamium for materials to construct a new abbey church; but on account of the unsettled character of the times its erection was delayed till the time of William the Conqueror, when Paul of Caen, a relative of Archbishop Lanfranc, was in 1077 appointed abbot. Canterbury as built by Lanfranc was almost a reproduction of St. Stephen's, Caen; but Paul, while adopting the same model for St. Albans, built it on an immensely larger scale. The church was consecrated in 1115, but had been finished some years before. Of the original Norman church the principal portions now remaining are the eastern bays of the nave, the tower, and the transepts, but the main outlines of the building are still those planned by Paul. It is thus one of the most important specimens of Normau architecture in England, with the special characteristic that, owing to the use of the flat broad Roman tile, the Norman portions are peculiarly bare and stern. The western towers were pulled down in the 13th century. About 1155 Robert de Gorham repaired and beautified the early shrine and rebuilt the chapter-house and part of the cloister; but nothing of his work now remains except part of a very beautiful doorway lately discovered. Abbot John de Cella (1195–1214) pulled down the west front and portions of the north and south aisles. He began the erection of the west front in a new and enriched form, and his work was continued by his successor William de Trumpyngtone (1214–35) in a plainer manner. In 1257 the eastern portion was pulled down, and between the middle of the 13th and the beginning of the 14th century a sanctuary, ante-chapel, and lady chapel were added, all remarkably fine specimens of the architecture of the period. In 1323 two great columns on the south side suddenly fell, which necessitated the rebuilding of five bays of the south aisle and the Norman cloisters. Various incongruous additions were made during the Perpendicular period, and much damage was also done during the dissolution of the abbeys to the finer work in the interior. The building within recent years has undergone extensive renovation, first under the direction of Sir Gilbert Scott, and latterly to a much greater extent under Sir Edmund Beckett. Its extreme length outside is 550 feet, which is exceeded by Winchester by 6 feet. The nave (284 feet) is the longest Gothic nave in the world and exceeds that of Winchester by about 20 feet. The length of the transepts is 175 feet inside. The monastic buildings have all disappeared with the exception of the great gateway.

To the southwest of the present city of St. Albans stood the ancient *Verulamium*, one of the oldest towns in Britain, on Watling Street. It was the chief station of Cassivellaunus at the time of Cæsar's invasion, and under the Romans became a *municipium*. The ancient town which grew up around St. Albans church was completely destroyed by the Saxons between 500 and 560. During Wat Tyler's insurrection the monastery was besieged by the townspeople, many of whom were executed in consequence. At St. Albans the Lancastrians were defeated on 21st May, 1455, their leader, the duke of Somerset, being killed, and Henry VI. taken prisoner; there too Queen Margaret defeated the earl of Warwick on 17th February, 1461. During the civil wars the town was garrisoned for the Parliament. On a printing press, one of the earliest in the kingdom, set up in the abbey the first English translation of the Bible was printed. A charter of incorporation was granted to the town by Edward VI. It returned two members to parliament until 1852, when it was disfranchised. It became a bishop's see in 1877. Nicholas Breakspear, the only English pope (Adrian IV.), was born near St. Albans, and was elected its abbot in 1137.[1]

[1] [Adrian IV. was not abbot of St. Albans. See vol. I., p. 150.—AM. ED.]

See Matthew Paris, *Historia Major;* H. T. Riley, *Chronicle of the Monastery of St. Albans,* 11 vols., 1863–73; Nicholson, *History of St. Albans;* Buckler, *Norman Church of St. Albans;* Neale, *Abbey Church of St. Albans,* 1879; Sir E. Beckett, *St. Albans Cathedral and its Restoration,* 1885.

ST. ALBANS, a township and village of the United States, the capital of Franklin county, Vermont, at the junction of several divisions of the Central Vermont Railroad. The village lies on an elevated plain about 3 miles east of Lake Champlain, and has its principal buildings arranged round a public park. Besides being the seat of the extensive workshops of the railroad company, St. Albans is the great cheese and butter market of the eastern States. In the neighborhood, which is celebrated for the beauty of its scenery, are quarries of calico stone and variegated marble. The population of the township was 1814 in 1850, 3637 in 1860, 7014 in 1870, and 7193 in 1880. Being only 14 miles distant from the Canadian frontier, the village has more than once been the scene of political disturbances. In 1866 a band of 1200 Fenians, on their return from a fruitless invasion of Canada, were disarmed there by the United States troops.

ST. AMAND-LES-EAUX, a town of France, in the department of Nord, at the junction of the Elnon with the Scarpe (a left-hand tributary of the Scheldt), 7½ miles by rail northwest of Valenciennes and 22 southeast of Lille. It has numerous industrial establishments, but is better known from the mineral waters in the vicinity. Though from Roman coins found in the mud it is evident that these must have been frequented during the Roman period, it is only two centuries since they began to be again turned to account. There are four distinct springs; the water (75° Fahr.) contains sulphates of lime and sulphur, and deposits white gelatinous threads without smell or taste. The black mud, which constantly gives out sulphuretted hydrogen, is composed of three strata—(1) a clayey peat, (2) clay, and (3) a composition of silica, carbonate of lime, oxide of iron, and aluminium. Numerous small sulphurous springs ooze through the lowest stratum and, soaking those above, form a slough in which patients suffering from rheumatism, gout, and certain affections of liver and skin remain for hours at a time. The population in 1881 was 7881 (commune, 11,184).

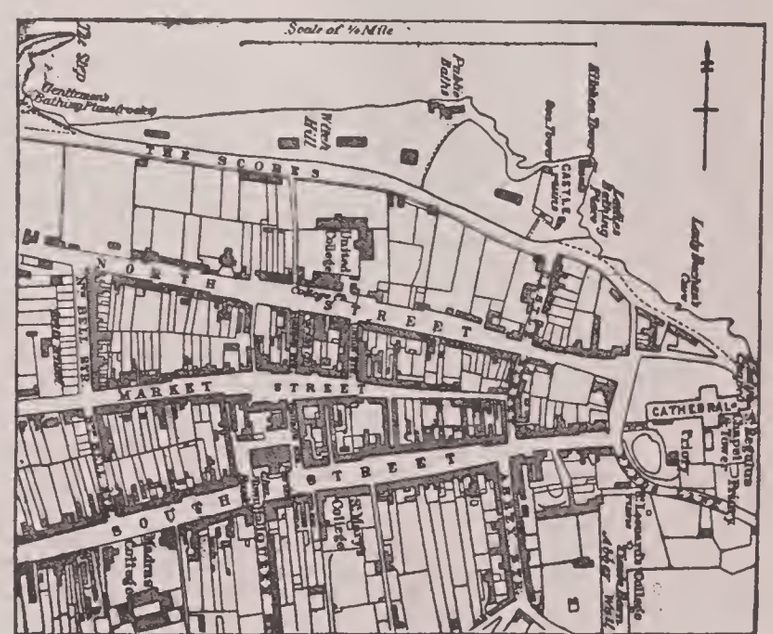
St. Amand owes its name to St. Amand, bishop of Tongres, who founded a monastery here in the reign of Dagobert. The abbey was laid waste by the Normans in 882 and by the count of Hainault in 1340. The town was captured by Mary of Burgundy in 1477, by the count of Ligne, Charles V.'s lieutenant, in 1521, and finally in 1667 by the French. The abbey has been destroyed, with the exception of the gateway flanked by two octagonal pavilions, now occupied by municipal offices; and of the abbey church there remains only the 17th-century façade.

SAINT-AMANT, Marc Antoine Gerard, Sieur de (1594–1661), the most eminent of a curious bacchanalian school of poets in France during the 17th century, was born at Rouen in the year 1594. Very little is known of his family except that it was of some position at Rouen, and the mysterious description which all his French biographers give of his father—that he was a sailor "qui commanda pendant 22 ans un escadre de la reine Élizabeth"—does not greatly assist an English imagination. It appears that Saint-Amant himself haunted taverns and other resorts of gay society a good deal during his youth and manhood, that he attached himself at different times to different great noblemen—Retz (the duke, not the cardinal), Créqui, Harcourt, etc.—that he saw some military service, and sojourned at different times in Italy, in England (a sojourn which provoked from him a violent poetical attack on the country, only printed within the last thirty years), in Poland (where he held a court appointment for two years), and elsewhere. But details on all these points are both few and vague. Saint-Amant's later years were spent in France; and he died at Paris in 1661.

Saint-Amant has left a not inconsiderable body of poetry as various in style as Herrick's, and exhibiting a decided poetical faculty, hardly at all assisted by education. Of one class of his poetry the chief monument is the *Moïse Sauvé,* published in 1653. The author calls this by the odd title of "idylle héroique;" but it is to all intents and purposes an epic of the school of Tasso. It is not by any means without merit, and the alexandrine couplet is managed in it with much vigor and ease. The second and larger part of Saint-Amant's works consists of short miscellaneous poems on a great variety of subjects. The best of these are Bacchanalian, the oft-quoted *La Débauche* being one of the most remarkable convivial poems of its kind. All through his work flashes of strength and true poetical imagination occur; but he was rarely happy in his choice of subjects, and his execution is constantly marred by want of polish and form.

The standard edition of Saint-Amant, with life, notes, etc., is that in the "Bibliothèque Elzévirienne" by M. C. L. Livet (2 vols., Paris, 1855.)

ST. ANDREWS, a city, royal burgh, university town, and seaport of Scotland, in the county of Fife, is situated on a bay of the German Ocean and on a branch of the North British Railway, 9 miles east of Cupar and 11 south-southeast of Dundee. It occupies a platform of sandstone rock about 50 feet in height, running east and west and presenting to the sea a precipitous wall, which has been much encroached on by its action within recent years. The principal streets (North Street, Market Street, and South Street) diverge from the cathedral and run east and west, and Queen Street runs south from the centre of South Street. Many new houses and villas have been recently erected towards the south, north, and west. The prosperity of the city depends primarily on its educational institutions, especially the university. The golf links, which are considered the best in Scotland, and sea-bathing attract many residents and visitors. In the 16th century St. Andrews was one of the most important ports north of the Forth, and is said to have numbered 14,000 inhabitants; but it fell into decay after the Civil War, and, although it has much increased in the present century, its trade has not revived to any extent. The harbor, protected by a pier 630 feet in length, affords entrance to vessels of 100 tons burden. The principal imports are wood and coals, and the principal exports agricultural produce. The herring and deep-sea fishing is carried on by about 170 fishermen. The evidences of antiquity in the dwelling-



Plan of St. Andrews.

houses are comparatively few. The city was never surrounded by walls, but had several gates, of which that called the West Port still remains. The most prominent ruins are those of the cathedral and the castle (see below). Among the modern public buildings are the town-hall (1858) in the Scottish baronial style, the golf club-house, the Gibson and fever hospitals, and the recreation hall (1884). The population of St. Andrews in 1801 was only 3263, but by 1881 it had nearly doubled, being 6406. The parliamentary burgh in 1881 numbered 6458.

The cathedral originated partly in the priory of Canons Regular founded to the southeast of the town by Bishop Robert (1122–1159). Martine, who wrote in the end of the 17th century, states that in his time some of the buildings were entire and that considerable remains of others existed, but nearly all traces have now disappeared, with the exception of portions of the abbey walls and the archways, now known as the "Pends," forming the main entrance from the city. The wall is about three-quarters of a mile long and bears turrets at intervals. The cathedral was founded by Bishop Arnold (1159–1162), to supply more ample accommodation for the canons and for the celebration of the worship of the see than was afforded by the church of St. Regulus. Of this older building in the Romanesque style, probably dating from the 10th century, there remain the square tower, 108 feet in height, and the choir of very diminutive proportions. On a plan of the town *c.* 1530 a chancel appears beyond, and on seals affixed to the city and college charters there are representations of other buildings attached. The cathedral which succeeded the church of St. Regulus is represented in full outline in the plan of the town of 1530. It was constructed in the form of a Latin cross, the total length of the building inside the walls being 355 feet, the length of the nave 200, of the choir and lateral aisles 62, and of the lady chapel at the eastern extremity 50. The width at the transepts was 166 feet and of the nave and choir 62. According to Fordun the building was founded in 1159; but before it was finished the see witnessed the succession of eleven bishops, the consecration taking place in the time of Bishop Lamberton (1297–1328) in 1318, when the ceremony was witnessed by Robert the Bruce. When entire it had, besides a central tower, six turrets, of which two at the eastern and one of the two at the western extremity rising to a height of 100 feet still remain. The building was partly destroyed by fire in 1378, and the restoration and further embellishment were completed in 1440. It was stripped of its altars and images in 1559 by the magistrates and inhabitants of the city. It is believed that about the end of the 16th century the central tower gave way, carrying with it the north wall. Since then large portions of the ruins have been taken away for building purposes, and nothing was done to preserve them till 1826. The principal portions now remaining, partly Norman and partly Early English, are the eastern and western gables, the greater part of the southern wall of the nave, and the western wall of the south transept.

Closely connected with the fortunes of the cathedral are those of the castle, the picturesque ruins of which are situated about 250 yards northwest of the cathedral, on a rocky promontory now much worn away by the sea. It is supposed to have been erected by Bishop Roger about the beginning of the 13th century as an episcopal residence, and was strongly fortified. It was frequently taken by the English, and after it had been captured by the Scottish regent in 1336–37 was destroyed lest it should fall into their hands. Towards the close of the century it was rebuilt by Bishop Trail in the form of a massive fortification with a moat on the south and west sides. James I. spent some of his early years within it under the care of Bishop Wardlaw, and it is supposed to have been the birthplace of James III. From a window in the castle Cardinal David Beaton witnessed the burning of Wishart in front of the gate, and shortly afterwards he was murdered within it in his bedroom by a party of Reformers. The castle was taken from the conspirators by the French, among the prisoners captured being John Knox. Some years afterwards it was repaired by Archbishop Hamilton, but in a less massive and substantial form. It had in 1656 fallen into such disrepair that the town council ordered its "sleatts and timmer, redd and lumps" to be devoted to the repair of the pier at the harbor. The principal remains are a portion of the south wall enclosing a square tower, the bottle dungeon below the northwest tower, the kitchen tower, and a curious subterranean passage.

The town church, formerly the church of the Holy Trinity, was originally founded in 1112 by Bishop Turgot. The early building was a beautiful Norman structure, but at the close of the 18th century the whole, with the exception of little else than the square tower and spire, was re-erected in a plain and ungainly style. Within the church Knox preached the sermon which led to the stripping of the cathedral and the destruction of the monastic buildings. It contains an elaborate monument to Archbishop Sharp. Near the southwest of the town is the ruined northern transept of the chapel of the Dominican monastery founded by Bishop Wishart in 1274; but all traces of the Observantine monastery founded about 1450 by Bishop Kennedy have disappeared, except the well. The church of St. Mary on the rock erected by the Culdees is supposed to have stood on the Lady's Craig now covered by the sea; and the foundations of another, also dedicated to the Virgin, to the west of the harbor were discovered in 1860, giving the full outline of the ground-plan of the building.

The university was possibly a development of the "schools" which were in existence as early as the beginning of the 12th century, and were endowed by certain "rents and kune" payable to them from lands in the neighborhood. Its immediate origin was due to a society formed in 1410 by Lawrence of Lindores, abbot of Scone, Richard Cornwall, archdeacon of Lothian, William Stephen, afterwards archbishop of Dunblane, and a few others, for the instruction of all who chose to attend their lectures. A charter was granted in 1411 by Bishop Wardlaw, who attracted the most learned men in Scotland as professors, and bulls were obtained from the pope in 1413 confirming the charter and constituting it a *studium generale* or university. The lectures were delivered in various parts of the town until 1430, when a building called the "pedagogy" to the Faculty of Arts was granted by the founder of the university. St. Salvator's College was founded and richly endowed by Bishop Kennedy in 1456: twelve years later it was granted the power to confer degrees in theology and philosophy, and by the end of the century was regarded as a constituent part of the university. In 1512 the university received a further addition by the foundation of St. Leonard's College by Prior John Hepburn and Archbishop Alexander Stuart on the site of buildings which at one time were used as a hospital for pilgrims. In the same year Archbishop Stuart nominally changed the original "pedagogy" into a college and annexed to it the parish church of St. Michael of Tarvet; but its actual erection into a college did not take place until 1537. By a bull obtained from Paul III. it was dedicated to the Blessed Virgin Mary of the Assumption. The outline of the ancient structure is preserved, but the general character of the buildings has been much altered by various restorations. They form two sides of a quadrangle, the library and principal's residence being on the north and the lecture-rooms and old dining-hall on the west. The university library, which now includes the older college libraries, was founded about the middle of the 17th century, rebuilt in 1764, and improved in 1829. The lower hall in the older part of the building has been used as a provincial meeting-place for the Scottish parliament. When the constitution of the colleges was remodelled in 1579 St. Mary's was set apart to theology; and in 1747 the colleges of St. Salvator and St. Leonard were formed into the United College. The buildings of St. Leonard's are now occupied as a high class school for girls. The college chapel is in ruins. The United College occupies the site of St. Salvator's College, but the old buildings have been removed, with the exception of the college chapel, now used as the university chapel and the parish church of St. Leonard's, a fine Gothic structure containing an elaborate tomb of Bishop Kennedy; the entrance gateway with the square clock tower rising to a height of 152 feet; and the janitor's house, with some class-rooms above. The modern building, in the Elizabethan style, forming two sides of a quadrangle, was erected between the years 1827 and 1847. The Madras College was founded and endowed by Dr. Andrew Bell. It is attended by about 700 pupils. There are also several large boarding and day schools.

St. Andrews (see SCOTLAND) is said to have been made a bishopric in the 9th century, and when in 908 the Pictish and Scottish Churches were united the primacy was transferred to it from Dunkeld, its bishops being henceforth known as bishops of Alban. Turgot, who was appointed in 1109, was the first bishop who really filled the see. It became an archbishopric during the primacy of Patrick Graham (1466–78). This ceased in 1688. It was created a royal burgh by David I. in 1124. The St. Andrews district of burghs returns one member to the House of Commons.

Martine, *History and Antiquities of St. Rule's Chapel, St. Andrews*, 1787; Grierson, *Delineations of St. Andrews*, 1807, 3d ed. 1838; *Reliquiæ Divi Andreæ*, 1797; *Liber Cartarum Sancti Andreæ* Bannatyne Club, 1841; Skene, "Ecclesiastical Settlements in Scotland," in *Proc. Soc. Antiq. Scot.*, 1862–63; *Histories* of St. Andrews by Lyon (1843) and Rogers (1849); Skene, *Celtic Scotland.* (T. F. H.)

ST. ASAPH, a city and parliamentary borough of North Wales, in the county of Flint, is situated on an eminence in the Vale of Clwyd, near the junction of the Clwyd and Elwy, about 6 miles south-southeast of Rhyl and 6 north-northwest of Denbigh. It is somewhat irregularly built and has an antique appearance. On the brow of the hill is an encampment, *Bron-y-Wylva*, supposed to have been occupied by the Roman forces under Suetonius Paulinus. According to tradition the cathedral occupies the site of a church and monastery founded by St. Kentigern about 560, when he fled from Strathclyde. It was originally called Llan-Elwy, the church on the Elwy. It is uncertain whether the first bishop was Kentigern or Asaph, to whom Kentigern committed the charge of the church and monastery when he returned to Scotland. The ancient wooden structure was burnt down by the English in 1245; and again in 1278[1] the same fate befell the building. A third edifice was in great part destroyed during the wars of Owen Glendower in 1402. The greater part of the present building was constructed by Bishop Redman about 1480; the choir and chancel underwent restoration from the designs of Sir Gilbert Scott in 1867–68, and the nave in 1875, when a new roof was added. It is one of the smallest cathedrals in Britain, its total length being 182 feet, while the breadth across the transepts is 108 feet. It is a plain cruciform structure, chiefly Decorated, but with some Early English portions, with an embattled tower, 97 feet in height, rising from the intersection of the nave and the transept. In the south transept there is a library of nearly 2000 volumes, including some rare and valuable books. The bishop's palace is a comparatively modern structure. The town has a grammar-school (1882), county court offices, the union workhouse, and almshouses. The population of the borough (area, 1155 acres) in 1881 was 1901 and of the parish 3177.

ST. AUGUSTINE, a city of the United States, capital of St. John's county, Florida, has the distinction of being the oldest city in the States built by Europeans, and has recently become a popular winter watering-place. By rail it is 36 miles southeast from Jacksonville. It stands on a narrow sandy peninsula, not more than 12 feet above the sea, formed by the Matanzas and San Sebastian rivers, and is separated from the ocean by the northern end of Anastasia Island. The streets are very narrow, the principal thoroughfares being only 12 or 15 feet wide, and the balconies of the old houses often project so as almost to meet overhead. Along the sea-front for nearly a mile extends a granite-coped sea-wall (1837–43), which forms a fine promenade. At its northern end stands the old fort of San Marco (now Fort Marion), a well-preserved specimen of Spanish military architecture (finished 1756), with moat and outworks, walls 21 feet high, bastions at the corners, heavy casemates, dungeons, and subterranean passages. It is in the form of a trapezium, and covers about 4 acres. Like most of the Spanish buildings, it is constructed of coquina, a curious shelly conglomerate from Anastasia Island, which was easily quarried, but grew very hard on exposure to the atmosphere. The same material was used for paving the streets, which were thus kept extremely clean and firm. At the southern end of the sea-wall is the old Franciscan monastery, now used as United States barracks. Of the Spanish wall which ran across the peninsula and defended the city on the north side there only remains the so-called city gate. In the centre of St. Augustine is the Plaza de la Constitucion, which takes its name from the monument in the middle, erected in 1812 in memory of the Liberal Spanish Constitution. On this square stand the cathedral (1793), with a Moorish belfry, the old governor's palace, now used as a post-office and public library, and an Episcopal church in modern Gothic. Other buildings of note in the town are the convent of St. Mary and the convent of the sisters of St. Joseph. Modern villas and hotels have recently been erected in various parts. Palmetto straw goods are largely manufactured in St. Augustine, the palmetto being one of the characteristic features of the surrounding landscape, to which orange and lemon trees also contribute. The climate is remarkably equable, the mean temperature for winter being 58°, and for the other seasons 68°, 80°, and 71° respectively. Frosts seldom occur, though that of 1835 killed many of the orange-trees. In 1880 the total population of the city was 2293, but in winter northern visitors swell the number to 7000 or 8000.

Menendez de Aviles arrived off the coast of Florida on 28th August (St. Augustine's day) 1565, and accordingly he gave the name of that saint to the city which he shortly afterwards founded. His first act was to attack the French settlement on St. John's river, and two years later the French retaliated on St. Augustine (see FLORIDA, vol. ix. 298, and RIBAULT). In 1586 Drake attacked and plundered the town, and throughout the 17th century it frequently suffered from the raids of Indians, pirates, and the English settlers of South Carolina and Georgia. Occupied by the British from 1763 to 1783, it ultimately passed to the United States in 1821. During the Civil War it changed hands three times.

ST. BARTHOLOMEW, or ST. BARTHÉLEMY, a French island of the West Indies, in the archipelago of the Antilles, is situated in 17° 55′ 35″ N. lat. and 63° 60′ 15″ W. long., 108 miles north-northwest of Guadaloupe, of which, politically, it is a dependency. In form it is very irregular and the surface is mountainous. The soil, in spite of a scarcity of moisture, is not unfertile; and in some of the valleys the growing of vegetables is an important industry. Bananas, cassia, tamarinds, and sassafras are exported. In modern times zinc and lead ores have been found in the island, but they are not worked. Rocks and shallows make St. Bartholomew difficult of access, and its port (Le Carénage), though safe during the greater part of the year, is capable of receiving only the larger class of coasting vessels. The chief town is Gustavia, near the port. The population was 2942 in 1883.

St. Bartholomew, occupied by the French in 1648, was ceded to Sweden in 1784; but it was restored to France by the treaty signed at Paris, August, 1877, with the full approval of the inhabitants, who had remained French in language and manners. Universal suffrage was introduced in 1830 and slavery abolished in 1848.

ST. BRIEUC, a town of France, chef-lieu of the department of Côtes du Nord, 295 miles west of Paris by the railway from Brest, at the junction of a branch to Vannes by Pontivy. It stands 290 feet above the sea, between 1 and 2 miles from the English Channel, where Légué, on the left bank of the Gouet, serves as its seaport. About 600 vessels, with an aggregate of 27,600 tons, enter or clear per annum; the local shipowners take part especially in the Newfoundland and Iceland fisheries. St. Brieuc is an old town with a considerable number of curious houses. The principal articles of trade are grain, flax, hemp, vegetables, honey, cider, butter, and eggs, which are despatched to England, and fish and game, which are sent in considerable quantites to Paris. At the fairs in bygone days the Breton women sold their hair for trifling sums. Nurseries of some size exist at St. Brieuc, and in the neighborhood are quarries of blue granite, giving employment to 300 workmen. St. Brieuc is the seat of a bishopric in the province of Rennes, and has a cathedral dating from the 13th century, but partially rebuilt in the 18th, and extensively restored recently. The tombs of the bishops, the modern but delicately carved organ-loft, the tapestries, and the stained-glass windows deserve mention. The old monastery of the Capuchins is occupied by the civil hospital. The monastery of the Cordeliers contains the lycée, a library of 30,000 volumes, and a museum of archæology and natural history, and the convent of the

[1] [The cathedral was burned by the English in 1282. See King's *Cathedrals of Wales*, p. 257, London 1873.—AM. ED.]

Ursulines has been turned into barracks. The episcopal palace, the prefecture, and the town-house were formerly private mansions, a class of old buildings which is steadily being reduced in number by the opening of new streets. A colossal image of the Virgin looks down upon the town, and the Duguesclin boulevard, on the site of the ramparts, has a statue of that hero. The population in 1881 was 14,869 (commune 17,833).

St. Brieuc owes its origin and its name to the missionary St. Briocus, who came from Wales in the 5th century, and whose tomb afterwards attracted crowds of pilgrims. The place was defended in 1375 by Olivier de Clisson against the duke of Brittany, and again attacked by the same Clisson in 1394, the cathedral suffering greatly in both sieges. In 1592 the town was pillaged by the Spaniards, in 1601 ravaged by the plague, and in 1628 surrounded by walls, of which no traces remain. Between 1602 and 1708 the States of Brittany several times met at St. Brieuc, and during the Reign of Terror Chouans and Blues carried on a ruthless conflict with each other.

ST. CATHARINES, a city and port of entry of Ontario, Canada, and the capital of Lincoln county, is situated 12 miles northwest of Niagara Falls and 35 south of Toronto (by water), on the Welland Canal and the Grand Trunk and Welland branch of the Grand Trunk Railway. It is celebrated for its artesian mineral wells, and contains a convent and a marine hospital. The manufacture of flour has long been a staple industry, and the abundant water-power is also utilized in cotton-mills, machine-shops, agricultural implement works, etc. Incorporated as a town in 1845, St. Catharines had in 1861 a population of 6284, in 1871 of 7864, and in 1881 of 9631. A city charter was granted in 1875.

ST. CHAMOND, a manufacturing town of France, in the department of Loire, 7½ miles east-northeast of St. Étienne, at the confluence of the Janon with the Gier (an affluent of the Rhone), and on the railway from St. Étienne to Lyons. Besides working a considerable number of coal-mines, St. Chamond employs twelve mills in the silk manufacture, and from 12,000 to 15,000 looms (mostly driven by hydraulic machinery) in lace-making, and has a variety of other manufactures. The population was 14,149 in 1881.

St. Chamond, founded in the 7th century by St. Ennemond or Chamond, archbishop of Lyons, became the chief town of the Jarret, a little principality formed by the valley of the Gier. Silk-milling was introduced in the town in the middle of the 16th century by Gayotti, a native of Bologna, and perfected towards the beginning of the 19th by Richard Chambovet. Remains are found at St. Chamond of a Roman aqueduct, which conveyed the waters of the Janon along the valley of the Gier to Lyons.

ST. CHARLES, a city of the United States, the county seat of St. Charles county, Missouri, is situated on the left or north bank of the Missouri 20 miles from its mouth, and 23 from St. Louis by the St. Louis and Omaha line of the Wabash, St. Louis, and Pacific Railway, which crosses the river by a great iron bridge 6535 feet long, erected in 1871 at a cost of $1,750,000. Besides one of the largest car-factories in the United States, the industrial establishments of St. Charles comprise tobacco-factories, flour-mills, hominy-mills, creameries, woollen-factories, and breweries. St. Charles College (Methodist Episcopal), chartered in 1838, the Lindenwood Female College (Presbyterian) the Convent of the Sacred Heart, and the Roman Catholic public library are the principal institutions. In 1850 the inhabitants numbered only 1498; by 1870 they were 5570, and in 1880, 5014 (in the township 8417).

A Spanish post was established at St. Charles in 1769. As a town it dates from 1809 and as a city from 1849. The first State legislature of Missouri met in the town in 1821 and St. Charles continued to be the State capital till 1826.

ST. CHRISTOPHER, or ST. KITTS, one of the Leeward Islands, West Indies, situated in 17° 18′ N. lat. and 62° 48′ W. long. Its length is 23 miles, its greatest breadth 5 miles, and the total area 68 square miles. Mountains traverse the central part from southeast to northwest, the greatest height, Mount Misery, being about 4100 feet above the sea-level. On the seaboard is Basseterre, the capital, the outlet of a fertile plain, which contains the cultivated land. The thermometer ranges from 78° to 84° Fahr. St. Christopher is united with NEVIS (*q.v.*) as one colony, with one executive and one legislative council (official and nominated) for the united presidency. In 1883 the revenue and expenditure were £34,000 [$165,240] and £33,000 [$160,380] respectively, and the public debt was £2500 [$12,150]. The tonnage entering and clearing was 307,000 and the imports and exports were valued at £190,000 [$923,400] and £240,000 respectively per annum. The sugar exports amounted to 10,000 tons. The population of the island was about 30,000.

ST. CLAIR, a borough of the United States in Schuylkill county, Pennsylvania, 3 miles east of Pottsville on the Reading and Philadelphia Railroad. It mainly depends on its coal mines. The population was 5726 in 1870 and 4149 in 1880.

ST. CLOUD, a village of France, on the left bank of the Seine, 7 miles west from the centre of Paris and 9½ by the railroad from Paris to Versailles, forming part of the canton of Sèvres and of the arrondissement of Versailles (Seine-et-Oise). Picturesquely built on a hill-slope, it overlooks the river, the Bois de Boulogne, and Paris; and, lying amid the foliage of its magnificent park and numerous villa gardens, it is one of the favorite resorts of the Parisians. The palace of St. Cloud, which had been a summer residence for Napoleon I., Louis XVIII., Charles X., Louis Philippe, and Napoleon III., was burned by the Prussians in 1870 along with part of the village. In spite of the damage inflicted on the park at the same period, magnificent avenues still make it one of the finest rural haunts in the neighborhood of Paris. It occupies a varied tract of 960 acres, and abounds in picturesque views. Every year in September a great fair, lasting three weeks, is held in the park; and within its precincts are situated the new national Sèvres porcelain manufacture and the Breteuil pavilion, the seat of the international metre commission. St. Cloud possesses a church, erected about 1865, in the style of the 12th century, with an elegant stone spire; and here too has been established the upper normal school (science and letters) for the training of teachers (male) for the provincial normal schools of primary instruction. The population in 1881 was 4081, and 4126 in the commune.

Clodoald or Cloud, grandson of Clovis, adopted the monastic life and left his name to the spot where his tomb was discovered after the lapse of 1200 years, in a crypt near the present church. He had granted the domain to the church of Paris, which possessed it as a fief till the 18th century. At St. Cloud Henry III. and the king of Navarre (Henry IV.) established their camp during the League for the siege of Paris; and there the former was assassinated by Jacques Clément. The castle was at that time only a plain country house belonging to Pierre de Gondi, archbishop of Paris. Louis XIV. bought it for his brother, the duke of Orleans, who was the originator of the palace which perished in 1870. Peter the Great of Russia was received there in 1717 by the regent, whose grandson sold the palace to Marie Antoinette. It was in the orangery at St. Cloud that Bonaparte executed the *coup d'état* of 18th Brumaire; and after he became emperor the palace was his favorite residence, and there he celebrated his marriage with Marie Louise. In 1815 it was the scene of the signing of the capitulation of Paris; and in 1830 from St. Cloud Charles X. issued the orders which brought about his fall. Napoleon III. was there when he received the senatusconsult which restored the empire in his favor (1st December, 1852). Seized by the Prussians at the commencement of the investment of Paris in 1870, St. Cloud was sacked during the siege.

ST. CROIX,[1] or SAINTE CROIX, one of the Danish

[1] [Also called Santa Cruz.—AM. ED.]

West India Islands, is situated between 17° and 18° N. lat., about 40 miles south-southeast of St. Thomas. Twenty-three miles long, and with a maximum width of 6 miles, it has an area estimated at 51,168 acres. Blue Mountain, the highest peak (1100 feet), lies in the range of hills running parallel with the coast in the western half of the island. The narrower eastern end is also hilly. In the centre and towards the west the surface is undulating, and towards the south flat with brackish lagoons. With the exception of about 4000 acres, the soil is everywhere productive; but only about one-third of the area is devoted to sugar-growing and one-sixth to pasture-land, the greater part of the remainder being either worthless brushwood (the haunt of small deer) or scanty timber. Besides little Negro hamlets there are two garrison towns—Christiansted (or popularly Bassin) on the north coast, with a small harbor 15 to 16 feet deep at the entrance, and Frederiksted (popularly West End) on the west coast, with an open roadstead. The population of the island was 23,194 in 1860, 22,760 in 1870, and 18,430 in 1880. This decrease is due to the comparative failure of the sugar-crops. Destruction of the forest (or some unsuspected cause) has brought diminished rainfall (from 20 to 34 inches per annum); and the belt of abandoned cane ground has been steadily increasing. To help in checking this decay the Government constructed (1876) a great central factory, to which the juice is conveyed from the plantations by a system of pipes. Apart from the official element (mostly Danish), the white inhabitants of St. Croix are almost wholly British either by birth or descent.

St. Croix was discovered by Columbus on his second voyage. In 1651 France entrusted it to the Knights of Malta, and in 1733 it was purchased by Denmark for 750,000 livres [$142,500], (167,000 rixdollars). Slavery was abolished in 1848, and coolies began to be employed in 1863.

ST. CYR, Marshal (1764–1830). See Gouvion St. Cyr.

ST. CYR-L'ÉCOLE, a village of France (Seine-et-Oise), 2½ miles west of Versailles at the end of the old park of Louis XIV. It had only 2712 inhabitants in 1881, and its importance is solely due to the famous military school now established in the convent which Madame de Maintenon founded for the education of noble young ladies in indigent circumstances. It was here that Racine's *Esther* and *Athalie* were first acted, having been written expressly for the pupils. Madame de Maintenon's tomb is still preserved in the chapel. The convent was suppressed at the Revolution, and the gardens are now partly transformed into parade-grounds. Two advanced forts of the new enceinte round Paris are situated at St. Cyr.

ST. DAVID'S, a village of Pembrokeshire, South Wales, and the seat of a bishopric, is situated in the valley of the Alan, 16 miles northwest of Haverfordwest, the nearest railway station, and 1½ miles east from the most westerly point of Wales. By some it is supposed to be the Roman Menapia. It consists of straggling and somewhat mean houses, occupying the crest of the hill above the cathedral. It was the birthplace of St. David, the patron saint of Wales. The see, which includes nearly the whole of South Wales, was founded at least not later than the 7th century. Till the middle of the 12th century the bishops had archiepiscopal powers. The existing cathedral was begun in 1180. Its tower fell in 1220, crashing through the choir and transepts; when it was rebuilt the old western arch was retained. About the time the choir and transepts were repaired St. Thomas's chapel was added. In 1248 an earthquake caused the walls of the nave to bulge. The chapels east of the presbytery were begun about this period, and the lady chapel between 1296 and 1328. The aisles of the nave and of the presbytery were raised by Bishop Gower (1328–1347), who set up the beautiful stone rood screen. The great window in the south transept in the Perpendicular style was erected in 1384, and the roofs renewed in the Late Perpendicular between 1461 and 1522. The west front was rebuilt by Nash about the end of the 18th century, and in 1862 extensive restorations, including the rebuilding of the two western piers of the tower and of the west front, were begun under the direction of Sir G. G. Scott. The cathedral contains the tomb of Edmund Tudor, father of Henry VII., and the shrine of St. David. The total internal length of the building is 298 feet, the breadth of the nave (with aisles) 70 feet, and the breadth of the transepts 27 feet 3 inches. Parts of the rich interior decoration of the nave are particularly worthy of notice. To the north of the cathedral are the picturesque ruins of the chapel of St. Mary's College, founded in 1377. On the other side of the Alan are the remains of the bishop's palace, a masterpiece of Bishop Gower, particularly noteworthy for the beautiful arcade and parapet running round the whole building. It was partly unroofed by Bishop Barlow in 1536. In the centre of the village stands the ancient cross, 28 feet high, the steps of which were restored by Bishop Thirlwall in 1873. The place is without municipal government, its mayor being the officer of the bishop's manorial court. The population of the parish in 1881 was 2053.

ST. DENIS, a town of France in the department of Seine, 4½ miles north of Paris by the Northern Railway, which there divides into two branches leading respectively to Pontoise and Creil, is now a great manufacturing centre for machinery, boats, railway carriages, chemical products, printed goods, candles, beer, leather, and flour. Many of the works are supplied with water from the Crould and the Rouillon, which there fall into the Seine; and a canal extends from the Seine to La Villette, the great inner harbor of Paris. In 1881 the population was 43,127. The name and fame of the town are derived from the abbey founded by Dagobert on the spot where St. Denis, the apostle of Paris, was interred (see below). The west front was built between 1137 and 1140. The right-hand tower is almost pure Romanesque; that on the left was Gothic, and its spire was carried to a height of 280 feet, but it was struck by lightning in 1837 and its reconstruction effected in so clumsy a manner that it had to be taken down till it was on a level with the roof of the nave. The rose window, now occupied by a clock face, dates from the 13th century. Under one of the three rows of arches above the main entrance runs an inscription recording the erection of the church by Suger with abbatial funds and its consecration in 1140. The porch formed by the first three bays of the church contains some remains of the basilica of Pippin the Short. The nave proper (235 feet long and 57 wide) has seven bays, and dates, as well as most of the choir and transepts, from the reign of St. Louis. The gallery of the triforium is of open work and is filled in with glass. The secondary apse (*rond-point*) and its semicircular chapels (consecrated on the 11th June, 1144,) are considered as the first perfected attempt at Gothic. The transepts have fine 13th-century façades, each with two unfinished towers; if the plan had been fully carried out there would have been six towers besides a central flèche in lead. In the chapels of the nave are the tombs of Louis XII. and Anne of Brittany (1591); of Henry II. and Catherine de' Medici, a masterpiece by Germain Pilon; of Louis of Orleans and Valentine of Milan, from the old church of the Celestines at Paris; of Francis I. and Claude of France, one of the most splendid tombs of the Renaissance, executed under the direction of Philibert Delorme; and that of Dagobert, which, though considerably dilapidated, ranks as one of the most curious of mediæval (13th-century) works of art. In the apse some stained glass of the time of Suger still remains. The crypt dates partly from Charlemagne and partly from Suger. In the centre is the vault where the coffin of the dead king used to lie

until, to make room for that of his successor, it was removed to its final resting-place. It is at present occupied by the coffin of Louis XVIII., the last sovereign whose body was borne to St. Denis and the only one whose ashes have been respected. Besides some fine statues, the crypt contains the Bourbon vault, in which were deposited the remains of Louis XVI. and Marie Antoinette, or at least whatever of them was recoverable from the cemetery of La Madeleine, where the Chapelle Expiatoire now stands. The treasury of St. Denis has been despoiled of its richest possessions, including the books now in the National Library; but it still contains crosses, altar-pieces, and reliquaries, notably those of St. Denis and his two companions, Rusticus and Eleutherius, the three patrons of the basilica. The chapter of St. Denis is usually composed of emeritus bishops with the title of canons; but the institution is about to be abolished (1886). St. Denis possesses a fine town-house and a poor-house (300 beds). Its three forts formed part of the Parisian enceinte in 1870–71, and from 23d to 26th January, 1871, the place was bombarded by the Prussians, who did considerable damage to the basilica.

St. Denis, the ancient Catulliacum, was a town of no pretensions till the foundiug of its abbey. The process of rebuildiug begun in the 12th century by Abbé Sugcr was completed under Philip the Bold. In the meantime St. Louis caused mausoleums to be erected with figures of the princes already buried in the abbey; and from his time onwards to Henry II. every monarch in succession had his monument. Louis XIV. reduced the abbey to the rank of a priory; and at the Revolution it was suppressed, the tombs being violated and the church sacked (1793). Two years later all the remains and fragments that could be recovered were collected in the museum of the Petits Augustines at Paris; but the bronze tombs had been melted down, the stained-glass windows shattered, and large numbers of interesting objects stolen or lost. Napoleon established in the monastery a school for daughters of the members of the Legion of Honor, which has continued to flourish. Louis XVIII. caused all the articles belonging to St. Denis to be brought back from the museums to their original site, and added nnmerous other monuments from the suppressed abbeys. But it was not till after 1848 that, under the intelligent direction of Viollet le Duc, the damage inflicted by the revolutionist and unskilful restorer was repaired and the basilica recovered its original appearance. Charles the Bold instituted the famous fair of Landit, which was transferred from the neighboring plain to St. Denis itself in 1552, and is still held in the town. Sheep and parchment were formerly the staples. The abbey was pillaged by Charles the Bad, king of Navarre, in 1358, by the Burgundians and Flemings in 1411, and by the English in 1430. A sanguinary battle, in which the Catholic leader Constable Anne de Montmorency found victory and death, was fought between Huguenots and Catholics in the neighborhood on 10th November, 1567.

ST. DENIS, the capital of Réunion (*q.v.*).

ST. DIÉ, a town of France, chef-lieu of an arrondissement and a bishop's see in the department of Vosges, is situated on the right bank of the Meurthe, 1030 feet above the sea, on the railway from Lunéville (32 miles northwest) to Épinal (38 miles southwest). One portion of the town was rebuilt after the fire of 1757 in the regular and monumental style of Nancy; the other has a somewhat mean appearance. Several Alsatian manufacturers having emigrated to St. Dié on the annexation of their country to Germany, the town has made great progress since 1871, and now possesses weaving factories, bleacheries, hosiery factories, engineering works, a tile work, and an extensive brewery. The cathedral has a Romanesque nave (10th century) and a Gothic choir; the portal, in red sandstone, dates from the 18th century. A fine cloister, recently restored and containing a beautifully executed stone pulpit, leads to the Petite Église or Notre Dame, a well-preserved specimen of early Romanesque. Other points of interest are the library, the museum, belonging to the Société Philomathique Vosgienne, the large schools, and the public fountains. The town commands an extensive view of the Vosges and is a convenient centre for excursions. The population in 1881 was 12,677 (15,312 in the commune).

St. Dié (*Deodatum, Theodata, S. Deodati Fanum*) grew up round a monastery founded in the 6th ceutury by St. Deodatus of Nevers, who gave up his episcopal functions in order to retire to this place. In the 10th century the community became a chapter of canons; and among those who subsequently held the rank of provost or dean were Giovanni de' Medici (afterwards Pope Leo X.) and several princes of the house of Lorraine. Among the extensive privileges enjoyed by them was that of coining money. Though they coöperated in building the town walls, the canons and the dukes of Lorraine soon became rival competitors for the authority over St. Dié. The institution of a town council in 1628, aud the establishment under King Stanislaus of a bishopric which appropriated part of their spiritual jurisdiction, contributed greatly to dimiuish the influence of the canons; and with the Revolution they were completely swept away. During the 17th century the town was repeatedly sacked by the Burgundians under Charles the Bold, by the French, and by the Swedes. It was also partially destroyed by fire in 1065, 1155, 1554, and 1757. St. Dié was the seat of a very early printing press.

SAINTE-BEUVE, Charles Augustin (1804–1869), the most notable critic of our time, was born at Boulogne-sur-Mer on 23d December 1804. He was a posthumous child,—his father, a native of Picardy, and controller of town-dues at Boulogne, having married in this same year, at the age of fifty-two, and died before the birth of his son. The father was a man of literary tastes, and used to read, like his son, pencil in hand; his copy of the Elzevir edition of Virgil, covered with his notes, was in his son's possession, and is mentioned by him in one of his poems. Sainte-Beuve's mother was half English,—her father, a mariner of Boulogne, having married an Englishwoman. The little Charles Augustin was brought up by his mother, who never remarried, and an aunt, his father's sister, who lived with her. They were poor, but the boy, having learnt all he could at his first school at Boulogne, persuaded his mother to send him, when he was near the age of fourteen, to finish his education at Paris. He boarded with a M. Landry, and had for a fellow-boarder and intimate friend Charles Neate, afterwards fellow of Oriel College and member of Parliament for the city of Oxford. From M. Landry's boarding-house he attended the classes, first of the Collége Charlemagne, and then of the Collége Bourbon, winning the head prize for history at the first, and for Latin verse at the second. In 1823 he began to study medicine, and continued the study with diligence and interest for nearly four years, attending lectures on anatomy and physiology and walking the hospitals. But meanwhile a Liberal newspaper, the *Globe*, was founded in 1827 by M. Dubois, one of Sainte-Beuve's old teachers at the Collége Charlemagne. M. Dubois called to his aid his former pupil, who, now quitting the study of medicine, contributed historical and literary articles to the *Globe*, among them two, which attracted the notice of Goethe, on Victor Hugo's *Odes and Ballads*. These articles led to a friendship with Victor Hugo and to Sainte-Beuve's connection with the romantic school of poets, a school never entirely suited to his nature. In the *Globe* appeared also his interesting articles on the French poetry of the 16th century, which in 1828 were collected and published in a volume, and followed by a second volume containing selections from Ronsard. In 1829 he made his first venture as a poet with the *Vie, Poésies, et Pensées de Joseph Delorme*. His own name did not appear; but Joseph Delorme, that "Werther in the shape of Jacobin and medical student," as Guizot called him, was the Sainte-Beuve of those days himself. About the same time was founded the *Revue de Paris*, and Sainte-Beuve contributed the opening article, with Boileau for its subject. In 1830 came his second volume of poems, the *Consolations*, a work on which Sainte-Beuve looked back in later life with a special affection. To himself it marked and expressed, he said, that epoch of his life to which he

could with most pleasure return, and at which he could like best that others should see him. But the critic in him grew to prevail more and more and pushed out the poet. In 1831 the *Revue des Deux Mondes* was founded in rivalry with the *Revue de Paris*, and from the first Sainte-Beuve was one of the most active and important contributors. He brought out his novel of *Volupté* in 1834, his third and last volume of poetry, the *Pensées d'Août*, in 1837. He himself thought that the activity which he had in the meanwhile exercised as a critic, and the offence which in some quarters his criticism had given, were the cause of the less favorable reception which this volume received. He had long meditated a book on Port Royal. At the end of 1837 he quitted France, accepting an invitation from the academy of Lausanne, where in a series of lectures his work on Port Royal came into its first form of being. In the summer of the next year he returned to Paris to revise and give the final shape to his work, which, however, was not completed for twenty years. In 1840 M. Cousin, then minister of public instruction, appointed him one of the keepers of the Mazarin Library, an appointment which gave him rooms at the library, and, with the money earned by his pen, made him for the first time in his life easy in his circumstances, so that, as he afterwards used to say, he had to buy rare books in order to spend his income. A more important consequence of his easier circumstances was that he could study freely and largely. He returned to Greek, of which a French schoolboy brings from his *lycée* no great store. With a Greek teacher, M. Pantasides, he read and re-read the poets in the original, and thus acquired, not, perhaps, a philological scholar's knowledge of them, but a genuine and invaluable acquaintance with them as literature. His activity in the *Revue des Deux Mondes* continued, and articles on Homer, Theocritus, Apollonius of Rhodes, and Meleager were fruits of his new Greek studies. He wrote also a very good article in 1844 on the Italian poet Leopardi; but in general his subjects were taken from the great literature which he knew best, that of his own country,—its literature both in the past and in the contemporary present. Seven volumes of "Portraits," contributed to the *Revue de Paris* and the *Revue des Deux Mondes*, exhibit his work in the years from 1832 to 1848, a work constantly increasing in range and value. In 1844 he was elected to the French Academy as successor to Casimir Delavigne, and was received there at the beginning of 1845 by Victor Hugo.

From this settled and prosperous condition the revolution of February, 1848, dislodged him. In March of that year was published an account of secret-service money distributed in the late reign, and Sainte-Beuve was put down as having received the sum of one hundred francs [$19.30]. The smallness of the sum would hardly seem to suggest corruption; it appears probable that the money was given to cure a smoky chimney in his room at the Mazarin Library, and was wrongly entered as secret-service money. But Sainte-Beuve, who piqued himself on his independence and on a punctilious delicacy in money matters, was indignant at the entry, and thought the proceedings of the minister of public instruction and his officials, when he demanded to have the matter sifted, tardy and equivocal. He resigned his post at the Mazarin and accepted an offer from the Belgian Government of a chair of French literature in the university of Liége. There he gave the series of lectures on Chateaubriand and his contemporaries which was afterwards (in 1861) published in two volumes. He liked Liége, and the Belgians would have been glad to keep him; but the attraction of Paris carried him back there in the autumn of 1849. Louis Napoleon was then president. Disturbance was ceasing; a time of settled government, which lasted twenty years and corresponds with the second stage of Sainte-Beuve's literary activity, was beginning. Dr. Véron, the editor of the *Constitutionnel*, proposed to him that he should supply that newspaper with a literary article for every Monday; and thus the *Causeries du Lundi* were started. They at once succeeded, and "gave the signal," as Sainte-Beuve himself says with truth, "for the return of letters." Sainte-Beuve now lived in the small house in the Rue Mont-Parnasse (No. 11) which he occupied for the remainder of his life, and where in 1850 his mother, from whom he seems to have inherited his good sense, tact, and finesse, died at the age of eighty-six. For three years he continued writing every Monday for the *Constitutionnel;* then he passed, with a similar engagement, to the *Moniteur*. In 1857 his Monday articles began to be published in volumes, and by 1862 formed a collection in fifteen volumes; they afterwards were resumed under the title of *Nouveaux Lundis*, which now make a collection of thirteen volumes more. In 1854 M. Fortoul nominated him to the chair of Latin poetry at the College of France. His first lecture there was received with interruptions and marks of disapprobation by many of the students, displeased at his adherence to the empire; at a second lecture the interruption was renewed. Sainte-Beuve had no taste for public speaking and lecturing; his *frontis mollities*, he said, unfitted him for it. He was not going to carry on a war with a party of turbulent students; he proposed to resign, and when the minister would not accept his resignation of his professorship he resigned its emoluments. The *Étude sur Virgile*, a volume published in 1857, contains what he had meant to be his first course of lectures. He was still a titular official of public instruction; and in 1858 his services were called for by M. Rouland, then minister of public instruction, as a lecturer (*maître de conférences*) on French literature at the Ecole Normale Supérieure. This work he discharged with assiduity and success for four years. In 1859 he was made commander of the Legion of Honor, having twice previously to 1848 refused the cross. During the years of his official engagement his Monday contributions to the *Moniteur* had no longer been continuous; but in 1862 an arrangement was proposed by which he was to return to the *Constitutionnel* and again supply an article there every Monday. He consented, at the age of fifty-seven, to try this last pull, as he called it, this "dernier coup de collier;" he resigned his office at the École Normale and began the series of his *Nouveaux Lundis*. They show no falling off in vigor and resource from the *Causeries*. But the strain upon him of his weekly labor was great. "I am not a *monsieur* nor a gentleman," he writes in 1864, "but a workman by the piece and by the hour." "I look upon myself as a player forced to go on acting at an age when he ought to retire, and who can see no term to his engagement." He had reason to hope for relief. Except himself, the foremost literary men in France had stood aloof from the empire and treated it with a hostility more or less bitter. He had not been hostile to it: he had accepted it with satisfaction, and had bestowed on its official journal, the *Moniteur*, the lustre of his literature. The prince Napoleon and the princess Mathilde were his warm friends. A senatorship was mentioned; its income of £1600 [$7776] a year would give him opulence and freedom. But its coming was delayed, and the strain upon him continued for some time longer. When at last in April, 1865, he was made senator, his health was already seriously compromised. The disease of which he died, but of which the doctors did not ascertain the presence until his body was opened after his death—the stone—began to distress and disable him. He could seldom attend the meetings of the senate; the part he took there, however, on two famous occasions, when the nomination of M. Renan to the College of France came under discussion in 1867 and the law on the press in the year following, provoked the indignation of the great majority in that

conservative assembly. It delighted, however, all who "belonged," to use his own phrase, "to the diocese of free thought"; and he gave further pleasure in this diocese by leaving at the beginning of 1869 the *Moniteur*, injudiciously managed by the Government and M. Rouher, and contributing to a Liberal journal, the *Temps*. His literary activity suffered little abatement, but the attacks of his malady, though borne with courage and cheerfulness, became more and more severe. Pain made him at last unable to sit to write; he could only stand or lie. He died in his house in the Rue Mont Parnasse on the 13th of October, 1869. He had inherited an income of four thousand francs [$772] a year from his mother, and he left it six thousand [$1158.]; to the extent of eighty pounds [$388.80] a year and no further had literature and senatorship enriched him. By his will he left directions that his funeral was to be without religious rites, quite simple, and with no speeches at the grave except a few words of thanks from one of his secretaries to those present. There was a great concourse; the Paris students, who had formerly interrupted him, came now to do honor to him as a Liberal and a champion of free thought—a senator they could not but admit—undeniably, alas, a senator, but *oh, si peu!* Yet his own account of himself is the best and truest, —an account which lays no stress on his Liberalism, no stress on his championship of free thought, but says simply: "Devoted to my profession as critic, I have tried to be more and more a good, and, if possible, an able workman."

The work of Sainte-Beuve divides itself into three portions—his poetry, his criticism before 1848, and his criticism after that year. His novel of *Volupté* may properly go with his poetry.

We have seen his tender feeling for his poetry, and he always maintained that, when the "integrating molecule," the foundation of him as a man of letters, was reached, it would be found to have a poetic character. And yet he declares, too, that it is never without a sort of surprise and confusion that he sees his verses detached from their context and quoted in public and in open day. They do not seem made for it, he says. This admirable critic knew, indeed, what a Frenchman may be pardoned for not willingly perceiving, and what even some Englishmen try to imagine that they do not perceive, the radical inadequacy of French poetry. For us it is extremely interesting to hear Sainte-Beuve on this point, since it is to English poetry that he resorts in order to find his term of comparison, and to award the praise which to French poetry he refuses. "Since you are fond of the poets," he writes to a friend, "I should like to see you read and look for poets in another language, in English for instance. There you will find the most rich, the most dulcet, and the most new poetical literature. Our French poets are too soon read; they are too slight, too mixed, too corrupted for the most part, too poor in ideas even when they have the talent for strophe and line, to hold and occupy for long a serious mind." And again: "If you knew English you would have treasures to draw upon. They have a poetical literature far superior to ours, and, above all, sounder, more full. Wordsworth is not translated; these things are not to be translated; you must go to the fountain-head for them. Let me give you this advice: learn English."

But, even as French poetry, Sainte-Beuve's poetry had faults of its own. Critics who found much in it to praise yet pronounced it a poetry "narrow, puny, and stifled," and its style "slowly dragging and laborious." Here we touch on a want which must no doubt be recognized in him, which he recognized in himself, and whereby he is separated from the spirits who succeed in uttering their most highly inspired note and in getting their full measure,—some want of flame, of breath, of pinion. Perhaps we may look for the cause in a confession of his own. "I have my weaknesses; they are those which gave to King Solomon his disgust with everything and his satiety with life. I may have regretted sometimes that I was thus extinguishing my fire, but I did not ever pervert my heart." It is enough for us to take his confession that he extinguished or impaired his fire.

Yet his poetry is characterized by merits which make it readable still and readable by foreigners. So far as it exhibits the endeavor of the romantic school in France to enlarge the vocabulary of poetry and to give greater freedom and variety to the alexandrine, it has interest chiefly for readers of his own nation. But it exhibits more than this. It exhibits already the genuine Sainte-Beuve, the author who, as M. Duvergier de Hauranne said in the *Globe* at the time, "sent à sa manière et écrit comme il sent," the man who, even in the forms of an artificial poetry, remains always "un penseur et un homme d'esprit." That his Joseph Delorme was not the Werther of romance, but a Werther in the shape of Jacobin and medical student, the only Werther whom Sainte-Beuve by his own practical experience really knew, was a novelty in French poetical literature, but was entirely characteristic of Sainte-Beuve. All his poetry has this stamp of direct dealing with common things, of plain unpretending reality and sincerity; and this stamp at that time made it, as Béranger said, "a kind of poetry absolutely new in France." It found, therefore, with all its shortcomings, friends in men so diverse as Béranger, Lamartine, Jouffroy, Beyle. Whoever is interested in Sainte-Beuve should turn to it, and will be glad that he has done so.

It has been the fashion to disparage the criticism of the *Critiques et Portraits Littéraires*, the criticism anterior to 1848, and to sacrifice it, in fact, to the criticism posterior to that date. Sainte-Beuve has himself indicated what considerations ought to be present with us in reading the *Critiques et Portraits*, with what reserves we should read them. They are to be considered, he says, "rather as a dependency of the elegiac and romanesque part of my work than as express criticisms." "The *Revue des Deux Mondes*," he adds, which published them, was young in those days, "mixed a good deal of its wishes and its hopes with its criticism, sought to explain and to stimulate rather than to judge. The portraits there of contemporary poets and romance-writers can in general be considered, whether as respects the painter or as respects the models, as youthful portraits only; *juvenis juvenem pinxit.*" They have the copiousness and enthusiasm of youth; they have also its exuberance. He judged in later life Chateaubriand, Lamartine, Victor Hugo, more coolly, judged them differently. But the *Critiques et Portraits* contain a number of articles on personages, other than contemporary French poets and romance-writers, which have much of the soundness of his later work, and, in addition, an abundance and fervor of their own which are not without their attraction. Many of these are delightful reading. The articles on the Greek poets and on Leopardi have been already mentioned. Those on Boileau, Molière, Daunou, and Fauriel, on Madame de la Fayette and Mademoiselle Aïssé, may be taken as samples of a whole group which will be found to support perfectly the test of reading, even after we have accustomed ourselves to the later work of the master. Nay, his soberness and tact show themselves even in this earlier stage of his criticism, and even in treating the objects of his too fervid youthful enthusiasm. A special object of this was Victor Hugo, and in the first article on him in the *Portraits Contemporains* we have certainly plenty of enthusiasm, plenty of exuberance. We have the epithets "adorable," "sublime," "supreme," given to Victor Hugo's poetry; we are told of "the majesty of its high and sombre philosophy." All this is in the vein of Mr. George Gilfillan. But the article next following this, and written only four years later, in 1835, is the article

of a critic, and takes the points of objection, seizes the weak side of Victor Hugo's poetry, how much it has of what is "creux," "sonore," "artificial," "voulu," "théâtral," "violent," as distinctly as the author of the *Causeries* could seize it. "The Frank, energetic and subtle, who has mastered to perfection the technical and rhetorical resources of the Latin literature of the decadence," is a description never to be forgotten of Victor Hugo as a poet, and Sainte-Beuve launches it in this article, written when he was but thirty years old, and still a painter of "portraits de jeunesse" only.

He had thus been steadily working and growing; nevertheless, 1848 is an epoch which divides two critics in him of very unequal value. When, after that year of revolution and his stage of seclusion and labor at Liége, he came back to Paris in the autumn of 1849 and commenced in the *Constitutionnel* the *Causeries du Lundi*, he was astonishingly matured. Something of fervor, enthusiasm, poetry, he may have lost, but he had become a perfect critic—a critic of measure, not exuberant; of the centre, not provincial; of keen industry and curiosity, with "Truth" (the word engraved in English on his seal) for his motto; moreover, with gay and amiable temper, his manner as good as his matter,—the "critique souriant," as, in Charles Monsclet's dedication to him, he is called.

Merely to say that he was all this is less convincing than to show, if possible, by words of his own, in what fashion he was all this. The root of everything in his criticism is his single-hearted devotion to truth. What he called "fictions" in literature, in politics, in religion, were not allowed to influence him. Some one had talked of his being tenacious of a certain set of literary opinions. "I hold very little," he answers, "to literary opinions; literary opinions occupy very little place in my life and in my thoughts. What does occupy me seriously is life itself and the object of it." "I am accustomed incessantly to call my judgments in question anew, and to re-cast my opinions the moment I suspect them to be without validity." "What I have wished" (in *Port Royal*) "is to say not a word more than I thought, to stop even a little short of what I believed in certain cases, in order that my words might acquire more weight as historical testimony." To all exaggeration and untruth, from whatever side it proceeded, he had an antipathy. "I turn my back upon the Michelets and Quinets, but I cannot hold out my hand to the Veuillots." When he was writing for the *Moniteur* he was asked by the manager of the paper to review a book by an important personage, a contributor; his answer is a lesson for critics and paints him exactly. "I should like to say yes, but I have an insurmountable difficulty as to this author; he appears to me to compromise whatever he touches; he is violent, and has not the tradition of the things he talks about. Thus his article on Condorcet, which the *Moniteur* inserted, is odious and false; one may be severe upon Condorcet, but not in that tone or in that note. The man has no *insight*—a defect which does not prevent him from having a pen with which at a given moment he can flourish marvellously. But, of himself, he is a gladiator and a desperado. I must tell you, my dear sir, that to have once named him with compliment in some article of mine or other is one of my self-reproaches as a man of letters. Let me say that he has not attacked me in any way; it is a case of natural repulsion."

But Sainte-Beuve could not have been the great critic he was had he not had, at the service of this his love of truth and measure, the conscientious industry of a Benedictine. "I never have a holiday. On Monday towards noon I lift up my head, and breathe for about an hour; after that the wicket shuts again and I am in my prison cell for seven days." The *Causeries* were at this price. They came once a week, and to write one of them as he wrote it was indeed a week's work. The "irresponsible indolent reviewer" should read his notes to his friend and provider with books, M. Paul Chéron of the National Library. Here is a note dated the 2d of January, 1853: "Good-day and a happy New Year. To-day I set to work on Grimm. A little dry; but after St. François de Sales" (his Monday article just finished) "one requires a little relief from roses. I have of Grimm the edition of his *Correspondence* by M. Taschereau. I have also the *Memoirs* of Madame d'Épinay, where there are many letters of his. But it is possible that there may be *notices* of him mentioned in the bibliographical book of that German whose name I have forgotten. I should like, too, to have the *first editions* of his *Correspondence;* they came out in successive parts." Thus he prepared himself, not for a grand review article once a quarter, but for a newspaper review once a week.

His adhesion to the empire caused him to be habitually represented by the Orleanists and the Republicans as without character and patriotism, and to be charged with baseness and corruption. The Orleanists had, in a great degree, possession of the higher press in France and of English opinion,—of Liberal English opinion more especially. And with English Liberals his indifference to parliamentary government was indeed a grievous fault in him; "you Whigs," as Croker happily says, "are like quack doctors, who have but one specific for all constitutions." To him either the doctrine of English Liberals, or the doctrine of Republicanism, applied absolutely, was what he called a "fiction," one of those fictions which "always end by obscuring the truth." Not even on M. de Tocqueville's authority would he consent to receive "les hypothèses dites les plus honorables."—"the suppositions which pass for the most respectable." All suppositions he demanded to sift, to see them at work, to know the place and time and men to which they were to be applied. For the France before his eyes in 1849 he thought that something "solid and stable"—*un mur*, "a wall," as he said—was requisite, and that the government of Louis Napoleon supplied this wall. But no one judged the empire more independently than he did, no one saw and enounced its faults more clearly; he described himself as being, in his own single person, "the *gauche* of the empire," and the description was just.

To these merits of mental independence, industry, measure, lucidity, his criticism adds the merit of happy temper and disposition. Goethe long ago noticed that, whereas Germans reviewed one another as enemies whom they hated, the critics of the *Globe* reviewed one another as gentlemen. This arose from the higher social development of France and from the closer relations of literature with life there. But Sainte-Beuve has more, as a critic, than the external politeness which once at any rate distinguished his countrymen: he has a personal charm of manner due to a sweet and humane temper. He complained of *un peu de dureté*, "a certain dose of hardness," in the new generation of writers. The personalty of an author had a peculiar importance for him; the poetical side of his subjects, however latent it might be, always attracted him and he always sought to extricate it. This was because he had in himself the moderate, gracious, amiably *human* instincts of the true poetic nature. "Let me beg of you," he says in thanking a reviewer who praised him, "to alter one or two expressions at any rate. I cannot bear to have it said that I am the *first* in anything whatever, as a writer least of all; it is not a thing which can be admitted, and these ways of classing people give offence." Literary man and loyal to the French Academy as he was, he can yet write to an old friend after his election: "All these academies, between you and me, are pieces of childishness; at any rate the French Academy is. Our least quarter of an hour of solitary reverie or of serious talk, yours and

mine, in our youth, was better employed; but, as one gets old, one falls back into the power of these nothings; only it is well to know that nothings they are."

Perhaps the best way to get a sense of the value and extent of the work done in the last twenty years of his life by the critic thus excellently endowed is to take a single volume of the *Causeries du Lundi*, to look through its list of subjects, and to remember that with the qualities above mentioned all these subjects are treated. Any volume will serve; let us take the fourth. This volume consists of articles on twenty-four subjects. Twenty of these are the following: Mirabeau and Sophie, Montaigne, Mirabeau and Comte de la Marck, Mademoiselle de Scudéry, André Chénier as politician, Saint-Evremond and Ninon. Joseph de Maistre, Madame de Lambert, Madame Necker, the Abbé Maury, the Duc de Lauzun of Louis XVI.'s reign, Marie Antoinette, Buffon, Madame de Maintenon, De Bonald, Amyot, Mallet du Pan, Marmontel, Chamfort, Ruhlière. Almost every personage is French, it is true; Sainte-Beuve had a maxim that the critic should prefer subjects which he possesses familiarly. But we should recognize more fully than we do the immense importance and interest of French literature. Certain productions of this literature Mr. Saintsbury may misjudge and overpraise; but he is entirely right in insisting on its immense importance. More than any modern literature it has been in the most intimate correspondence with the social life and development of the nation producing it. Now it so happens that the great place of France in the world is very much due to her eminent gift for social life and development; and this gift French literature has accompanied, fashioned, perfected, and continues to reflect. This gives a special interest to French literature, and an interest independent even of the excellence of individual French writers, high as that often is. And nowhere shall we find such interest more completely and charmingly brought out than in the *Causeries du Lundi* and the *Nouveaux Lundis* of the consummate critic of whom we have been speaking. As a guide to bring us to a knowledge of the French genius and literature he is unrivalled,—perfect, so far as a poor mortal critic can be perfect, in knowledge of his subject, in judgment, in tact, and tone. Certain spirits are of an excellence almost ideal in certain lines; the human race might willingly adopt them as its spokesmen, recognizing that on these lines their style and utterance may stand as those, not of bounded individuals, but of the human race. So Homer speaks for the human race, and with an excellence which is ideal, in epic narration; Plato in the treatment at once beautiful and profound of philosophical questions; Shakespeare in the presentation of human character; Voltaire in light verse and ironical discussion. A list of perfect ones, indeed, each in his own line! and we may almost venture to add to their number, in his line of literary criticism, Sainte-Beuve. (M. A.)

SAINTE-CLAIRE DEVILLE, Étienne Henri (1818–1881), French chemist, was born on 11th March, 1818, in the island of St. Thomas, West Indies, where his father was French consul. He was educated in Paris along with his elder brother Charles at the Collége Rollin. In 1844, having graduated as doctor of medicine and doctor of science, he was appointed dean of the new faculty of science at Besançon, by Thenard. In 1851 he succeeded Balard in the École Normale and in the Sorbonne. He died at Boulogne-sur Seine on 1st July, 1881.

Sainte-Claire Deville began his experimental work in 1841 with investigations on oil of turpentine and balsam of tolu, in the course of which he discovered the hydrocarbon toluene. But he soon abandoned organic chemistry, and his most important work was in inorganic and thermal chemistry. In 1850 he discovered anhydrous nitric acid, a substance interesting not only in itself but as the first obtained of an important group, the so-called "anhydrides" of the monobasic acids. In 1855 he succeeded in obtaining aluminium in mass. This metal, of which clay is the hydrated silicate, is of course one of the most abundant of metals, but was not obtained in the metallic state until Wöhler in 1827 decomposed its chloride by means of potassium. The aluminium thus prepared was in the form of a fine powder, and, although the isolation of the metal was of great theoretical importance, there did not seem much prospect of a practical application of the discovery. In 1845 Wöhler returned to the subject and by using large quantities of material obtained small globules of an obviously metallic character. Deville, who knew only Wöhler's paper of 1827, set to work to prepare aluminium, not for the sake of the metal itself, but with the view of procuring by the action of aluminium on chloride of alumiuium a lower chloride from which a series of new compounds corresponding to the ferrous salts might be obtained. He did not succeed in this, but he did succeed in producing globules of alumiuium of considerable size. This led him to perfect the process, and ultimately he devised a method by which aluminium could be prepared on a large scale. The first use to which he put the metal was to make a medal with the name of Wöhler and the date 1827. In connection with the preparation of aluminium may be mentioned Deville's investigations, partly with Wöhler, into the allotropic forms of silicon and boron.

Along with Debray,[1] Deville studied the platinum metals; their object was on the one hand to prepare the six metals in a state of purity and on the other to obtain a suitable metal for the standard mètre. In the course of these investigations large quantities of platinum and of the alloys of platinum and iridium were fused and cast,[2] and the methods used for obtaiuing the necessary high temperatures were applied to the fusion of other refractory metals, such as cobalt, nickel, chromium, and manganese.

Aloug with Troost, Deville devised a method for determining the density of vapors at very high temperatures and applied it to the cases of sulphur, selenium, tellurium, zinc, cadmium, and many other substances boiling at temperatures up to 1400° C. The interesting and important results have been already described (see Chemistry and Molecule). Deville made a large number of ingenious experiments on the artificial production of minerals. Among these may be specially mentioned the formation of apatite and isomorphous minerals and of crystallized oxides. Deville and Caron found that when the vapor of a metallic fluoride acts on fused boracic acid the fluorine and the oxygen change places, a metallic oxide remains in crystals, while the gaseous fluoride of boron escapes. In this way they prepared corundum (crystallized oxide of aluminium) and sapphire, ruby, and emerald; colored forms of corundum were obtained by mixing small quantities of fluoride of chromium with the fluoride of aluminium. Another method discovered by Deville for the preparation of crystallized oxides is of great interest. When an amorphous oxide—such as amorphous ferric oxide—is heated to redness and exposed to a slow current of hydrochloric acid gas, it gradually changes into a crystalline oxide of the same composition. In this way Deville obtained hæmatite, tinstone, periclase, and other crystalline oxides. This conversion of an amorphous into a crystalline substance without change of composition, by the action of a gas (in this case hydrochloric acid) which itself undergoes no change, is one of these mysterious processes which used to be referred to a "catalytic force" or called "actions by contact"; like many such actions, this has been shown by Deville to belong to the same class of phenomena as dissociation.

This leads us to Deville's greatest contribution to general chemistry. Many chemical actions have been long known which take place either in the one or the other sense according to certain conditions. For instance, if a tube containing metallic iron is heated to redness and steam passed through it, water is decomposed, black oxide of iron is formed, and hydrogen escapes. If, on the other hand, the tube is filled with black oxide of iron and hydrogen passed through, the oxide is reduced and water is formed. Both of these opposite changes occur at the very same temperature. Again, a solution of sulph-hydrate of potassium is completely decomposed by passing a current of carbonic acid gas through it for a sufficient time, sulphuretted hydrogen being given off and bicarbonate remaining in solution. But exactly the opposite happens if we begin with bicarbonate and pass sulphuretted hydrogen gas through it: carbonic acid gas escapes and the solution ultimately contains nothing but sulph-hydrate. An imperfect, unsatisfactory explanation of some of the phenomena of which these are examples was given by Berthollet; it remained for Deville to give a general theory and show their relation to such physical phe-

[2] The mètre commission fused a quarter of a ton of the alloy at a single operation.

[1] [Jules Henri (1827–88), a Parisian chemist and metallurgist, especially engaged with the platinum group and metrical standards.—Am. Ed.]

nomena as evaporation and condensation. This he did by his experimental work on "Dissociation" and his theoretical discussion of the facts in papers published in the *Comptes Rendus*. He gave a very complete and clear account of the whole subject in a lecture delivered before the Chemical Society of Paris in 1866.

As illustrations we shall take a few cases as different from one another as possible.

It has long been known that carbonate of lime—limestone—when heated is decomposed into quicklime and carbonic acid gas, and that this decomposition takes place the more quickly the more thoroughly the carbonic acid produced is removed. Sir James Hall showed that, if the carbonate of lime is heated in a closed vessel strong enough to resist the pressure of the carbonic acid gas, it can be fused, only a small part undergoing decomposition. Deville examined this relation quantitatively and showed that, if in a closed vessel we have quicklime, carbonate of lime, and carbonic acid gas, the pressure of the *carbonic acid gas* depends on the temperature only, and is quite independent of the quantity of the quicklime or of the carbonate of lime, as long as there is some, however little, of both, and is also quite uninfluenced by the presence of other gases. It will be seen that this case exactly resembles that of the evaporation of water. In a closed vessel containing liquid water and water-vapor the pressure of the *water-vapor* depends on the temperature only and is independent of the quantity of liquid water, as long as there is any, and is not influenced by the presence of other gases. In both cases, if we disturb the equilibrium and then leave things to themselves the equilibrium is restored. If in the first case we diminish the pressure of the carbonic acid gas, some carbonate of lime decomposes, yielding carbonic acid gas until the pressure is raised to what it was; if we increase the pressure, some of the carbonic acid combines with quicklime until the pressure is reduced to what it was before. In the second case, if we diminish the pressure, some of the liquid water evaporates; if we increase it, some of the water-vapor condenses, and so the pressure is restored. Rise of temperature causes in the one case evaporation of water, in the other decomposition of carbonate of lime,—in both increase of pressure. Lowering of temperature causes in the one case condensation of water-vapor, in the other combination of quicklime and carbonic acid gas,—in both diminution of pressure.

As a second instance we may take the dissociation of water. Just as water-vapor condenses into liquid water under certain conditions, but always with the evolution of heat (latent heat of vapor), so the mixture of oxygen and hydrogen in the proper proportion to form water combines, under conditions, to form water-vapor, but always with the evolution of heat (heat of combination). In both cases we have change of state but no change of composition, and in both we have evolution of heat. In the first case we can reverse the process: heat the liquid water, heat becomes latent, liquid water changes into water-vapor. There is a certain definite pressure of water-vapor corresponding to the temperature: raise the temperature, more water evaporates, the pressure of water-vapor increases. It occurred to Deville, to whom both changes were equally physical, that in the second case the process should be reversible also,—that on heating the water-vapor it ought to decompose into oxygen and hydrogen, heat disappearing here also, and that, as there is a definite pressure of water-vapor corresponding to the temperature (often called the tension of water-vapor), so there should be a definite ratio of the pressure of hydrogen and oxygen to that of water-vapor (the tension of dissociation). Deville showed in the most conclusive manner that this is the case and devised ingenious arraugements for proving the actual occurrence of dissociation.

Another case very fully investigated by Deville is that already mentioned,—viz., the action of water-vapor on iron, and of hydrogen on oxide of iron. He showed that, for a fixed temperature, water-vapor and hydrogen are in equilibrium in presence of iron and oxide of iron when the pressures of the two gases, hydrogen and water-vapor, are in a certain ratio quite independent of the quantity of the iron or of the oxide of iron, as long as there is some of each. If the ratio is changed, say by increasing the pressure of the water-vapor, chemical action takes place: water is decomposed, oxide of iron is formed, and hydrogen set free. Again, if the pressure of the water-vapor is diminished, part of the hydrogen acts on oxide of iron, reducing it and forming water. In both cases the ratio of pressures is restored. This gives an easy explanation of the apparently anomalous results mentioned above. When a current of hydrogen is passed over oxide of iron the water-vapor produced is swept away as fast as it is formed; the ratio of the pressure of hydrogen to that of water-vapor is therefore always greater than that required for equilibrium and reduction of iron, and formation of water goes on continuously until all the oxide of iron is reduced. In the same way, a current of water-vapor carries away the hydrogen as fast as it is produced; the ratio of the pressure of hydrogen to that of water-vapor is always less than that required for equilibrium, and the oxidation of iron and production of hydrogen goes on until no metallic iron remains. Exactly the same explanation applies to the action of carbonic acid gas on solution of sulph-hydrate of potassium, and of sulphuretted hydrogen on solution of bicarbonate of potassium. Equilibrium results when the pressures of the gases are in a certain ratio; if the equilibrium is disturbed chemical action takes place in the direction which tends to restore the equilibrium by reproducing the ratio of pressures.

The apparatus devised by Deville for detecting and measuring dissociation illustrates his remarkable ingenuity. We shall instance only one example in addition to those already mentioned.

One of the great difficulties in observing dissociation depends on its reversible character. A compound may indeed decompose when raised to a high temperature; but, if, as we cool it again, reunion occurs, it is not easy to prove that any chemical change took place. One of the ways in which Deville got over this difficulty was by the use of his "hot and cold tube." Inside a porcelain tube he placed a metal tube of smaller diameter, so that their axes coincided, leaving an annular space between them. This annular space was closed at both ends, but by means of side tubes near the ends, could be filled with any gas, or a current of gas could be passed through it. The porcelain tube was raised to a high temperature by being placed in a furnace, while the internal metal tube was kept cold by running water through it. By this means he proved the dissociation of carbonic acid gas, carbonic oxide, and sulphurous acid gas,—the carbon or sulphur being deposited on the outer wall of the cold internal tube, and thus kept at a temperature below that at which recombination could take place.

Deville's observations on dissociation and his generalizations from them have a very direct bearing on the kinetic theory of gases, and it is a fact of interest in the history of science that Deville did not recognize the validity of that theory. Our estimate of the ingenuity, skill, and patience shown in his experimental work, and of the genius and sound judgment which directed his theoretical conclusions, is perhaps raised when we recollect that he was neither led in the first nor biased in the second by ideas derived from the kinetic theory, and his hostile or at least neutral attitude towards it gives perhaps greater value to the evidence that his work has contributed to its soundness.

Deville's works were published in the *Annales de Chimie et de Physique* and in the *Comptes Rendus*. He further published a volume, entitled *De l'Aluminium; ses Propriétés*, etc., Paris, 1859, and the lecture *On Dissociation* already referred to. (A. C. B.)

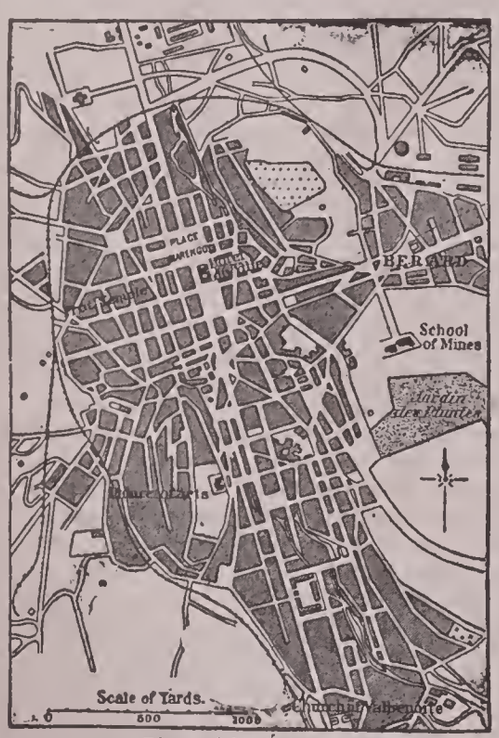
STE. MARIE-AUX-MINES. See MARKIRCH.

SAINTES, a town of France, the chef-lieu of an arrondissement in the department of Charente-Inférieure, on the left bank of the Charente, 88 feet above the sea and 45 miles southeast of La Rochelle by the railway from Nantes to Bordeaux. It occupies a delightful position and is of interest for its Roman remains. Of these the best preserved is the triumphal arch of Germanicus, although it has been removed and rebuilt stone by stone. The amphitheatre is larger than those of Nîmes, Bordeaux, and Pompeii, and in area (.89 of an acre) is surpassed only by the Colosseum. The external ellipse was 436 feet long and 354 broad. Rubble embedded in cement is the material of the building, which dates probably from the close of the 1st or the beginning of the 2d century. Measures have been taken to keep the ruins, now made picturesque by trees, from further injury or decay. The capitol was destroyed after the capture of the town from the English by Charles of Alençon, brother of Philip of Valois, in 1330. An ancient hypogæum is still preserved, as well as numerous traces of the channels by which water was conveyed to private houses. The antiquarian museum contains 7000 medals and numerous sculptured pieces. Saintes was a bishop's see till 1790; the cathedral of St. Peter, rebuilt at the close of the 12th century, was almost destroyed by the Huguenots in 1558. As rebuilt between 1582 and 1585 the interior of the church has an unattractive appearance. The tower is 236 feet high. The church of St. Eutropius (which was founded in the close of the 6th century, rebuilt in the 11th, and had its nave destroyed in the Wars of Religion) stands above a very interesting

well-lighted crypt, the largest in France after that of Chartres, adorned with richly sculptured capitals and containing the tomb of St. Eutropius (4th or 5th century). Notre Dame, a splendid example of the architecture of the 11th and 12th centuries, with a noble round clock-tower, is unfortunately occupied by the military authorities, who have divided and mutilated the interior. The town, which was at one time at the head of the department, is still the seat of the courts of assize and has a court-house. Other public buildings are a town-house (Renaissance), a hospital, and a library. Small vessels ascend the river as far as Saintes, which has an advantageous situation between Angoulême and Cognac higher up and Taillebourg and Rochefort farther down, and is the seat of iron and copper foundries, factories for agricultural instruments, cooperages, and skin-dressing establishments. The population in 1881 was 13,341 (15,763 in the commune).

Saintes (Mediolanum or Mediolanium), the capital of the Santones, was a flourishing town before Cæsar's conquest of Gaul. Christianity was introduced by St. Eutropius, its first bishop, in the middle of the 3d century. Charlemagne rebuilt its cathedral. The Normans burned the town in 845 and 854. Richard Cœur de Lion fortified himself within its walls against his father Henry II., who captured it after a destructive siege. It was not till the reign of Charles V. that Saintes was permanently recovered from the English. The Protestants did great damage during the Wars of Religion.

ST. ÉTIENNE, an industrial and manufacturing town of France, chef-lieu of the department of Loire, 312 miles south-southeast of Paris and 36 miles south-southwest of Lyons by rail, with a branch line to Le Puy. The coal-field of St. Étienne is the richest in



Plan of St. Étienne.

France after that of Valenciennes and Pas de Calais, giving employment to 12,000 miners and 5000 workmen at the pit-heads. There are 64 concessions worked by 28 companies, extending over an area 20 miles long by 5 in width ; the mineral is of two kinds,—smelting coal (said to be the best in France) and gas coal ; the yearly output is between 3,000,000 and 4,000,000 tons, but with a tendency to decrease. In the metallurgic establishments of the arrondissement, which extend all the way along the railway from Firminy to Rive-de-Gier, 5540 workmen are employed, and in 1882 61,127 tons of cast metal, 58,445 tons of iron, 10,815 tons of sheet-iron, and 131,563 tons of steel of all kinds were manufactured. The last-named industry, carried on according to the Bessemer and Martin processes, yields nearly a third of the whole French production of steel. Military and naval material, railway plant, and articles of general merchandise are all made at St. Étienne, and its name is especially associated with large castings, bomb-proof plates, ship-armor, masts, and pieces of machinery. The national gun-factory, under the direction of artillery officers and employing 4300 workmen, is almost exclusively devoted to the production of rifles and revolvers for the army. A certain number of gun-makers not engaged in the factory turn out from 80,000 to 90,000 firearms (hunting-pieces, revolvers, etc.) per annum. Hardware is manufactured by 60 firms, employing 7000 workmen (who are not, however, exclusively occupied with this department) ; leading articles are locks (known as Forez locks), common cutlery, files, nails, bolts, anvils, vices. Hemp cables for mines, hats, pottery, and lime are among the miscellaneous manufactured products of the town, which is besides a great centre of the ribbon trade, with a testing-house (*condition*) for examining the silk. From 500 to 600 tons of silk, valued at £1,200,000 [$5,832,000] to £1,400,000 [$6,804,000], are used per annum, and the manufactured articles reach a value ranging from £2,800,000 [$13,608,000] to £3,200,000 [$15,552,000]. The ribbons, laces, trimmings (in silk, cotton, and india-rubber) produced in the arrondissement of St. Étienne are valued at £4,000,000 [$19,440,000], and form four-fifths of the total French production. With the exception of a few factories where machinery is employed, the whole manufacture is carried on by persons with small means. About 5000 looms (Jacquard's permitting thirty-six pieces to be woven at once) and 40,000 workmen are employed. Besides the old abbey church of Valbenoîte (outside of the town) with its nave dating from the 13th century, the public buildings comprise a Protestant church, a synagogue, a town-house (finished under the second empire and decorated with statues of the ribbon trade and metallurgy), a school of mines (1816), with a mineralogical and geological collection, and a "palace of the arts," with a museum and library rich in old MSS. and collections in connection with artillery and natural history. Near Valbenoîte in the wooded gorge of the Furens is the reservoir of Gouffre d'Enfer, formed by a dam (1861–1866) 328 feet long, 131 high, and 131 wide at the base, and capable of storing about 70,000,000 cubic feet of water. The population of the town was 28,000 in 1764 ; by 1876 it was 126,019, but it had decreased to 114,962 (123,813 in the commune) in 1881.

At the close of the 12th century St. Étienne was only a parish of the Pays de Gier belonging to the abbey of Valbenoîte. By the middle of the 14th century the coal trade had reached a certain development, and by the close of the century the town was surrounded with walls and had consuls. A hundred years later it had three growing suburbs. The Wars of Religion stimulated the manufacture of arms, and about the same period the ribbon trade sprang into existence. It was not till the 18th century, however, that the town entered on its era of prosperity. The royal manufactory of arms was established in 1764. In 1789 they were producing at the rate of 12,000 muskets per annum ; between September, 1794, and May, 1796, they delivered 170,858 ; and 100,000 was the annual average throughout the whole period of the empire. The first railways opened in France were the line between St. Étienne and Andrezieu on the Loire in 1828 and that between St. Étienne and Lyons in 1831. In 1856 St. Étienne became the administrative centre of the department instead of Montbrison. Among the local celebrities are Francis Garnier, who conquered Tongking in 1873, and several engravers who have given eminence to the St. Étienne school of engraving.

ST. EUSTATIUS, or St. Eustache, one of the Dutch West India Islands, a dependency of Curaçao, lying northwest of St. Kitts in 17° 50′ N. lat. and 62° 40′ W. long., consists of two volcanic cones and an intervening valley, and contains the small town of Orangetown and two forts. The population, which from 7600 in 1786 had decreased to 1741 (about 1000 Negroes), was again 2247 in 1882. Between 300 and 400 vessels visit the island annually. Yams and sweet

potatoes are exported (5187 and 3010 tons in 1882). The Dutch occupied St. Eustatius in 1635, and, after frequent French and English irruptions, were confirmed in their possession of it in 1814.

SAINT-ÉVREMOND, Charles de Marguetel de Saint-Denis, Seigneur de (1613–1703), was born at Saint-Denis-le-Guast near Coutances, the seat of his family in Normandy, on 1st April, 1613. He was a younger son, but took his designation from one of the smaller estates of the family and appears to have had a sufficient portion. He was a pupil of the Jesuits at the Collége de Clermont, Paris, then a student at Caen. For a time he followed the law at the Collége d'Harcourt. He soon, however, took to arms and in 1629 went with Bassompierre to Italy. He served through great part of the Thirty Years' War, chiefly in Germany, and meeting Gassendi at Paris, became strongly imbued with his doctrines. He was present at Rocroy, Nördlingen, and at Lens. For a time he was attached to Condé, but is said to have offended him by some satirical speech or speeches. During the Fronde, Saint-Évremond, unlike most of his contemporaries, never changed sides, but was a steady royalist. The duke of Candale (of whom he has left a very severe portrait) gave him some appointments in Guienne, and Saint-Évremond is said to have saved 50,000 livres [$9500] in less than three years. He was one of the numerous victims of the fate of Fouquet. His letter to Créqui on the peace of the Pyrenees, which is said to have been discovered by Colbert's agents at the seizure of the superintendent's papers, seems a very inadequate cause for exile, and it has been supposed that there was more behind; but nothing is known certainly. Saint-Évremond went to Holland and England, where he was received with open arms by Charles II., and was pensioned. He found himself very much at home in England, and though after James II.'s flight to France Saint-Évremond was invited to return he declined. Hortense Mancini, the most attractive of Mazarin's strangely attractive group of nieces, came to England and set up a *salon* for love-making, gambling, and witty conversation, and here Saint-Évremond was for many years at home. He died on Michaelmas Day, 1703, and was buried in Westminster Abbey, where his monument still is in Poet's Corner close to that of Prior.

Saint-Évremond is perhaps the most remarkable instance of the curious 17th-century fancy for circulating literary work in manuscript or clandestinely. He never himself authorized the printing of any of his works during his long lifetime, though Barbin in 1668 published an unauthorized collection. But he empowered Des Maizeaux to publish his works after his death, and they duly appeared, the earliest form and date being 3 vols. 4to, 1705. They were often reprinted in various forms during the first half of the 18th century. Saint-Évremond, however, had made his mark and established his influence long before the earliest of these books appeared. He was an older man than Pascal, a very much older man than Anthony Hamilton, and he probably preceded the first, as he certainly long preceded the second, in the employment for literary purposes of a singularly light, polished, and graceful irony, which taught a great deal to Voltaire, but which Voltaire was never able to imitate with quite the air of good company which distinguishes his teacher. The masterpiece of Saint-Évremond's style in this respect is the so-called *Conversation du Maréchal d'Hocquincourt avec le Père Canaye* (the latter a Jesuit and Saint-Évremond's master at school), which has been frequently classed with the *Lettres Provinciales*, but which with less of moral purpose and of cutting reproof even excels those famous compositions in dramatic power and in subtle good-humored irony. The remainder of Saint-Évremond's works are desultory in the extreme. Some elaborate letters contain the exposition of an Epicurean philosophy of life which had a very great influence on the polite society of his day. Others, and the most important of all, exhibit the writer as a literary critic of singular discrimination and taste. His comparisons of Corneille and Racine, his remarks on English drama (chiefly that of Ben Jonson), his sketches of criticism on Roman character and literature, all show a remarkable union of acute and orderly generalization with freedom from the merely academic spirit which had in his time already begun to beset France. Altogether, Saint-Évremond may be said with greater right to deserve the phrase which used to be applied to Sir William Temple. He is the first master of the genteel style in French literature, and the lively poignancy of his irony prevents this gentility from ever becoming insipid. His influence indeed was hardly less in his adopted than in his native country, and it may be traced in the Queen Anne essayists to a not much less degree than in Hamilton and Voltaire.

Saint-Évremond's complete works have not recently been reprinted, but there are selections by Hippeau, Giraud, and others.

ST. GALL, in area the sixth (789 square miles), in actual population the fourth (210,491), and in relative density of population the tenth of the Swiss cantons, was formed in 1803 out of the two independent communities of the "town" and the "abbey" (including Toggenburg), Rapperswyl, Uznach, Gaster, Sargans, Gams, Rheinthal, Sax (with Forsteck), which belonged to Zurich, and Werdenberg, which belonged to Glarus. It encloses the canton of Appenzell, extending between the Lake of Constance and the Lake of Zurich on the west, and being bounded by the Rhine on the east, while in the southwest lies the valley occupied by the Wallenstätt Lake and the Linth Canal. The Rhine separates St. Gall from Tyrol, and the rest of its frontier is conterminous in succession with Grisons, Glarus, Schwyz, Zurich, and Thurgau. In altitude the canton ranges from 1306 feet above the sea (the height of the Lake of Constance) to 10,660 feet in the Ringelspitz of the Sardona group. The arable area is not sufficient to supply the local demand for grain; but the stock-breeding and especially the manufacturing industries, to which a large part of the population is devoted, make up for any agricultural deficiency. Rorschach and Rapperswyl are lake ports; Wyl, Lichtensteig, Altstätten, and Uznach markets of some importance for local products. Ironstone is worked in the Gonzen district, and there are quarries at Rorschach and Bolligen, Mels and Degersheim. Ragatz, the well-known watering-place, is supplied with mineral water from Pfäffers. The people of St. Gall are three-fifths Roman Catholic and two-fifths Protestant (126,164 and 83,441 in 1880), but, in spite of this and considerable diversities of culture and character from district to district, a fair degree of harmony has ultimately been secured even in the treatment of educational questions. The constitution dates from 1861 and was partially revised in 1875. After being abolished for many years, the death-penalty was reënacted in 1882. Besides the city of St. Gall there were in the canton in 1880 three communes with upwards of 5000 inhabitants each,—Tablat (8092), Wattwyl (a seat of the cotton manufacture, 5283), and Straubenzell (5026).

ST. GALL (German *Sankt Gallen*), capital of the above canton, occupies along with its suburbs St. Fiden, Neudorf, and Langgasse (to the east), and Lachen and Vonwil (to the west), an area 4 miles long by 1 broad in the highland valley of the Steinach, which descends northeast to the Lake of Constance. On a pillar in the marketplace are the following details: Lat. 47° 25′ 36″ N.; long. 7° 2′ 27″ E. from Paris (9° 22′ 41″ Green.); height above the sea, 2196.6 feet; mean annual temperature, 45.6; annual rainfall, 50 inches; air-distance from Zurich 39 miles, from Geneva 174. The only town—not village—in Europe which has a higher position than St. Gall is Madrid. The chief building in St. Gall is the abbey, of which (as it was originally arranged) a ground plan and description are given in vol. i. pp. 18, 19. The abbey church, since 1846 the Roman Catholic cathedral, was entirely rebuilt in the latter part of the 18th century in the rococo style. Partly from the desire to include within the choir the tombs of the two founders and partly from the hostility which long existed between town and tonsure, both the towers (217 feet) are placed at the east end and the main entrance is in

the north side. The whole church has a length of 400 feet (with the sacristy 454 feet), and a breadth in the nave of 95 feet, a disproportion which is considerably disguised by the arrangement of the interior. Among the internal decorations are two colossal statues of St. Desiderius and St. Mauritius, the original patrons of the church, whose relics were brought from Scotland. Other buildings of importance are the (Protestant) church of St. Lawrence, partially rebuilt (1851–53) according to plans by the Swiss poet Johann G. Müller, the Government offices on the east side of the abbey-court (where Schöll's famous relief of the cantons of St. Gall and Appenzell is to be seen), the town-house, the offices of the Mercantile Directorium (a 17th-century institution to which the town owes much of its commercial prosperity), the great cantonal school—comprising a gymnasium, a technical school (preparatory to the polytechnicum at Zurich), and a mercantile school—the cantonal reformatory of St. Jacob, the hospitals, and the infantry and cavalry barracks. In the town park, part of which is occupied by the botanic gardens, stands the public museum, containing natural history collections, the industrial collections and industrial drawing-school of the Mercantile Directorium, the picture gallery of the Art Society, and the antiquarian collections of the Historical Society. The museum of the East Swiss Geographical Commercial Society is located in the cantonal school. Besides the abbey library, famous for its ancient MSS. (original of the *Niebelungenlied*, etc.), there is a town library (Bibliotheca Vadiana), founded by the reformer Joachim de Watt or Vadianus. In spite of its position and climate, St. Gall is the seat of extensive industries and trades. About 45,000 persons in the surrounding cantons are engaged in the manufacture of embroidered goods, mainly muslins, for the St. Gall capitalists, who also employ some 6000 or 7000 women in chain-stitch and hand embroidery. In 1872 6384 machines were at work in this department in the town and vicinity, and in 1882 14,883. The value of textile fabrics and embroidered goods annually exported from St. Gall is £3,600,000 [$17,496,000] to £4,000,000 [$19,440,000]. All round the town the meadows are used as bleaching-grounds for the webs. In 1870 the population was 16,675, in 1880 21,438.

The abbey of St. Gall was named after its founder, a follower of St. Columba, who along with Columbau left Ireland on the destruction of Bangor and finally settled down in the midst of the great forest which then stretched from the Lake of Constance to the Säntis Mountains, for the purpose of converting the Alemanns. On his death on 16th October, 625, this apostle of Celtic Christianity was buried in his oratory, and in the 9th century the spot thus consecrated became the site of the monastic buildings erected by Abbots Gozbert and Grimoald. The foundatiou was already a wealthy one, and it soon became a great centre of literary aud artistic culture, attracting numerous pupils and receiviug the homage of dukes and emperors. In the 10th century the abbey and its cluster of houses were surrounded with a wall, which in 954 had to defend the settlement against an attack by a band of Saracens. In the reign of Rudolph of Hapsburg the town obtained a recognition of its communal independence from Abbot Ulrich and from the emperor himself a variety of important privileges. An alliance defensive and offensive was formed in 1312 with Zurich, Constance, and Schaffhausen; and, although the prosperity of the town received a severe check by a great conflagration in 1314, the vigor with which the burghers prosecuted the newly introduced linen manufacture soon made it one of the most flourishing towns of Switzerland. About the middle of the 14th century the burghers began to share in the government of the town; and in 1457 they bought up all the claims of the abbots to territorial jurisdiction. In 1454 St. Gall joined the confederation of the Swiss towns, Zurich, etc. Abbot Ulrich VIII. determined to remove the abbey to Rorschach; but the inhabitants of St. Gall, Appenzell, etc., combined to destroy his new buildings, and, though St. Gall was besieged by the abbot's supporters and had to pay grievous damages (1490), the treaty which it signed bound the abbots never to attempt to remove the relics of the founder. The abbey, which had purchased the countship of Toggenburg, passed at the Reformation into the hands of the town (1529), but it was restored to the abbots in 1530; and, when in 1712 in the "Toggenburg War" Zurich and Bern devastated the abbey and its possessions, the townsfolk remained neutral. The final dissolution of the abbey occurred in 1798. Under the French, St. Gall was the chief town of the canton of Säntis.

SAINT-GERMAIN, Comte de (d. 1780), a celebrated adventurer of the 18th century who, by the assertion of his discovery of some extraordinary secrets of nature, exercised considerable influence at several European courts. Of his parentage and place of birth nothing is definitely known; the common version is that he was a Portuguese Jew. It was also commonly stated that he obtained his money from discharging the functions of spy to one of the European courts. He knew nearly all the European languages, spoke good German and English, excellent Italian, French (with a Piedmontese accent), and Portuguese and Spanish with perfect purity. Grimm affirms him to have been the man of the best parts he had ever known. His knowledge of history was comprehensive and minute, and his accomplishments as a chemist, on which he based his reputation, were undoubtedly real and considerable. The most remarkable of his professed discoveries was of a liquid which could prolong life, and by which he asserted he had lived 2000 years. At the court of Louis XV., where he appeared about 1748, he exercised for a time extraordinary influence, but, having interfered in the dispute between the houses of Austria and France, he was compelled in June, 1760, on account of the hostility of the duke of Choiseul, to remove to England. He appears to have resided in London for one or two years, but was at St. Petersburg in 1762, and is asserted to have played an important part in connection with the conspiracy against the emperor Peter III. in July of that year. He then went to Germany, where, according to the *Mémoires authentiques* of Cagliostro, he was the founder of freemasonry, and initiated Cagliostro into that rite. After frequenting several of the German courts he finally took up his residence in Schleswig-Holstein, where he and the landgrave Charles of Hesse pursued together the study of the "secret" sciences. He died at Schleswig in 1780.

Saint-Germain figures prominently in the correspondence of Grimm and of Voltaire. See also Oettinger, *Graf Saint-Germain*, 1846; Bülau, *Geheime Geschichten und räthselhafte Menschen*, vol. i. cap. xiii.

ST. GERMAIN-EN-LAYE, a town of France, in the department of Seine-et-Oise, 8 miles north of Versailles and 13 west of Paris by rail. Built on a hill on the left bank of the Seine, nearly 200 feet above the river, and on the edge of a forest 10,000 to 11,000 acres in extent, St. Germain has a healthy and bracing air, which makes it a favorite place of summer residence with the Parisians. It had 15,545 inhabitants in 1881 (15,790 in the commune). The terrace of St. Germain, constructed by Lenôtre in 1672, is 7900 feet long and 100 feet wide, is planted with lime trees upwards of a hundred years old, and affords an extensive view over the valley of the Seine as far as Paris and the surrounding hills; hence it ranks as one of the finest promenades in Europe. It was also after Lenôtre's plans that the "parterre" promenade was laid out between the castle and the forest and the "English garden" (by which it is approached). The history of St. Germain centres in the castle, now occupied by a museum of national antiquities.

A monastery in honor of St. Germain, bishop of Paris, was built in the forest of Laye by King Robert. Louis VI. erected a castle close by. Burned by the English, rebuilt by Louis IX., and again by Charles V., this castle did not reach its full development till the time of Francis I., who may be almost regarded as the real founder of the building. A new castle was erected by Henry II.; but it was demolished by the count of Artois, and there remains only the so-called Henry IV. pavilion, now used as an hotel, and known

as the place where Thiers died, 3d September, 1877. The old castle, on the contrary, is being completely restored to the state in which it was under Francis I. The chapel, dating from 1240, is older than the Sainte Chapelle at Paris, and is worthy of note for its rose and other windows. The museum, which will occupy forty rooms, contains a chronological series of artistic and industrial products from the earliest prehistoric times. In the church of St. Germain is a mausoleum erected by Queen Victoria to the memory of James II. of England, who found in the old castle (now demolished) an asylum after the Revolution of 1688. In one of the public squares is a statue of Thiers. The town is the seat of one of the cavalry garrisons which surround Paris. At no great distance in the forest is the Couvent des Loges, a branch of the educational establishment of the Legion of Honor (St. Denis). The fête des Loges is one of the most popular in the neighborhood of Paris. Henry II., Charles IX., and Margaret of Navarre were born at St. Germain, as well as Louis XIV., who is said to have removed from this place to Versailles to get away from the sight of the clock-tower of St. Denis, the church where he was to be buried.

ST. HELENA, an island in the Atlantic in 15° 55′ 26″ S. lat. and 5° 42′ 30″ W. long. (Ladder Hill Observatory), lies 1140 miles from Africa, 1800 from America, 700 southeast of the island of Ascension (the nearest land), and 4000 from Great Britain, of which it has been a dependency since 1651. The area is about 45 square miles, the extreme length from southwest to northeast being 10¼ miles and the extreme breadth 8¼. The island is a very ancient volcano, greatly changed by oceanic abrasion and atmospheric denudation. The northern rim of the great crater still forms the principal ridge, with the culminating summits of Diana's Peak (2704 feet) and High Peak (2635); the southern rim has been altogether washed away, though its débris apparently keeps the sea shallow (from 20 to 50 fathoms) for some 2 miles southeast of Sandy Bay, which hypothetically forms the centre of the ring. From the crater wall outwards water-cut gorges stretch in all directions, widening as they approach the sea into valleys, some of which are 1000 feet deep, and measure one-eighth of a mile across at bottom and three-eighths across the top (Melliss). Along the enclosing hill-side caves have been formed by the washing out of the softer rocks. High Hill (2823 feet) and High Knoll (1903) are lateral cones. Many dykes and masses of basaltic rock seem to have been injected "subsequently to the last volcanic eruptions from the central crater." Among the more remarkable instances are the Ass's Ears and Lot's Wife, picturesque pinnacles standing out on the southeast part of the crater ridge, and the Chimney on the coast to the south of Sandy Bay. In the neighborhood of Man and Horse (southwest corner of the island), throughout an area of about 40 acres, scarcely 50 square yards exist not crossed by a dyke. On the leeward side of St. Helena the sea-face is generally formed by cliffs from 600 to 1000 feet high, and on the windward side these heights often increase to full 2000 feet, as at Holdfast Tom, Stone Top, and Old Joan Point. Limited deposits of calcareous sandstones and stalagmitic limestones occur at certain points, as on Sugar-Loaf Hill; they probably consist of particles of shells blown by the wind from some primeval beach, long since destroyed.

Map of St. Helena.

As regards its vegetation, St. Helena is divided into three zones,—(1) the coast zone, extending inland for a mile to a mile and a half, formerly clothed with a luxuriant vegetation, but now "dry, barren, soilless, lichen-coated, and rocky," with little save prickly pears, wire grass, and *Mesembryanthemum;* (2) the middle zone (400–1800 feet), extending about three-quarters of a mile inland, not so rocky, with shallower valleys and grassier slopes,—the English broom and gorse, brambles, willows, poplars, Scotch pines, etc., being the prevailing forms; and (3) the central zone, about 3 miles long and 2 wide, the last refuge for the most part of that marvellous flora which has been for generations the admiration and sorrow of the botanist. According to Mr. W. B. Helmsley (who has summarized all that is known on the matter in his report on the botany of the Atlantic Islands),[1] the certainly indigenous species of plants are 65, the probably indigenous 24, and the doubtfully indigenous 5; total 94. Of the 38 flowering plants 20 are shrubs or small trees. With the exception of *Scirpus nodosus*, all the 38 are peculiar to the island; and the same is true of 12 of the 27 vascular cryptogams (a remarkable proportion). Since the flora began to be studied, two species—*Melhania melanoxylon* and *Acalypha rubra*—are known to have become extinct; and at least two others have probably shared the same fate—*Heliotropium pennifolium* and *Demazeria oblitĕrata*. *Melhania melanoxylon*, or "native ebony," once abounded in parts of the island now barren; but the local legislation decided that goats were of more value than ebony. Its beautiful congener *Melhania erythroxylon* ("redwood") was still tolerably plentiful in 1810 but is now reduced to a few specimens. Very rare, too, has become *Pelargonium cotyledonis*, called "Old Father Live-for-ever," from its retaining vitality for months without soil or water. *Commidendron robustum* ("gumwood"), a tree about 20 feet high, once the most abundant in the island, was represented in 1868 by about 1300 or 1400 examples; and *Commidendron rugosum* ("scrubwood") is confined to somewhat limited regions. Both these plants are characterized by a daisy- or aster-like blossom, which looks very strange on a tree. In general the affinities of the indigenous flora of St. Helena were described by Sir Joseph Hooker as African, but Mr. Bentham points out that the important element of the *Compositæ* shows, at least in its older forms, a connection rather with South America. The exotic flora introduced from all parts of the world gives the island almost the aspect of a botanic garden. The oak, thoroughly naturalized, grows alongside of the bamboo and banana. As contributing largely to the general physiognomy of the vegetation must be mentioned—the common English gorse; *Rubus pinnatus*, probably introduced from Africa about 1775; *Hypochæris radicata*, which above 1500 feet forms the dandelion of the country; the beautiful but aggressive *Buddleia madagascariensis; Physalis peruviana;* the common castor-oil plant; and the pride of India. The peepul is the principal shade tree in Jamestown, and in Jamestown valley the date-palm grows freely. Orange and lemon trees, once common, are now scarce. The attempt (1869-71) to introduce cinchona cultivation failed. Potatoes are probably the staple production of the St. Helena farmers, and as many as three crops per annum are sometimes obtained.

The fauna of St. Helena is only second in interest to its flora. Besides domestic animals the only land mammals are rabbits, rats, and mice, the rats being especially abundant and building their nests in the highest trees. Probably the only endemic land bird is the wire bird, *Ægialitis sanctæ helenæ;* the averdevat, Java sparrow, cardinal, ground-dove, partridge (possibly the Indian *chukar*), pheasant, and guinea-fowl are all common. The pea-fowl, at

[1] *Voyage of H. M. S. Challenger, Botany*, vol. i.

one time not uncommon in a wild state, is long since exterminated. Though fresh water abounds in the island in the form of springs, rivulets, and streams, there are no freshwater fish, beetles, or shells. Of sixty-five species of sea-fish caught off the island seventeen are peculiar to St. Helena; economically the more important kinds are gurnard, eel, cod, mackerel, tunny, bullseye, cavalley, flounder, hog-fish, mullet, and skulpin. Mr. Wollaston, in *Coleoptera Sanctæ Helenæ*, 1877, shows that out of a total list of 203 species of beetles 129 are probably aboriginal and 128 peculiar to the island,—an individuality perhaps uncqualled in the world. More than two-thirds are weevils and a vast majority wood-borers, a fact which bears out the tradition of forests having once covered the island. The *Hemiptera* and the land-shells also show a strong residuum of peculiar genera and species. A South American white ant (*Termes tenuis*, Hagen.), introduced from a slave-ship in 1840, soon became a real plague at Jamestown, where a considerable portion of the public library fell a prey to its voracity. The honey-bee, which throve for some time after its introduction, again died out. (Comp. Wallace, *Island Life.*)

The population of St. Helena was 6444 in 1871 and 5059 (2617 males, 2442 females) in 1881. It consists of Government officials, of old-established residents ("yamstalks") of somewhat composite origin, European and Asiatic, and of the descendants of Negroes landed from the West African slave-ships subsequent to 1840. The only town—Jamestown (3000 inhabitants)—lies in a deep valley on the northwest coast, and there is a village in the neighboring Rupert's Valley. Ladder Hill, the seat of the garrison, is so called from the almost precipitous ladder-like wooden stair by which its height of 600 feet can be scaled. Longwood, where Napoleon died in 1821, is a farmhouse in an elevated plain (2000 feet high), about 3¾ miles inland from Jamestown.

St. Helena was discovered by the Portuguese navigator João da Nova on the 21st of May, 1501. The island received its first known inhabitant in 1513 in the person of Fernandez Lopez, a Portuguese of good family, who preferred being marooned to returning to Europe after the barbarous mutilation to which he had been subjected for some misdemeanor. Cavendish (1588), Kendall (1591), and Lancaster (1593) were the earliest English visitors. The Dutch, who had for some time been in possession of the island, withdrew in 1651, but on two occasions (1665 and 1673) managed to expel the forces of the English East India Company, which had at once seized the abandoned prize. The company, having procured a second charter of possession on 16th December, 1673, remained the governing authority till 22d April, 1834, when St. Helena passed into the hands of the British crown. In 1832 it had purchased the freedom of the slaves (614) for £28,062 [$136,381.32]. As a port of call the island continued to prosper till the opening of the Suez Canal, which, by altering the route to the East Indies, deprived the people of their means of subsistence. The revenue has decreased from £13,931 [$67,704.66] in 1874 to £10,421 [$50,646.06] in 1884, the expenditure from £14,521 [$70,572.06] to £10,806 [$52,517.16], the value of imports from £53,874 [$261,827.64] to £41,816 [$203,225.76], and of exports from £4006 [$19,469.16] to £1436 [$6,978.96]. Halley the astronomer in 1676 left his name to Halley's Mount; and Maskelyne and Waddington visited the island in 1761.

See Seale, *Geognosy of Saint Helena* (folio plates), 1834; Brooke, *History of Saint Helena*, 1808 and 1824; Beatson, *Tracts*, etc., 1816; Darwin, *Geological Observations on Volcanic Islands*, 1844; Melliss, *Saint Helena*, 1875.

ST. HELEN'S, a market-town and municipal and parliamentary borough of southwest Lancashire, England, is situated on a branch of the London and North-Western Railway, 21 miles west by south of Manchester and 10 east-northeast of Liverpool. It is the principal seat in England for the manufacture of crown, plate, and sheet glass, and has extensive copper smelting and refining works, as well as chemical works, iron and brass foundries, and potteries. There are collieries in the neighborhood. The town, which is entirely of modern origin, obtained a charter of incorporation in 1868. A town-hall was erected in 1873, and there are also a public library and various institutes for affording instruction and amusement to the working-class population. Extensive drainage works have been carried out under a local Act. The corporation are the owners of the waterworks and gasworks. Enfranchised in 1885, St. Helen's returns one member to the House of Commons. The population of the borough (area, 6586 acres) in 1871 was 45,134, and in 1881 it was 57,403.

ST.-HELIER. See JERSEY, vol. xiii. p. 646.

SAINT HILAIRE. See GEOFFROY SAINT-HILAIRE.

SAINT-HILAIRE, AUGUSTE DE (1799–1853), French botanist and traveller, was born at Orleans on 4th October, 1799. He began to publish memoirs on botanical subjects at an early age. In 1816–22 and in 1830 he travelled in South America, especially in south and central Brazil, and the results of his personal study of the rich flora of the regions through which he passed appeared in several books and numerous articles in scientific journals. These works are most valuable from the copious information they afford not only about the plants and other natural products but also about the native races he encountered. Those by which he is best known are the *Flora Brasiliæ Meridionalis* (3 vols. folio, with 192 colored plates, 1825–32), published in conjunction with A. de Jussieu and Cambessède, *Histoire des plantes les plus remarquables du Brésil et de Paraguay* (1 vol. 4to, 30 plates, 1824), *Plantes usuelles des Brésiliens* (1 vol. 4to, 70 plates, 1827–28), also in conjunction with De Jussieu and Cambessède, *Voyage dans le district des Diamants et sur le littoral du Brésil*, (2 vols. 8vo, 1833). His numerous articles in journals deal largely with the plants of Brazil and the general characters of its vegetation; but Saint-Hilaire also aided much in establishing the natural system of classification on the firm basis of structural characters in the flowers and fruits; and that he recognized the importance of the study of anomalies in this view is shown in more than one of his writings. His *Leçons de Botanique, comprenant principalement la Morphologie Végétale*, published in 1840, is a very comprehensive and clear exposition of botanical morphology up to 1840 and of its application to systematic botany. He died at Orleans on 30th September, 1853.

ST. IVES, a seaport and borough of west Cornwall, England, is situated at the west entrance of the beautiful St. Ives Bay on the Bristol Channel, 7 miles north of Penzance. The older streets are narrow and irregular, but on the slopes above there are modern terraces with good houses. The town takes its name from St. Hya or Ia, an Irish virgin who is said to have arrived in the bay in the 5th century. The parish church of St. Andrew is in the Early Perpendicular style of the 15th century. In the churchyard is an ancient cross recently restored. A town-hall was erected in 1832. The town is the headquarters of the pilchard fishery. The port has suffered greatly from the accumulation of sand. A stone pier was built by Smeaton in 1767; a breakwater was commenced in 1816 but abandoned; and a wooden pier, which was commenced in 1865, is still unfinished. Formerly the town was called Pendenis or Pendunes. Its charter of incorporation, granted by Charles I. in 1639, was forfeited in 1685, but was renewed by James II. in 1686. From the reign of John until 1832 it sent two members to parliament, and one from 1832 until 1885, when it was merged in the St. Ives division of the county. The population of the municipal borough (area, 1890 acres) in 1871 was 6965, and in 1881 it was 6445.

ST. JEAN BAPTISTE, a suburb of Montreal, Canada, under a separate municipality. It lies north-northeast of Mount Royal Park and is hardly a mile from the centre of the city. The population in 1881 was 5874.

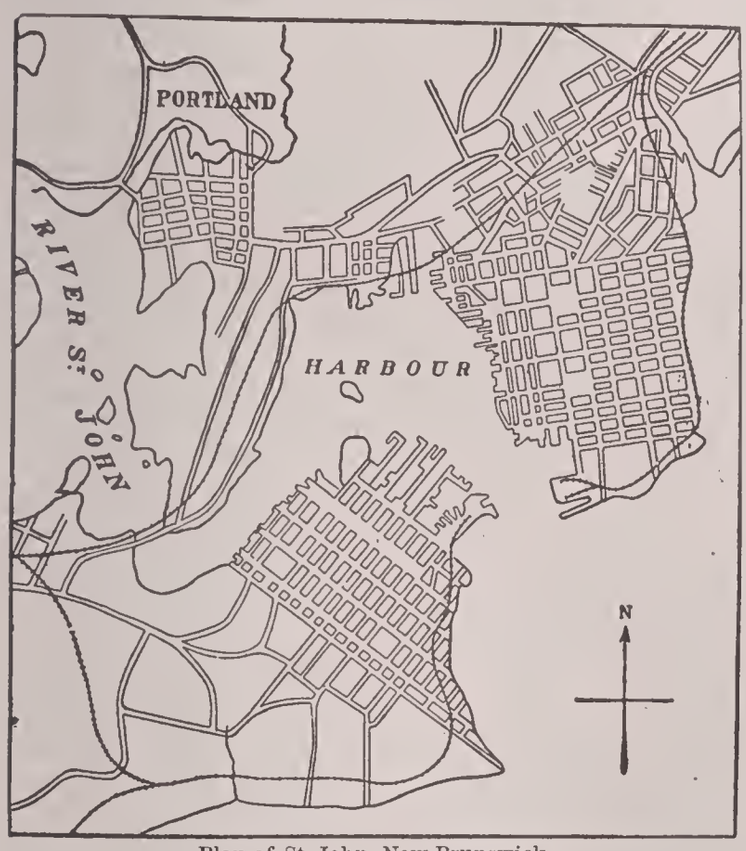
ST. JEAN D'ACRE. See ACRE.

ST. JEAN D'ANGĒLY, a town of France, the chef-lieu of an arrondissement in the department of Charente-Inférieure, on the right bank of the Boutonne (a right-hand affluent of the Charente) and on the railway from Taillebourg (12 miles southwest) to Niort (30 miles north). The town, which is badly planned and built, contains the remains of a Benedictine abbey, destroyed in 1568; the existing church corresponds to but a part of the large old abbey

church erected in the 13th century. The harbor admits vessels of 30 to 40 tons burden, and wine and brandy are exported. The population was 6538 in 1881 (7279 in the commune).

St. Jean owes its origin to a castle of the 7th century, which the dukes of Aquitaine used as a lodge for boar-hunting in the neighboring forest of Angeri. Pippin, son of Louis le Debonnaire, turned it into a monastery, where he deposited the head of John Baptist. This relic attracted hosts of pilgrims; a town grew up, took the name St. Jean d'Angeri, afterwards d'Angély, was fortified in 1131, and in 1204 received from Philip Augustus a communal charter. The possession of the place was disputed between French and English in the Hundred Years' War, and between Catholics and Protestants at a later date. Louis XIII. took it from the Protestants in 1629 and deprived it of its fortifications, its privileges, and its very name, which he wished to change into Bourg-Louis.

ST. JOHN, capital of St. John county and the largest city of the province of New Brunswick, is strikingly situated at the mouth of the river of the same name, in 45° 14′ 6″ N. lat. and 66° 3′ 30″ W. long. (see vol. xvii., plate IV). It stands on an elevated rocky peninsula which projects into the harbor for a considerable distance. The latter, which is protected by batteries and never freezes, is well equipped with wharves and docks, and is capable of accommodating ships of the largest size. Its entrance is guarded by Partridge Island, lying 2 miles south of the city, and containing the quarantine hospital and lighthouse. About 1¼ miles north of the lighthouse is situated the Beacon, and below the town east of the channel is the breakwater, 2250 feet long. The St. John river enters the harbor through a rocky and sharply defined gorge, 100 yards wide and about 400 long, having a total fall of about 17 feet, which is passable to ships for forty-five minutes during each ebb and flow of the tide. The river has alternately an inward and an outward fall twice every twenty-four hours, the high-water tide level immediately below the gorge being 6 to 8 feet higher than the average level above the gorge. The river is here spanned by a stanch suspension bridge 640 feet long and 100 feet above low-water level, and a cantilever railway bridge, 2260 feet long, with a river span of 825 feet, was opened in 1885. The city, approached from the sea, presents a bold and picturesque appearance, and, next to Quebec, possesses more natural beauty than any other town in Canada. There are three large public squares, and the streets (lighted with gas and the electric light) are regularly laid out. The water supply is derived from Little river, 5 miles distant, and brought to the city by three separate mains with an aggregate capacity estimated at 10,000,000 gallons daily; the present daily consumption (including that of the city of Portland) is 5,000,000 gallons. The works, which are owned by the city, cost $992,326. The water supply of St. John (West) is derived from Spruce Lake. St. John (East) has also an admirable sewerage system.



Plan of St. John, New Brunswick.

On the 20th of June, 1877, two-fifths of St. John (about 200 acres) were destroyed by fire, which in nine hours burned over $27,000,000 worth of property. The city was quickly rebuilt, and on a much grander scale, many brick and stone edifices taking the place of the old landmarks, which were principally composed of wood. The chief buildings are—the Roman Catholic cathedral, Trinity, St. Andrew's, the Stone, St. David's, the Centenary, Germain Street Baptist, and Leinster Street Baptist churches, the custom house, post-office, city hall, savings bank, Wiggins's Orphan Asylum, Victoria skating rink, lunatic asylum, Victoria and Madras schools, the Masonic and Oddfellows' halls, the young men's Christian association building, the general public, the epidemic, and the marine hospitals, the court-house, jail, police office, and mechanics' institute (with a reading room, library, and museum). There are thirty-three places of worship (Church of England 6, Roman Catholic 3, Presbyterian 7, Wesleyan Methodist 5, Baptist 6, Congregationalist 1, Methodist Episcopal 1, Christian Brethren 1, Disciples of Christ 2, and Christadelphians 1); the educational institutions consist of a grammar school, a Madras school, Baptist seminary, and several public and private schools and academies. St. John has also a free public library, numerous religious, charitable, scientific, and literary societies, and three daily newspapers. Carleton, on the opposite side of the river, and connected with the east side by ferry, is included within the corporation limits, and is represented in the common council. The population in 1871 was 28,805, in 1881 it was 26,127 (males 12,263, females 13,864), the decrease being caused by the great fire of 1877, when many persons left the city.

St. John is the entrepôt of a large extent of country, rich in minerals, agricultural produce, and timber. It is the seat of an extensive business connection, and possesses first-class means of communication both by steamships and sailing vessels and by railways. Of late years its maritime and manufacturing interests have been greatly extended. The chief articles of manufacture are iron-castings, steam engines and locomotives, railway cars, coaches and carriages, machinery, edge-tools, nails and tacks, cotton and woollen goods, furniture, wooden ware, leather, boots and shoes, soap and candles, agricultural implements, lumber, sugar-boxes, paper, boats, sails, etc. The fisheries afford employment to about 1000 men, and shad, salmon, halibut, cod, herrings, alewives, sturgeons, and haddock comprise the chief varieties taken. The exports ($4,310,576 in 1884) consist of fish, lumber, woollen and cotton goods, manufactured articles, etc.; the imports ($4,621,691 in 1884) are tobaccos, sugar and molasses, spirits and malt liquors, dried fruits, coffee, tea, silks, velvets, etc. The following figures represent the movement of the coasting trade in 1884: vessels arrived 1864, tonnage 117,566, men 7340; vessels departed 1941, tonnage 105,050, men 6875. The number of entrances from foreign ports was 1904 (486,471 tons), of clearances 1961 (517,415 tons). The vessels on the registry books (31st December, 1884) numbered 677, with a tonnage of 251,136; 53 vessels were built in that year with a tonnage of 18,989. The taxable property in 1885 was—real estate $9,122,000, personal $9,153,300, income $2,833,900, total $21,109,200. The corporation affairs are managed by a mayor, elected by the people annually, and a city council of eighteen members. St. John city and county return

three members to the House of Commons of Canada, and six members to the House of Assembly of New Brunswick. The climate though healthy is changeable, the pleasantest season being the autumn. The highest temperature observed since 1860 was 87° Fahr., and the lowest -22° Fahr., the mean temperature for spring, summer, autumn, and winter respectively being 36.9°, 58°, 45°, and 20.6°. The number of schools is 81, with 4171 pupils (average daily attendance 2722). Besides the libraries belonging to the city and the mechanics' iustitute, there are large collections of books open to members of the young men's Christian association aud the Church of Englaud institute. Navigation on St. John river opens on 15th April and closes on 26th November.

De Monts visited St. John in 1604, but it was not until 1635 that a regular settlement of the place was made, when Charles de la Tour founded a colony, which existed under French rule, with varying fortuues, until 1758, when it finally passed under British control. In 1764 the first Scottish settlers arrived in New Brunswick, and in 1783 the Loyalists landed at St. John and established the city. It was called Parr Town, in honor of Governor Parr, until 1785, when it was incorporated with Conway (Carleton) uuder royal charter, as the city of St. John.

ST. JOHN, Charles William George (1809–1856), naturalist and sportsman, was the son of General the Hon. Frederick St. John, second son of Frederick, second viscount Bolingbroke, and was born 3d Decembar, 1809. He was educated at Midhurst School, Sussex, and about 1828 obtained a clerkship in the treasury, but, after joining some friends in various expeditions to the Highlands of Scotland, he found his duties so irksome that he resigned in 1834. The same year he married a lady with some fortune, and was thus enabled to gratify his taste for the life of a sportsman and naturalist. He ultimately settled in the "Laigh" of Moray, "within easy distance of mountain sport, in the midst of the game and wild animals of a low country, and with the coast indented by bays of the sea, and studded with freshwater lakes, the haunt of all the common wild fowl and many of the rarer sorts." In 1853 a paralytic seizure permanently deprived him of the use of his limbs, and for the benefit of his health he removed to the south of England. He died at Wooston near Southampton on 22d July, 1856.

He wrote several books on sport, which record the results of accurate observations on the habits and peculiarities of the birds and wild animals of the Highlauds. They are written in a pleasant and graphic style, and illustrated with engravings, many of them from pen-and-ink sketches of his own, in which the traits and features of the animals are depicted, though in rough outline, yet with almost the vividness of life. His works are *Wild Sports and Natural History of the Highlands* (1846, 2d ed. 1848, 3d ed. 1861); *Tour in Sutherland* (1849, 2d ed., with recollections by Captain H. St. John, 1884); *Notes of Natural History and Sport in Morayshire*, with Memoir by C. Innes (1863, 2d ed. 1884).

SAINT-JOHN, Henry. See Bolingbroke.

ST. JOHN, James Augustus (1801–1875), traveller and author, was born in Carmarthenshire, Wales, on 24th September, 1801. After attending a village grammar-school he received private instruction from a clergyman in the classics, and also acquired proficiency in French, Italian, Spanish, Arabic, and Persian. At the age of seventeen he went to London, where he obtained a connection with a Plymouth newspaper, and, along with James Silk Buckingham, became editor of the *Oriental Herald*. In 1827, along with D. L. Richardson, he founded the *London Weekly Review*, which was subsequently purchased by Colburn and transformed into the *Court Journal*. About 1829 he left London for Normandy, and in 1830 published an account of his experiences there under the title *Journal of a Residence in Normandy* (2 vols.). After spending some time in Paris and Switzerland he set out for Nubia and Egypt, visiting the second cataract in a small vessel. He made important discoveries in regard to volcanic agencies on both sides of the Nile, and found traces of volcanic agency in the Libyan Desert. He also explored the antiquities connected with the religion of ancient Egypt. The results of his journey were published under the titles *Egypt and Mohammed Ali, or Travels in the Valley of the Nile* (2 vols., 1834), *Egypt and Nubia*, (1844), and *Isis, an Egyptian Pilgrimage* (2 vols., 1853). He died on 22d September, 1875.

St. John was also the author of *Lives of Celebrated Travellers* (1830), *Anatomy of Society* (1831), *History, Manners, and Customs of the Hindus* (1831), *Margaret Ravenscroft, or Second Love* (3 vols. 1835), *The Hellenes, or Manners and Customs of Ancient Greece* (1842), *Sir Cosmo Digby*, a novel (1844), *Views in Borneo* (1847), *There and Back Again in Search of Beauty* (1853), *The Nemesis of Power* (1854), *Philosophy at the Foot of the Cross* (1854), *The Preaching of Christ* (1855), *The Ring and the Veil*, a novel (1856), *Life of Louis Napoleon* (1857), *History of the Four Conquests of England* (1862), *Weighed in the Balance*, a novel (1864), and *Life of Sir Walter Raleigh* (1868). He also edited, with notes, various English classics.

Of his four sons, all of some literary distinction—Percy Bolingbroke, Bayle, Spencer, and Horace Roscoe—the second Bayle St. John (1822–1869), predeceased him. He was educated privately, and began contributing to the periodicals when only thirteen. At the age of twenty he wrote a series of papers for *Fraser* under the title "De Re Vehiculari." To the same magazine he contributed a series of essays on Montaigne, and, after continuing his studies on the same subject for some time, he published in 1857 *Montaigne the Essayist, a Biography*, in 4 volumes. In 1846 he passed through France and Italy on his way to Egypt, where, during a residence of two years, he wrote *The Libyan Desert* (1849). On his return he settled for some time in Paris and published *Two Years in a Levantine Family* (1850) and *Views in the Oasis of Siwah* (1850). After a second visit to the East he published *Village Life in Egypt* (1852). From this time he continued until twelve months of his death to reside in Fraunce, and as the result of his residence there published *Purple Tints of Paris; Characters and Manners in the New Empire* (1854), *The Louvre, or Biography of a Museum* (1855), and the *Subalpine Kingdom, or Experiences and Studies in Savoy* (1856). He was also the author of *Travels of an Arab Merchant in the Soudan* (1854), *Maretimo, a Story of Adventure* (1856), and *Memoirs of the Duke of Saint-Simon in the Reign of Louis XIV.* (4 vols., 1857).

SAINT JOHN OF JERUSALEM, Knights of the Order of (see Knighthood). In the year 1023 certain merchants of Amalfi obtained permission from the caliph of Egypt to establish a hospital in Jerusalem for the use of "poor and sick Latin pilgrims." The hospice prospered far beyond the hopes of its founders, and grateful travellers spread its fame throughout Europe and sent offerings to its funds, while others voluntarily remained behind to assist actively in its pious purposes. With its increased utility organization became necessary, and in this organization is to be found the origin of the Order of Saint John. When Jerusalem was taken by Godfrey de Bouillon (see Crusades), his wounded soldiers were tended by Peter Gerard, rector of the Amalfi hospital of Saint John, and the more wealthy of the crusaders eagerly followed the example of their leader in endowing so useful and so practical an institution. Many of the Christian warriors sought permission to join the ranks of the fraternity. At the proposal of Gerard a regularly constituted religious body was formed; the patriarch of Jerusalem invested every approved candidate with a black robe bearing on the breast an eight-pointed white cross and received in return a vow of poverty, obedience, and chastity. In 1113 Pope Paschal II. formally sanctioned the establishment of the order by a bull. Five years later Gerard was succeeded by Raymond du Puy, and under his auspices the monastic knights took a fresh oath to become militant defenders of the cause of the Cross. During the first century of its existence the fraternity thus acquired a religious, republican, military, and aristocratic character. The rules introduced by Raymond du Puy became the basis of all subsequent regulations; the leading members of the hospital or master's assistants were formed into an all-powerful council, which divided the order into knights of justice, chaplains, and serving brethren. There was also an affiliation of

religious ladies (*dames*) and of *donats* or honorary members. The income of the body corporate was derived from landed property in all parts of Europe. To facilitate the collection of rents, commanderies (first called preceptories) were formed. These gradually acquired the character of branch establishments where candidates were received and the same observances practiced as in the parent convent. Raymond du Puy twice repulsed the advancing Turks; and Hugh de Payens, fired by the successes of the Hospitallers, founded the sister order of the Temple. In 1160 Raymond du Puy died. The rule of his immediate successors was uneventful; Gilbert d'Ascali greatly weakened the influence of the order by joining (1168) in an ill-fated expedition to Egypt. Roger Desmoulins, the eighth master, was killed fighting against Saladin before Jerusalem, while his successor, Garnier de Napoli, died of the wounds he received in the decisive battle of Tiberias, which led to the surrender of Jerusalem to the Moslems in 1187. The seat of the order was now transferred to Margat, a town which still remained in the possession of the Christians, and it becomes difficult to trace the frequent changes of the mastership. The dangerous enmity which arose between the Hospitallers and the Templars necessitated the energetic intervention of the pope. In 1216 Andrew, king of Hungary, was received into the order. The brief occupations of Jerusalem by the emperor Frederick II. (1228) and by Richard of Cornwall (1234)[1] had little appreciable effect on the waning fortunes of the Hospitallers. A savage horde from the borders of the Caspian advanced against the Christians, and in the final struggle with the Chorasmians the masters of both orders —united before the common enemy—fell with nearly the whole of their followers (1244). William de Chateauneuf, elected to the mastership by the few survivors, repaired to Acre only to take part in the fruitless crusade of Louis of France. The truce between the rival orders was doomed to be of short duration. In 1259 their armies met in a general engagement, and victory rested with the Hospitallers. A brief period of success in 1281 was powerless to avert the fall of Margat, and in 1289 Acre alone remained in the hands of the Christians. John de Villiers, a man of singular ability, became at this critical juncture master of the order. An overwhelming force was sent from Egypt to besiege Acre, which only fell after a desperate resistance. Under cover of the arrows of their archers the knights sailed for Cyprus (1291). Repeated acts of prowess by sea still served to remind the Moslem corsairs of the survival of their implacable foes. De Villiers died three years later and was succeeded by Odon de Pins, who tried ineffectually to restore the purely conventual character of the order. William de Villaret (elected in 1300) shared the dangers of an expedition to Palestine and prepared for the conquest of Rhodes, which was effected in 1310 by his brother and successor. The revenues of the Hospitallers were now augmented from the confiscated estates of their old rivals the Templars. Fulk de Villaret was attacked at Rhodes by Osman, ruler of Bithynia, but with the assistance of Amadeus of Savoy he defeated the invaders. A serious difference which arose between De Villaret and his subordinate knights enabled Pope John XXII. to appoint his nominee John de Villanova (1319). It was at this period that the order was divided into the seven *langues* of France, Provence, Auvergne, Italy, Germany, England, and Aragon. In 1346 De Gozon became grand-master. His administration and that of his immediate successors are only remarkable for a perpetual struggle for supremacy with the papal court. In 1365 Raymond Beranger captured Alexandria in concert with the king of Cyprus, but the victors contented themselves with burning the city. Philibert de Naillac had no sooner been elected grand-master than he was summoned to join the European crusade against the sultan Bajazet, and took part in the disastrous battle of Nicopolis. The Greek emperor unfortunately invoked the aid of Timur, who overthrew Bajazet, but followed up his success by an attack on Smyrna, the defence of which had been entrusted to the knights. Smyrna was taken and its brave garrison put to the sword. In 1440 and 1444 De Lastic defeated two expeditions sent against him from Egypt. Nine years later Constantinople fell at last into the hands of the Turks. It was evident to the knights that an attack on their sanctuary would follow the triumph of Islam, but it was not till 1480 that the long-dreaded descent on Rhodes took place. Fortunately for the order, Peter d'Aubusson was grand-master, and the skilfully planned attack of the three renegades was valorously repulsed. The heroic D'Aubusson recovered from his wounds, restored the shattered fortifications, and survived till 1503. Nearly twenty years passed away before the sultan Solyman determined to crush the knights, who had just elected L'Isle d'Adam as their chief. After a glorious resistance, D'Adam capitulated and withdrew with all the honors of war to Candia (Crete). Charles V., when the news of the disaster reached him, exclaimed, "Nothing in the world has been so well lost as Rhodes," and five years later (1530), with the approval of the pope, ceded the island of Malta and the fortress of Tripoli in Africa to the homeless knights. Peter Dupont succeeded D'Adam in 1534, and in the following year took a prominent part in the emperor's famous expedition against Tunis. The position in Tripoli was from the first precarious, and it was surrendered to the corsair Dragut in 1551. In 1557 John La Valette was chosen grand-master. The construction of fresh fortifications was hastened and every precaution taken against a surprise. On the 18th May, 1565, the Turkish fleet under the redoubtable Dragut appeared in sight and one of the most celebrated sieges in history began. It was finally raised on the 8th September after the death of Dragut and 25,000 of his followers. The city of Valetta afterwards rose on the scene of this desperate struggle. La Valette died in 1568, and no events of importance mark the grand-masterships of De Monte (1568), De la Cassière (1572), and Verdala (1581). During their terms of office the cathedral, the *auberges*, the hospital, and many remarkable edifices were built. Another city gradually arose on the opposite shores of the grand harbor, and the once barren island became almost imperceptibly the site of one of the strongest fortresses and most flourishing commercial communities in the Mediterranean. Verdala was succeeded by Martin Garces (1595), but it was reserved for Alof de Vignacourt to revive for a time the military reputation of the order. Vasconcellos, De Paula, and Lascaris were all aged men when, one after another, they were called to the supreme power, and their election (with a view to secure frequent vacancies) contributed to weaken the vitality of the fraternity. Lascaris lived till the age of ninety-seven, built the fortifications of Floriana, endowed Valetta with a public library, and resisted the growing encroachments of the Jesuits. Martin de Redin and Raphael Cottoner ruled each for three years. Nicholas Cottoner was elected in 1663, and the knights of St. John once again distinguished themselves in the siege of Candia. The loss which the order sustained in the repulse of the allies before Negropont (1689) was the indirect cause of the death of Caraffa, who was succeeded by Adrian de Vignacourt (1690), Raymond Perellos (1697), Zondodari (1720), De Vilhena (1722), Despuig (1736), and Pinto (1741). Emmanuel Pinto was a man of no mean ability and of considerable force of character. He steadily resisted all papal encroachments on his authority, expelled the Jesuits from Malta, and declined to hold a chapter-general. After the brief rule of Francis Ximines, Emmanuel De Rohan became

[1] [Richard of Cornwall was in Palestine in 1240. See Porter's *Knights of Malta*, p. 51. London, 1884.—Am. Ed.]

grand-master (1775). He assembled a chapter-general, erected the Anglo-Bavarian *langue*, and sent his galleys to relieve the sufferers from the great earthquake in Sicily. The order never perhaps seemed to all outward appearances more prosperous than when the storm of the French Revolution broke suddenly upon it. In 1792 the Directory decreed the abolition of the order in France and the forfeiture of its possessions. Five years afterwards De Rohan died. He had taken no pains to conceal his sympathy for the losing cause in France and his court had became an asylum and home for many French refugees. His successor Ferdinand Hompesch[1] was perhaps the weakest man ever elected to fill a responsible position in critical times. On the 12th April, 1798, the French government resolved on the forcible seizure of Malta. Warnings were sent to the grand-master in vain. Within two months from that date the island was in the hands of Bonaparte, and Hompesch was permitted to retire to Trieste with some of the most cherished relics of the order.

Subsequent to the departure of Hompesch a number of the knights who had taken refuge at St. Petersburg elected the emperor Paul grand-master. Notwithstanding the patent illegality of the proceeding the proffered honor was eagerly accepted and duly announced to all the courts of Europe (October, 1798). Hompesch was induced to resign in the following year. On the death of Paul an arrangement was arrived at which vested the actual nomination in the pope. From 1805 to 1879 only lieutenants of the order were appointed, who resided first at Catania, then at Ferrara, and finally at Rome. In 1879 Leo XIII. made Giovanni Battista Ceschi grand-master, and he actually rules over portions of the Italian and German *langues* and some other scattered groups of the ancient fraternity.

Two other associations also trace their origin from the same parent stock—the Brandenburg branch and the English *langue*. The former can claim an unbroken existence since its establishment in 1160. In 1853 the king of Prussia (in whom the right of nomination had been vested since 1812) restored the original bailiwick of Brandenburg and the assembled commanders elected Prince Charles of Prussia *Herrn Meister*, who notified his election to the lieutenant of the grand-master at Rome. The "Johanniter" did good service in the German campaigns of 1866 and 1870. As regards the English *langue*, 1 Elizabeth c. 24 annexed to the crown all the property of the order in England. After the restoration of the Bourbons the French knights met once more in chapter-general and elected a permanent capitular commission, which was officially recognized by both Louis XVIII. and the pope. After certain negotiations, the three French *langues*, acting in accord with those of Aragon and Castile, agreed to the resuscitation of the dormant *langue* of England (1827–1831), and Sir Robert Peat was appointed lord prior, taking the customary oath *de fideli administratione* in the Court of King's Bench. During the past half century the good work done by the modern knights—now (1886) once more located in St. John's Gate, Clerkenwell—can honorably compare with the memorable deeds of their predecessors. The establishment of the hospice at Jerusalem is due to the energy and zeal of Sir Edmund Lechmere, who has been mainly instrumental in collecting at St. John's Gate the unrivalled historical literature of which the order can boast.

There are few subjects of study which present so rich and so varied materials as the annals of the knights of St. John. The archives still preserved in Malta are almost unique in their value and completeness, and each grand-master patronized and encouraged the industrious historiographers who sought to perpetuate the fame of the order to which they belonged. The work of Giacomo Bosio is an elaborate and generally trustworthy record of events from the time of Gerard down to the year 1571. Bartolomeo del Pozzo treats with equal care the period between 1571 and 1636. Editions of these volumes were published in Rome, Naples, Verona, and Venice. The Abbé Vertot concludes his elaborate history with the year 1726. His book enjoyed a considerable popularity, was published in English with the original plates in 1728, but can hardly claim the confidence to which Bosio and del Pozzo are both entitled. From the 16th century down to the appearance of the famous *Codice* of De Rohan (1782) we have a series of publications on the subject of the statutes of the order. A fresh compilation seems generally to have followed each assembly of the chapter-general. Before the time of De Rohan the best-known edition was that of Borgofante (1676), but Bosio produced a translation from the Latin in 1589 when residing at Rome as agent of the grand-master, and another was printed at the press of the order at Malta in 1718. The *Memorie de' Gran Maestri* by Bodoni (Parma, 1780) may also be consulted with advantage. For information concerning the archæology of the order and the antiquities of Malta itself reference should be made to Abela and Ciantar's *Malta Illustrata*, dedicated to Em. Pinto in 1772; to Raphael Caruana's *Collezione di monumenti e lapidi sepolcrali di militi Gerosolimitani nelle chiesa di San Giovanni* (Malta, 1838–40); to De Boisgelin's *Malta* (3 vols); and to *Les Monumens des Grands Maitres*, by Villeneuve-Bargemont (Paris, 1829). The last named writer has, however, drawn largely on his own imagination for the earlier part of the information he professes to give. In English the most noteworthy treatises concerning the knights are John Taaffe's *History of the Order of Malta* (London, 1852, 4 vols.) and General Porter's *History of the Knights of Malta of the Order of St. John of Jerusalem* (London, 1883). The Rev. W. R. Bedford has recently published a valuable account of the great hospital at Valetta. A useful guide to the contents of the Malta Record Office is to be found in M. Delaville Le Roulx's *Archives de l'Ordre de St. Jean de Jerusalem* (Paris, 1883). (A. M. B.).

ST. JOHN'S, the capital of Newfoundland, is situated on the eastern shore of the island, 60 miles north of Cape Race, in 47° 33′ 33″ N. lat. and 52° 45′ 10″ W. long. (see vol. xvii., plate V.). It is 10° 52′ east of Halifax, and stands on what is nearly the most eastern point of America—Cape Spear, 5 miles south of St. John's, alone projecting a little farther towards the Old World. It is 1000 miles nearer than New York to England, and but 1640 from the coast of Ireland. The approach to the harbor of St. John's presents one of the most picturesque views along the coast of America. In a lofty iron-bound coast a narrow opening occurs in the rocky wall, guarded on one side by Signal Hill (520 feet), and on the other by South Side Hill (620 feet), with Fort Amherst lighthouse on a rocky promontory at its base. The entrance of the Narrows is about 1400 feet in width, and at the narrowest point, between Pancake and Chain Rocks the channel is not more than 600 feet wide. The Narrows are half a mile in length, and at their termination the harbor trends suddenly to the west, thus completely shutting out the swell from the ocean. Vessels of the largest tonnage can enter at all periods of the tide. The harbor is a mile in length and nearly half a mile in width. At its head is a dry dock, recently completed at a cost of $550,000; it is 600 feet in length, 83 in breadth, and 26 in depth, capable of admitting the largest steamers afloat. The city is built on sloping ground on the northern side of the harbor, on the southern side of which the hills rise so abruptly from the water that there is only room for a range of warehouses and oil-factories. Three principal streets, winding and irregular, follow the sinuosities of the harbor and of one another the whole length of the city, and these are intersected by a number of cross-streets. Water Street, the principal business locality, presents a very substantial, though not handsome, appearance, the houses being of stone or brick. Shops, stores, and counting-houses occupy the ground floor, while many of the merchants and shopkeepers live in the upper stories. Fish-stores, warehouses, and wharves project from behind on the side next the harbor. The city, three-fourths of which is still of wood, is rapidly extending in several directions, and in recent years many dwelling-houses of an improved description have been erected. There is an abundant supply of excellent water, brought in pipes from a lake 5 miles off. Epidemics are rare, and the city is very healthy. Of the public buildings the most important are Government House, a substantial and spacious building erected in 1828 by the Imperial Government; the colonial building (1847), containing the chambers of the legislature and Government offices; the athenæum (1877), containing a public hall, library, reading-room, savings bank, museum, etc. The foundation of a new post-office was laid in the same year. The churches are—the Church of England and Roman Catholic cathedrals, St. Thomas's and St. Mary's (Church of England), St. Patrick's, three Methodist churches, St. Andrew's Presbyterian church, and the Congregational church. The manufacture of seal and cod oils has long been carried on upon an extensive scale. Of late years other manufactures have been introduced, and have made considerable progress. The are three iron foundries, two large machine-shops, two boot and shoe factories, a nail-factory, three furniture-factories, two tobacco-factories, soap-works, two

[1] [A German noble (1744–1803) of Dusseldorf, who became successively a pensioner of Russia and France.—Am. Ed.]

tanneries, and a large and well-equipped factory for the manufacture of cables, ropes, twines, nets, seines, etc. The export trade in fish of various kinds, fish oils, seal oil, and seal skins is very large; the greater part of all the imports into Newfoundland also arrives at St. John's. The city is not yet (1886) incorporated, the Colonial Board of Works having charge of all civil affairs. The population, which in 1780 was 1605, had in 1801 increased to 3420, in 1812 to 7075, in 1835 to 15,000, and in 1874 to 23,890, and in 1884 it was 28,610 (Roman Catholics, 17,693; Episcopalians, 5741; Methodists, 3715; Presbyterians, 973; Congregationalists, 465; other denominations, 23). The census last mentioned also shows the population of the whole island and Labrador to be 197,589, being an increase of 36,209 since 1874, or at the rate of about 22 per cent. in ten years. The population of the Atlantic coast of Labrador, which is under the jurisdiction of Newfoundland, was 4211—1347 being Eskimo.

ST. JOHNSBURY, a township of the United States, capital of Caledonia county, Vermont, on the Passumpsic river (a tributary of the river Connecticut), about 50 miles south of the Canadian frontier, and on the railway between Boston (205 miles) and Montreal. St. Johnsbury is the seat of perhaps the largest scale-factory in the world, which employs about 600 hands and works up 4000 tons of iron per annum. The township contains an athenæum, public library (10,000 vols.), and art gallery. The population has increased from 2758 in 1850 to 4665 in 1870 and 5800 in 1880. The three villages are distinguished as St. Johnsbury (3360 in 1880), St. Johnsbury Centre, and St. Johnsbury East. Founded in 1786, the township received its name in honor of St. John de Crèvecœur, French consul at New York, and a benefactor of Vermont.

ST. JOSEPH, a city of the United States, capital of Buchanan county, Missouri, on the right bank of the Missouri, 260 miles west by north of St. Louis. It is an important railway junction, possessing since 1873 a great road and railway bridge over the river constructed of iron; in the extent of its wholesale business it ranks as the second city in the State; and among its manufacturing establishments are flour-mills, starch-works, boot and shoe factories, pork-packing establishments, wagon-factories, a distillery, etc. Besides a city-hall and market-house, it contains a court-house (1875), an opera-house, a State lunatic asylum (1874), an agricultural and mechanical exposition association, a Roman Catholic cathedral, and five public libraries. The population was 8932 in 1860, 19,565 (1512 colored) in 1870, and 32,431 (3227 colored) in 1880.

Founded in 1843 by Joseph Robidoux, a French Roman Catholic, who had settled in the district some years previously as a trader, St. Joseph in 1846 was made the county seat, and before 1857, when it received its first city charter, became well known as the great point of departure for emigrants bound for California and the West. During the Civil War, when it was fortified by the Federals, its natural development was considerably checked, but this revived as soon as the struggle was over.

SAINT-JUST, Antoine (1767-1794), French revolutionary leader, was born at Decize in the Nivernais on 25th August, 1767. He was educated at Soissons, and showed his character at school as ringleader of a plot to set the school buildings on fire. Saint-Just was caught red-handed in the act of incendiarism, and, refusing to exhibit any tokens of submission, was ignominiously expelled. His education, however, does not appear to have been neglected; and the reports and speeches of his short and stormy political career exhibit not a little scholarship, and in particular considerable acquaintance with ancient history. Intoxicated with republican ideas, Saint-Just threw himself with enthusiasm into the political troubles of his time, had himself appointed an officer in the National Guard, and by fraud—he being yet under age—admitted as a member of the electoral assembly of his district. Ambitious of fame, he in 1789 published twenty cantos of licentious verses under the title of *Organt*, and this work was afterwards reissued under the title of *My Pastimes; or The New Organt*. From that year onwards, however, the open turbulence of his youth gave place to a rigorously stoical demeanor, which, united to a policy tyrannical, uncompromisingly thorough, and pitilessly severe, became the marked and startling characteristic of his life. He now entered into correspondence with Robespierre, who thenceforth became his hero and ideal. Robespierre invited him to Paris, felt flattered by his worship, saw that he suited his purpose, and in a short time the two became hand and glove. Thus supported, Saint-Just became deputy of the department of Aisne to the national convention, where he made his first speech—gloomy, fanatical, remorseless in tone—on 19th November, 1792. He had but twenty months to live; but into these he seemed to crowd the life of twenty years. In the convention, in the Jacobin Club, and among the populace his relations with Robespierre became known, and he was dubbed the "St. John of the Messiah of the People." Hardly a week passed without the attention of France being arrested by his attitude or his utterances. Both were anxiously watched, as the unfailing indication of the trend of Robespierre's designs. His appointment as a member of the committee of public safety now placed him at the very height and centre of the political fever-heat. In the name of this committee he was charged with the drawing up of reports to the convention upon the absorbing themes of the overthrow of the party of the Gironde, thereafter, when even the "Mountain" seemed to have fallen in pieces, of the Hébertists, and finally, as the tragic sequel to the rupture between Robespierre and Danton of that denunciation of the latter which consigned him and his followers to the guillotine. What were then called reports were far less statements of fact than appeals to the passions; in Saint-Just's hands they furnished the occasion for a display of fanatical daring, of gloomy eloquence, and of undoubted genius; and—with the shadow of Robespierre behind them—they served their turn. Once a flash of cruel humor lighted up his angry retorts, and it became memorable. Desmoulins, in jest and mockery, said of Saint-Just—the youth with the beautiful cast of countenance and the long fair locks—"He carries his head like a Holy Sacrament." "And I," savagely replied Saint-Just, "will make him carry his like a Saint Denis." The threat was not vain: Desmoulins accompanied Danton to the scaffold. The same ferocious inflexibility animated Saint-Just with reference to the external policy of France. He proposed that the national convention should itself, through its committees, direct all military movements. This was agreed to, and Saint-Just was despatched to Strasburg, in company with Lebas, to superintend operations. It was suspected that the enemy without was being aided by treason within. Saint-Just's remedy was direct and terrible: he followed his experience in Paris, "organized the Terror," and soon the heads of all suspects were falling under the guillotine. The conspiracy was defeated, and the armies of the Rhine and the Moselle having been inspirited by success—Saint-Just himself taking a fearless part in the actual fighting—and having effected a junction, the frontier was delivered. Later, with the army of the North, he wrought similar magical changes in the aspect of affairs. Before the generals he placed the terrible dilemma of victory over the enemies of France or trial by the dreaded revolutionary tribunal; and before the eyes of the army itself he organized a force which was specially charged with the slaughter of those who should seek refuge from the enemy by flight. Success again crowned his terrible efforts, and Belgium was gained for France. Meanwhile affairs in Paris looked gloomier than ever,

and Robespierre recalled Saint-Just to the capital. As the storm was gathering Saint-Just gave it direction by mooting the dictatorship of his master as the only remedy for the convulsions of society. At last, at the famous sitting of the 9th Thermidor, he ventured to present as a report of the committees of general security and public safety a document expressing his own views, a sight of which, however, had been refused to the other members of the committee on the previous evening. Then the storm broke. He was vehemently interrupted, and the sitting ended with an order for Robespierre's arrest (see ROBESPIERRE). On the following day, 28th July, 1794, twenty-two men, nearly all young, were guillotined. Robespierre was one, aged thirty-six; Saint-Just another, aged twenty-six.

In 1800 there was published at Strasburg a work from the pen of Saint-Just entitled *Fragments on Republican Institutions*. It is a crude mixture of his opinions on social and political topics.

ST. KILDA, the largest islet of a small group of the Outer Hebrides, Scotland, 40 miles west of North Uist, in 57° 48′ 35″ N. lat. and 8° 35′ 30″ W. long. It measures 3 miles from east to west and 2 from north to south, and has an area of 3000 to 4000 acres. Except at the landing-place on the southeast, the cliffs rise sheer out of deep water, and on the northeast side the highest eminence in the island, Conager or Conna-Ghair, forms a gigantic precipice, 1220 feet high from sea to summit. According to Professor Judd, St. Kilda is probably the core of a Tertiary volcano; but, besides volcanic rocks, it is said to contain hills of sandstone in which the stratification is very distinct.[1] While the general relief is peculiarly bold and picturesque, a certain softness of scenery is produced by the richness of the verdure. The inhabitants are an industrious Gaelic-speaking community (110 in 1851, and 77 in 1881). They cultivate about 40 acres of land (potatoes, oats, barley), keep about 1000 sheep and 50 West Highland cows, and catch puffins and other sea-fowl. Coarse tweeds and blanketing are manufactured for home use. The houses are collected in a little village at the head of East Bay, which contains a Free church, a manse, and the factor's house. The island is practically inaccessible for eight months of the year.

St. Kilda, or, as it was originally called, Hirt (Hirth, Hyrtha), seems to have been in the possession of the Macleods for 400 or even 500 years. In 1779 it changed hands along with Harris, and again in 1804 and in 1871 (to Macleod of Macleod). The feudal superior is Lord Dunmore, who receives one shilling of feu-duty. From 1734 to 1742 Lady Grange was confined on St. Kilda by command of her high-handed husband (see *Proceed. Soc. Scot. Antiq.*, x. and xi). David Mallet makes the island the scene of his *Amyntor and Theodore, or the Hermit*. See works on St. Kilda by Rev. K. Macaulay (1764), L. MacLean (1838), J. Sands (1876 and 1877), and George Seton (1878).

ST. KILDA, a watering-place in Victoria, Australia, on the east shore of Hobson's Bay, 3½ miles south of Melbourne, with which it is connected by a railway. The borough had an area of 1886 acres and a population of 11,662 in 1881. The sea-beach is bordered by an esplanade; there is a large public park; and portions of the sea have been fenced-in to protect bathers from sharks. A town-hall, an assembly hall, a library, and the large Episcopal church of All Saints are among the public buildings.

ST. KITTS. See ST. CHRISTOPHER.

SAINT-LAMBERT, JEAN FRANÇOIS DE (1716–1803), French poet, was born at Nancy in 1716, and died at Paris in 1803. During great part of his long life he held various employments at the court of Stanislaus of Poland, when that prince was established in Lorraine. He also served in the French army, and then betook himself to literature, producing among other things a volume of descriptive verse, *Les Saisons* (wildly overpraised at the time and now never read), many articles for the *Encyclopédie*, and some miscellaneous works in verse and prose. Saint-Lambert's chief fame, however, comes from the strange fate which made him the successful rival in love of the two most famous men of letters in France, not to say in Europe, during the 18th century. The infatuation of the marquise du Châtelet for him and its fatal termination are known to all readers of the life of Voltaire. His subsequent courtship of Madame d'Houdetot, Rousseau's Sophie, though hardly less disastrous to his rival, was less disastrous to the lady and continued for the whole lives of himself and his mistress. They survived till the present century as a kind of irregular Baucis and Philemon, illustrating the manners of the vanquished *régime*, which had not been unjustly celebrated, and vindicating its constancy from a very general opinion.

ST. LAWRENCE. The river St. Lawrence[2] in North America, taken in connection with the great lakes, offers to trading vessels the most magnificent system of inland navigation in the world. Its total length from the source of the St. Louis river, which discharges into Fond du Lac at the head of Lake Superior, to Cape Gaspé is 2100 miles. The river St. Louis springs from the same spacious plateau in Minnesota that gives birth to the Mississippi and the Red River of the North. The intermediate distances between the source of the St. Lawrence and its mouths are shown in Table I. According to the most recent surveys the approximate area of the basin of the St. Lawrence is 510,000 square miles, of which 322,560 belongs to Canada and 187,440 to the United States.

Plate IV.

Length.

Lake Superior, the most westerly of the lakes, is the largest body of fresh water in the world. In addition to the river Nipigon, which may be regarded as the chief source of the upper St. Lawrence, and the St. Louis[3] and Pigeon rivers, which constitute the international boundary, it receives its waters from 200 rivers, draining an aggregate of 85,000 square miles,[4] including its own area of 32,000. Its length is 390 miles, its greatest breadth 160, and its mean breadth 80. Its mean depth is 900 feet and its altitude above the sea-level 600 feet. Its coast is generally rock-bound. Numerous islands are scattered about the north side of the lake, many rising precipitously to great heights from deep water,—some presenting castellated walls of basalt and others rising in granite peaks to various elevations up to 1300 feet above the lake. The Laurentian and Huronian rocks to the north along the shore abound in silver, copper, and iron ores. The United States side is generally lower and more sandy than the opposite shore, and is also especially rich in deposits of native copper and beds of red hæmatite iron ores. Both these minerals are extensively worked. Unfossiliferous terraces occur abundantly on the margin of the lake; at one point no fewer than seven occur at intervals up to a height of 33 feet above the present level of the water. Lake Superior is subject to severe storms and the effect of the waves upon the sandstone of the "picture-rocks" near Grand Island presents innumerable fantastic and very remarkable forms. The lake never freezes, but cannot be navigated in winter on account of the shore ice. At the west end of the lake, at the mouth of the St. Louis, is situated the city of Duluth, a place of considerable importance as the eastern terminus of the Northern Pacific Railway,

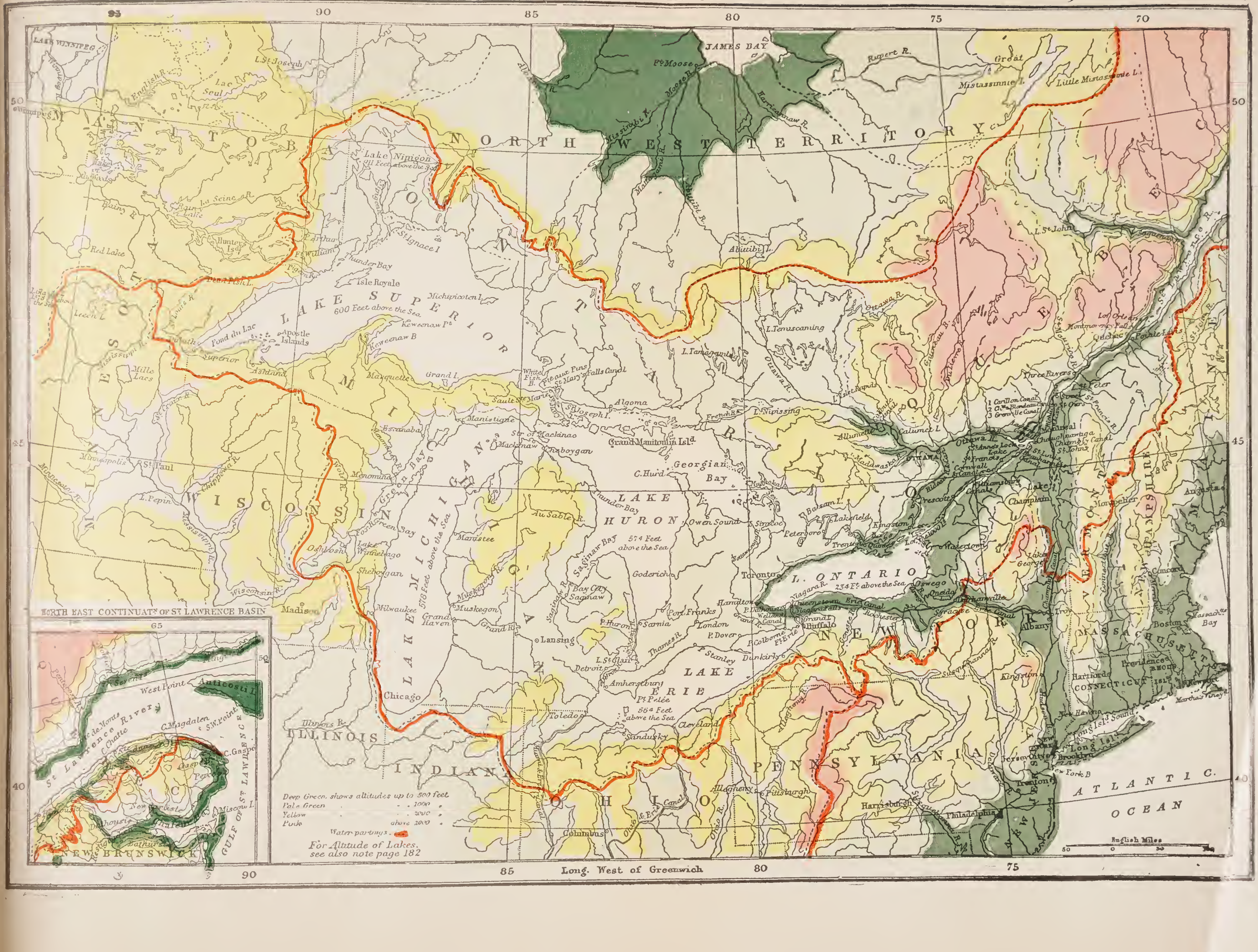
Lake Superior.

[1] No trained geologist seems to have visited the island subsequent to Macculloch.

[2] The name given by Jacques Cartier, who ascended the river in 1535 as far as Montreal.

[3] [The St. Louis river of Minnesota is not on the boundary.—AM. ED.]

[4] The magnitudes and altitudes of the great lakes are derived from the *Report* of the Canadian Canal Commission, February, 1871; the engineering data relating to canals have been mainly obtained from other annual reports published by the Canadian Government and from the annual reports of the chief of engineers, United States army.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MANITOBA
NORTH WEST TERRITORY
ONTARIO
QUEBEC
MINNESOTA
WISCONSIN
MICHIGAN
ILLINOIS
INDIANA
OHIO
PENNSYLVANIA
NEW YORK
VERMONT
NEW HAMPSHIRE
MASSACHUSETTS
CONNECTICUT
NEW BRUNSWICK
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
L. ONTARIO
JAMES BAY
ATLANTIC OCEAN
LAKE WINNIPEG
Lac Seul
L. St Joseph
English R.
Lake Nipigon
Red Lake
Hunters Isd
Fort William
Thunder Bay
Isle Royale
Keweenaw Pt
Keweenaw B
Michipicoten I.
Fond du Lac
Apostle Islands
Ashland
Mille Lacs
Marquette
Grand I.
Sault St Marie
St Joseph I.
Manistique
Grand Manitoulin Isld
Fr Moose
Moose R.
Albany R.
Rupert R.
Great Mistassinnie L.
Little Mistassinnie L.
Abbitibi R.
Abbitibi L.
Harricanaw R.
Mattagami R.
Missinabi R.
L. St John
Saguenay R.
Ottawa R.
L. Temiscaming
L. Timagami
Gatineau R.
Lièvre R.
Three Rivers
Montmorency Falls
Quebec
Pointe Levis
St Maurice R.
St Lawrence R.
Lake Peter
Lake St Francis
Lake St Louis
Lake St Johns
Calumet L.
Allumette
Maddawaska R.
Chaudiere R.
Chaudiere Falls
Chambly Canal
Richelieu R.
Lake Champlain
Montpelier
Augusta
Concord
Boston
Massachusetts Bay
Providence
Newport
Hartford
New Haven
Long Island Sound
Long Island
New York B.
Brooklyn
Jersey City
Trenton
Philadelphia
Harrisburgh
Pittsburgh
Allegheny
Cleveland
Sandusky
Toledo
Columbus
Detroit
Amherstburg
Pt Pelée
L. St Clair
Thames R.
Stanley
Dunkirly
Port Franks
Goderich
Owen Sound
Georgian Bay
C. Hurd
Manitoulin I.
Mackinaw
Sagginaw Bay
Saginaw R.
Bay City
Saginaw
Muskegon
Grand Haven
Grand R.
Lansing
Kalamazoo R.
Milwaukee
Madison
Chicago
Illinois R.
Wisconsin R.
Fox R.
Green Bay
Menomonee
Escanaba
Manistee
Au Sable R.
Oshkosh
Lake Winnebago
Sheboygan
Port Green Bay
Mississippi R.
Minneapolis
St Paul
L. Pepin
Chippewa R.
Red Cedar R.
Lake Traverse
Big Stone Lake
Pembina
Pembina Mts
Turtle Mts
Plains
Rainy Lake
La Seine R.
Lake of the Woods
Winnipeg R.
Winnipeg
Lake Manitoba
Lake Winnipegosis
Swan R.
Assiniboine R.
Qu'Appelle R.
Qu'Appelle Lakes
Moose Mts
Wood Mts
Cypress Hills
Medicine Hat
Fort Walsh
Fort Macleod
Fort Calgary
Bow R.
Elbow R.
Saskatchewan R.
Edmonton
Fort Pitt
Battleford
Carlton
Fort Pelly
Fort Ellice
Fort Qu'Appelle
Fort Garry
Fort Alexander
Fort Frances
Rainy R.
Rainy Lake
Lake of the Woods
Lake Nipigon
Long Lake
Michipicoten R.
Michipicoten Harbour
Pigeon R.
Pic R.
Dog Lake
Lake Nipissing
French R.
Mattawa R.
Mattawa
Deux Rivières
Lake Temiscaming
Ottawa R.
Bytown
Rideau Canal
Rideau Falls
Rideau R.
Kingston
Cataraqui
Lake Ontario
Bay of Quinte
Prince Edward Co.
Belleville
Port Hope
Cobourg
Toronto
Hamilton
Niagara R.
Niagara Falls
Welland Canal
Grand L.
Buffalo
Lake Erie
Lake Huron
Lake Michigan
Lake Superior
Lake St Clair
Lake Simcoe
Lake Couchiching
Lake Nipissing
Lake Temiscaming
Lake Timagami
Lake Abbitibi
Lake Mistassinnie
Lake Peter
Lake Champlain
Lake George
Lake Memphremagog
Lake Winnipeg
Lake Manitoba
Lake Winnipegosis
Lake of the Woods
Lake Traverse
Big Stone Lake
Rainy Lake
Lake Nipigon
Lake Superior
Lake Michigan
Lake Huron
Lake St Clair
Lake Erie
Lake Ontario

and of the St. Paul and Duluth Railway, which runs to St. Paul on the Mississippi, 155 miles south of Duluth.[1]

St. Mary's river and canal.

St Mary's river, 55 miles long, is the only outlet from Lake Superior, and its course to Lake Huron is but a succession of expansions into lakes and contractions into rivers. St. Mary's rapids, which in a distance of half a mile absorb 18 feet out of the total fall of 22 feet between the two lakes, are avoided by a ship canal, constructed in 1855.

As originally built, the canal was 1 mile long, had a width of 100 feet at the water line and a depth of 12 feet. The locks were two in number, combined, each 350 feet in length, 70 feet in width, with a lift of 9 feet. At the time the canal was made these dimensions were sufficient to pass any vessel on the lakes fully laden, but by 1870 it became necessary to provide for more rapid lockage and for the passage of larger vessels. Accordingly the old canal was widened and deepened, and a new lock constructed, 515 feet long and 80 wide,—the width of the gates being 60 feet, the lift of the lock 18, and the depth of water on the mitre sills 17. There is now everywhere a navigable depth of 16 feet from Lake Superior through St. Mary's Falls Canal and St. Mary's river to Lake Huron. In 1883 the registered tonnage passing the canal was 2,042,295 tons,—the annual increase of tonnage during the previous fifteen years having averaged 107,313 tons. The United States Government engineers have already presented a project for still further improvements, namely, to replace the old locks by one only with a length of 700 feet and a width of 70, and with a depth of 21 feet on the sill.

TABLE I.—*Distances of Sections of St. Lawrence.*

Local Name.	From	To	Sections of Navigation.	Statute Miles. Intermediate.	Statute Miles. Total from Source of St. Louis.
.....	Source of St. Louis river	Fond du Lac.....	St. Louis river.....	152	152
.....	Fond du Lac.....	Pointe aux Pins	Lake Superior.....	390	542
Sault St. Mary.	Pointe aux Pins	St. Joseph's I....	St. Mary's river.....	55	597
.....	St. Joseph's I.....	Sarnia.....	Lake Huron	270	867
St. Mary river..	Sarnia.....	Amherstburg ...	St. Clair and Detroit river.....	76	943
.....	Amherstburg	Port Colborne...	Lake Erie.....	232	1175
Niagara river...	Port Colborne.....	Port Dalhousie..	Welland Canal	27	1202
.....	Port Dalhousie.....	Kingston.....	Lake Ontario.....	170	1372
St. Lawrence..	Kingston	Prescott.....	Head of canal section.....	59	1431
	Prescott.....	Montreal	St. Lawrence Canal Section..	119	1550
	Montreal	Three Rivers....	Head of ocean navigation to head of tidal flow..	86	1636
	Three Rivers.....	Quebec.....	Head of tidal flow to Quebec	74	1710
	Quebec.....	Cape Chat.....	.....	266	1976
	Cape Chat.....	Cape Gaspé.....	Mouth of river St. Lawrence.....	124	2100
.....	Cape Gaspé	Belle Isle[2].....	Mouth of the Gulf of St. Lawrence.....	436	2536

Lake Huron.

Lake Huron is 270 miles long and 105 broad and has an area of 23,000 square miles (the area of its basin, including the lake, being 74,000), a mean depth variously stated at from 700 to 1000 feet, and an altitude above the sea of 574 feet. Georgian Bay on the northeast lies entirely within the region of Canada, whilst Thunder Bay and Saginaw Bay on the west and southwest are in the State of Michigan. The north and northeast shores of Lake Huron are mostly composed of sandstones and limestones, and where metamorphic rocks are found the surface is broken and hilly, rising to elevations of 600 feet or more above the lake, unlike in this respect the southern shores skirting the peninsulas of Michigan and southwestern Ontario, which are comparatively flat and of great fertility. As in Lake Superior, regular terraces corresponding to former water-levels of the lake run for miles along the shores of Lake Huron at heights of 120, 150, and 200 feet; and deposits of fine sand and clay containing freshwater shells rise to a height of 40 feet or more above the present level of the water. At several places these deposits extend to a distance of 20 miles inland. The chief tributaries of the lake on the Canadian side are the French river from Lake Nipissing, the Severn from Lake Simcoe, the Muskoka, and the Nottawasaga, all emptying into Georgian Bay; and on the United States side the Thunder Bay river, the Au-Sable, and the Saginaw.

Lake Michigan.

Lake Michigan is entirely in the territory of the United States. It has a maximum breadth of 84 miles and its length is 345 miles from the northwest corner of Indiana and the north part of Illinois to Mackinaw, where it communicates with Lake Huron by a strait 4 miles wide at its narrowest part. Its depth is variously stated at from 700 to 1800 feet. Its altitude above sea-level is 578 feet. Its basin is 70,040 square miles in area, of which the lake occupies 22,400. Five of its tributaries are from 135 to 245 miles in length. The country round Lake Michigan is for the most part low and sandy. The rocks are limestones and sandstones of the Sub-carboniferous groups, lying in horizontal strata and never rising into bold cliffs. Along the south shore are post-tertiary beds of clay and sand lying a few feet above the level of the lake, the waters of which probably at one time found their way by the valleys of the Illinois and the Mississippi into the Gulf of Mexico.

Chicago (population, 503,185 in 1880) is situated at the southwest angle of the lake. In the receipt and shipment of grain and pork it is the largest market in the world. In 1883 12,015 vessels with a tonnage of 3,980,837 tons cleared from the harbor. Comparing the decades of 1864–73 and 1874–83 the total export in quarters of wheat and corn from Chicago was as follows:

	Lake.	Rail.	Total.
1864–73.....	43,884,196	6,328,337	52,212,533
1874–83.....	66,265,175	27,342,140	93,607,315
	110,149,371	33,670,477	143,819,848

In 1883 the export of grain by the lakes amounted to 6,850,722 quarters, of which 68.1 per cent. were shipped direct to Buffalo and only 6.3 per cent. to Kingston and Montreal) as against 3,146,000 sent by rail. The first appropriation for the harbor of Chicago, made in 1883,[3] was expended in cutting a straight outlet from the Chicago river into the lake. The available depth was only 2 feet,

[1] Lake Nipigon is situated 50 miles to the north of Lake Superior, into which it drains by the river Nipigon; it is still very little known except from the report of Professor Bell of the Geological Survey. It is 313 feet above the level of Lake Superior, and in some parts is upwards of 500 feet in depth. The lake is thickly studded with islands; its shores are undulating and sometimes hilly; and owing to its numerous indentations its coast-line measures 580 miles.

[2] The distance from Belle Isle to Liverpool is 2234 statute or 1942 geographical miles.

[3] [This cutting or canal connecting Lake Michigan and the Illinois river was first opened in 1848.—AM. ED.]

but since then the harbor accommodation has been extended, by means of piers, dredging, and a breakwater, to accommodate vessels of 14 feet draught.

The harbor works at Chicago, as well as at other lake and river ports, are constructed simply of cribs or boxes, composed of logs 12 by 12 inches, filled with stone, and joined to each other, after they have finally settled down, by a continuous timber superstructure raised a few feet above the level of the water. On this plan breakwaters, piers at the mouths of rivers, and wharves have been built within the last sixty years at the most important points along the shores of the St. Lawrence lakes, as well as at most of the river harbors communicating with the Atlantic; and experience has proved that no cheaper and better system could have been devised for such localities.

St. Clair river and lake.

The St. Lawrence leaves Lake Huron by the St. Clair river at Sarnia, and after a course of 33 miles enters Lake St. Clair, 25 miles long, and terminating at the head of the Detroit river, near the city of Detroit in Michigan. Eighteen miles farther on the St. Lawrence, with a descent of 11 feet, enters Lake Erie. The navigation through the St. Clair river is easy throughout, but in Lake St. Clair there are extensive sandbanks covered with a depth of water varying from 6 to 10 feet. Previous to 1858 much inconvenience was experienced in navigating the lake owing to its insufficient depth; but at the end of that year the Governments of the United States and Canada dredged a canal through the bed of the lake, which is of soft material, to a minimum depth of 12 feet, with a width of 300 feet. This channel has since been deepened to 16 feet over a width of 200 feet, and works are now in progress to deepen the rocky shoal called the "Lime-Kiln Crossing" in the Detroit river to 18 feet, to enable vessels drawing 15 feet to pass with safety from lake to lake in stormy weather.

Lake Erie.

The peculiar features of Lake Erie are its shallowness and the clayey nature of its shores, which are generally low. The south shore is bordered by an elevated plateau, through which the rivers, which are without importance as regards Lake Erie, have cut deep channels. The mean depth of the lake is only 90 feet and its maximum depth 204. Owing to its shallowness it is easily disturbed by the wind, and is therefore the most dangerous to navigate of all the great lakes. Its length is 250 miles and its greatest breadth 60. The area of the basin of Lake Erie is 39,680 square miles, including 10,000 square miles, the area of the lake. Its waters are 564 feet above the sea and 330 above Lake Ontario. The extreme difference observed in the level of the lake between 1819 and 1838 was 5 feet 2 inches, but the average annual rise and fall (taken on a mean of twelve years) is only 1 foot 1½ inches. The mean annual rainfall is 34 inches. The navigation of Lake Erie usually opens about the middle of April and closes early in December. Besides the Erie and the Welland Canals, the lake has two other great canal systems on its south shore—the Ohio and Erie Canal, from Cleveland to Portsmouth, and the Miami and Erie Canal, from Toledo to Cincinnati.

Buffalo (population, 171,500 in 1883) is situated at the northeast angle of Lake Erie, and is therefore much exposed to the violence of southwest winds, in which direction the lake has a "fetch" of 200 miles. Thus more than ordinary care has been taken to provide safe harbor accommodation for the large fleets of vessels constantly arriving at Buffalo from the upper lakes. The Buffalo river, which has been made navigable for more than a mile, is protected at its mouth by a breakwater, 4000 feet long, built at about half a mile from the shore. The harbor thus formed allows of the entrance of vessels of 17 feet draught as against 13 in 1853. Not only is the port situated at the head of the Erie Canal and within an hour's sail of the Welland Canal, but it is the western terminus of the New York Central, Erie, and several other railways. The possession of these exceptional advantages has constituted Buffalo a great commercial centre of the inland seas of North America. For the six years ending 1883 the yearly average shipments of wheat and corn received by lake at Buffalo, by the Erie Canal, and by rail from elevators was 5,555,000 quarters by canal and 2,320,000 by rail, or 70.20 and 29.80 per cent. respectively. There are 38 elevators in the city, comprising storage, transfer, and floating elevators, with a combined storage capacity of 1,125,000 quarters and a daily transfer capacity of 333,000 quarters. During the ten years ending 1883 the annual average number of lake vessels arriving and departing from Buffalo Creek numbered 7438, the aggregate tonnage was 4,165,098 tons, and the average size of craft 560 tons.

In 1883 the enrolled tonnage of the United States vessels for the northern lakes, and the enrolled registered tonnage of steam and sailing vessels in the province of Ontario, including tugs and barges on the Ottawa river and barges at Kingston, were as follows (Table II.):

	United States.		Canada.	
	No.	Aggregate Tonnage.	No.	Aggregate Tonnage.
Sailing vessels.....	1373	310,454	452	44,000
Steam vessels.....	1149	304,649	352	64,000
	2522	615,103	804	108,000

Freight propellers are now rapidly doing away with sailing vessels, or causing them to be converted into barges or consorts. The rapid increase in their tonnage capacity has been remarkable. In 1841 there was only 1 freight propeller with a tonnage of 128 tons; in 1850 there were 50 with an average of 215 tons; in 1860 there were 197 with an average of 340 tons, and in 1880 there were 202 with an average of 689 tons.

Erie Canal.

The Erie Canal connects Lake Erie with the Hudson river at Troy and Albany and with Lake Ontario at Oswego. The movement of freight of all kinds by the canal was 3,602,535 tons in 1873, and 3,587,102 in 1883, and the average annual movement from 1874 to 1883 was 3,447,464 tons. This canal was constructed in 1825 by the State of New York, for the passage of vessels of 60 tons; but by the year 1862 it was sufficiently enlarged to allow of the passage of vessels of 240 tons. The dimensions and capacity of the canal and its two principal feeders are given in Table III.:

Locality.	Length in Miles.	Size of Canal.			No. and Size of Locks.			Rise of Lockage.
		Width on Surface.	Width on Bottom.	Depth of Water.	No. of Locks.	Length.	Width.	
		Ft.	Ft.	Ft.		Ft.	Ft.	Ft.
Buffalo to Albany.....	351	70	56	7	72	110	18	655
Oswego to Syracuse.....	38	70	56	7	18	110	18	155
Lake Champlain to Albany	66	50	35	5	20	100	18	180
	455							
Albany to New York by the Hudson river.....	145							

The cost of construction, maintenance, and management of the 455 miles of canal up to 30th September, 1873, amounted to £17,460,000 [$84,855,600]. A project has for some time been under serious consideration for the enlargement of one tier of the present locks and the deepening of the canal so that between Buffalo and Albany there would nowhere be a less depth than 8 feet. The estimated cost of this work is about £1,600,000 [$7,776,000].

Welland Canal.

The Welland Canal flanks the Niagara river and is 27 miles in length from Port Colborne on Lake Erie to Port Dalhousie on Lake Ontario. It was opened in 1833 for the navigation of small vessels and was first enlarged in 1844. Vessels, however, continued to increase in size until in 1860 there were 341 with an aggregate tonnage of 143,918 tons which were unable to pass through the enlarged canal. In 1870 the number that could not pass had increased to

384, with an aggregate tonnage of 194,685 tons; in 1880 to 460, with an aggregate tonnage of 287,342 tons; and in 1883 (notwithstanding the completion of the second enlargement in 1882) to 557, with an aggregate tonnage of 398,808 tons. The cost of the canal including its maintenance up to 30th June, 1883, was $20,859,605. Its dimensions are now as follows: number of lift locks, 25; dimensions, 270 by 45 feet; total rise of lockage, 326¾ feet; depth of water on sills, 12 feet. The movement of freight of all kinds by the canal was 1,330,629 tons in 1873, and 827,196 in 1883, and the average annual movement for the decade ending 1883 was 986,441 tons. This serious falling off in traffic is partly due to the numerous competitors by lake and rail which have sprung up during the last ten years for the transportation of products to the east, but principally to the deepening of the channels and harbors of the upper lakes, a work that has encouraged the construction of a class of vessels that cannot make use of the Welland Canal even after its last enlargement. In order to meet this strong competition the Government of the Dominion of Canada was called upon still further to deepen the canal, so as to allow the passage of the largest existing lake vessels without lightering; and in 1886 contracts were concluded for deepening it to 14 feet.

River Niagara.

The Niagara river flows from Lake Erie to Lake Ontario in a northerly direction. Its width between Buffalo and Fort Erie (the site of the international iron-trussed railway bridge; see sketch map of Niagara river in vol. xvii. p. 485) is 1900 feet and its greatest depth 48. At this point the normal current is 5½ miles an hour,—the extreme variation in the level of the river when uninfluenced by the wind being only 2 feet. During south-west gales, however, the water occasionally rises as much as 4 feet in a few hours, and at such times the current attains a maximum velocity of 12 miles an hour. Two miles below the bridge the river is divided into two arms by Grand Island, at the foot of which they reunite and spread over a width of 2 or 3 miles. The river then becomes studded with islands, until about 16 miles from Lake Erie, after a total fall of 20 feet, it narrows again and begins to descend with great velocity. This is the commencement of the rapids, which continue for about a mile with a total descent of 52 feet. The rapids terminate in the great cataract of Niagara, the fall of which on the American side is 164 feet and on the Canadian side 150 feet. The falls are divided by Goat Island, which rises 40 feet above the water and extends to the very verge of the precipice, where the total width of the river, including the island, is 4750 feet. The Horse-Shoe Fall on the Canadian shore is 2000 feet long, and the depth of water on the crest of the fall is about 20 feet. The American fall is only one-half that length, and discharges less than one-fourth the volume of the Horse-Shoe Fall. United, they discharge nearly 400,000 cubic feet per second or 41,000,000 tons per hour. The upper layer of the escarpment down which this enormous mass of water leaps consists of hard limestone about 90 feet thick, beneath which lie soft shales of equal thickness, which are continually being undermined by the action of the spray, driven violently by gusts of wind against the base of the precipice. In consequence of this action and that of the frost, portions of the incumbent rock overhang 40 feet, and often, when unsupported, tumble down, so that the falls do not remain absolutely stationary in the same spot. Sir C. Lyell in 1842 came to the conclusion that the cataract was receding at an average rate of 1 foot annually, "in which case it would have required 35,000 years for the retreat of the falls from the escarpment at Queenstown to their present site." From the foot of the falls to Queenstown, a distance of about 7 miles, the river descends 104 feet through a gorge from 200 to 300 feet deep and from 600 to 1200 feet wide. Midway in this deep defile the turbulent waters strike against the cliff on the Canadian side with great violence, and, being thus deflected from west to north, give rise to the dangerous eddy called the "Whirlpool." The escarpments end abruptly at Queenstown, where the waters suddenly expand to a great width, and finally, 7 miles farther on, tranquilly flow into Lake Ontario.

About one-third of a mile below the cataract a carriage-road suspension bridge (built in 1869 by Mr. Samuel Keefer) spans the river with a single opening of 1190 feet, at a height of 190 feet above the water; and 2 miles lower down Roebling's celebrated railway and road suspension bridge (completed in 1855) crosses the river at a height of 245 feet above the water with a single span of 800 feet. In November, 1883, a double-track railway three-span iron and steel cantilever bridge, situated about 100 yards above Roebling's bridge, was completed for the New York Central and Michigan Central Railways. The total length of the bridge is 910 feet and that of the centre span 470 feet. The height from the water to the level of the rails is 239 feet.

Lake Ontario.

Lake Ontario is the easternmost and smallest of the great lakes of the St. Lawrence system. Its basin drains 29,760 square miles, including the lake surface of 6700 square miles. The length of the lake is 190 miles, its greatest width 52 miles, its mean depth 412 feet, and its elevation above the sea 234 feet. It never freezes except near the shore. Its chief tributaries are the Trent on the north shore and the Genesee and the Oswego on the south shore, and its chief ports, Toronto, the capital of Ontario, 32 miles north of Port Dalhousie, at the foot of the Welland Canal; Oswego, at the southeast angle of the lake; and Kingston, at its northeast extremity, 52 miles north of Oswego.

Trent river navigation is a term applied to a series of reaches which do not, however, form a connected system of navigation, and which in their present condition are efficient only for local use. The series is composed of a chain of lakes and rivers extending from Trenton, at the mouth of the Trent on the Bay of Quinté, north shore of Lake Ontario, to Lake Huron. The new works (which will have locks 134 feet by 33 feet with a depth of 5 feet on sill) will give communication between Lakefield, 9½ miles from Peterboro, and Balsam Lake, the headwaters of the system, opening up a total of about 150 miles of direct and lateral navigation.

The port of Oswego has been in direct communication with the Hudson river since 1822, by means of a canal of small capacity as far as Syracuse, and thence by the Erie Canal to Troy and Albany. It is now proposed by the United States Government to enlarge this route under the name of the Oneida Ship Canal, so that vessels arriving from the Welland Canal with cargoes of 50,000 bushels of wheat may be able to tranship them at Oswego into steam barges holding 25,000 bushels, or into barges to be towed with a capacity of 28,000 bushels. The length of the proposed route by the Oneida Lake and Durhamville is 200 miles, with a lockage of 609 feet; and its estimated cost, including 20 ascending and 47 descending locks (each 170 by 28 by 8½ feet), is $25,213,857. The Government of the Dominion of Canada has also under consideration the following projects to connect the St. Lawrence with Lake Huron: (1) the Ottawa and Georgian Bay Canal, from Montreal, by the Ottawa and Lake Nipissing, to French river; (2) the Toronto and Georgian Bay Canal, by way of Lake Simcoe; (3) the Hur-Ontario Canal, from Hamilton to Lake Huron, near Port Franks.

Kingston to Montreal.

Kingston, being the port of transhipment for Montreal of three-fourths of the grain that arrives from the upper lakes, is a place of some commercial importance. Formerly lake vessels were sent from Chicago to Montreal through the St. Lawrence canals without breaking bulk. But it was afterwards found cheaper to transfer grain at Kingston, and to send it down the St. Lawrence in barges, the cost of such transfer being only half a cent per bushel. Kingston is also at the south terminus of the Rideau Canal, which connects it with the city of Ottawa.

This canal, 126 miles long, has 33 locks ascending 292 feet and 14 descending 165, and admits vessels 130 by 30 feet drawing 4½ feet of water. It was constructed in 1826–32 by the British Government at a cost of about $4,000,000, chiefly with a view to the defence of the province, but since the opening of the St. Lawrence canals it has become of com-

paratively little importance as a means of transport,—the distance from Montreal to Kingston being 68 miles longer by the Rideau and Ottawa Canals than by the St. Lawrence.

Almost immediately after leaving Kingston that part of the St. Lawrence commences which is called the Lake of a Thousand Islands. In reality they number 1692, and extend for 40 miles below Lake Ontario. At this point the Laurentian rocks break through the Silurian, and reach across the St. Lawrence, in this belt of islands, to unite with the Laurentian Adirondack region in the State of New York. Near Prescott, a town on the Canadian side about 60 miles below Kingston, begins the chain of the St. Lawrence canals proper, which were constructed to overcome a total rise of 206½ feet,—the number of locks being 27 and the total length of the six canals 43½ miles.

The canals are called, in the order of their descent, the "Galops," "Rapide Plat," and "Farran's Point," with an aggregate length of 12½ miles (the three forming with their intervening 15 miles of river navigation what is called the Williamsburg Canals), the "Cornwall," 11½ miles long, the "Beauharnois," connecting Lakes St. Louis and St. Francis, 11¼ miles long, and the "Lachine," 8½ miles long. The locks of the first five canals, constructed in 1845–48, are 200 feet in length, with a depth of from 7 to 10 feet on their sills at exceptionally low water, and, with the exception of the "Galops" and "Cornwall," which are 55 feet wide, their width is 45 feet. The Lachine Canal was begun in 1821 and completed in 1824 for the navigation of vessels drawing 4½ feet, but it was not until 1843–48 that it was widened and deepened to the dimensions of the upper canals. It has lately been still further enlarged, and is already provided with locks 270 by 40 feet, with an available depth of 14 feet. The canal was closed on 1st December, 1882, and opened on 1st May, 1883,—the navigation having been interrupted as usual by the ice for a period of five months. The cost to the provincial and Dominion Government of the six canals, including their maintenance to 30th June, 1883, was $14,454,508. The five upper canals are now being enlarged to the dimensions of the improved Lachine Canal.

Near Cornwall, on the left bank, 50 miles below Prescott, the intersection of the parallel of 45° determines the point where the St. Lawrence and its lakes (Lake Michigan excepted), having been an international boundary from the head of Lake Superior, become exclusively Canadian. Immediately below Cornwall the river flows through Lake St. Francis, which has a length of about 30 miles and a width varying from 2 to 5 miles. In the long reach of the river below the lake it has been calculated by the Canadian canal commissioners that the mean volume of water discharged is 510,000 cubic feet per second. Ten miles below the foot of Lake St. Francis, near the head of the island of Montreal, the river flows into Lake St. Louis, which receives the main body of the Ottawa river, a small fraction of whose waters is delivered into the St. Lawrence at the foot of the island 35 miles lower down the stream.

Ottawa river.

The Ottawa river, which is 600 miles long, drains 60,000 square miles, and contributes a volume of 90,000 cubic feet per second to the St. Lawrence, of which it is the largest tributary. Between Lake St. Louis and the city of Ottawa, the capital of the Dominion, and perhaps the largest market for lumber in the world, the St. Anne's lock (23½ miles from Montreal), Carillon Canal, Chute-à-Blondeau Canal, and the Grenville Canal (63½ miles from Montreal) have been constructed, and are now enlarged to 200 by 45 feet, with a depth of 9 feet on their sills, except the Chute-à-Blondeau Canal, whose single lock has still its original dimensions of 130 by 32 feet with only 6 feet on its sill. The total lockage between the Lachine Canal and Kingston by the Rideau Canal (the entrance to which is 119½ miles from Montreal) is 509 feet (345 rise, 164 fall) and the number of locks is 55. On the upper Ottawa—the Culbute Canal and L'Islet rapids—there are two locks 200 feet long, 45 wide, and 6 deep, with a lift of 18 to 20 feet. The cost of the Ottawa canals, including the Rideau Canal, to 30th June, 1883, was $9,126,125.

After leaving Lake St. Louis the St. Lawrence dashes wildly down the Lachine rapids, a descent of 42 feet in 2 miles, and 8 miles farther on, after passing beneath the 25 spans of the Victoria Tubular Railway Bridge, which has a length of 9144 feet, reaches the quays of Montreal, 198 miles below Kingston. In the beginning of the present century vessels of over 300 tons burden were unable to reach the city, but by deepening Lake St. Peter and the shoals in the St. Lawrence between Quebec and Montreal the latter has been made accessible to vessels of 4000 tons burden and drawing 25 feet of water. Work is being steadily continued and will not cease until a depth of 27½ feet is attained, so as to enable the largest vessels afloat to reach the long stretch of new deep-water quays. In 1883 the tonnage of the 660 sea-going vessels which visited the port was 664,263 tons, of which 605,805 belonged to 264 steamships, so that only 9 per cent. of the freight arriving from sea was carried in sailing vessels. The St. Lawrence has an average width of 1¾ miles for 46 miles from Montreal down to Sorel on the right bank, at which point it is joined by the Richelieu river, a tributary that drains 9000 square miles.

Montreal.

The Richelieu river is made navigable from its mouth to Lake Champlain, a distance of 81 miles to the United States boundary, by a dam and lock at St. Ours, half a mile long (14 miles above Sorel), and a canal of 12 miles in length 32 miles farther up the river, known as the Chambly Canal. These give a navigable depth of 7 feet, allowing vessels 114 feet long, 23 broad, and drawing 6½ feet of water, to pass through the canal from end to end. The cost of the works to 30th June, 1867, was $756,249. The total length of navigation between Montreal and New York by the Richelieu Canal, Lake Champlain, the Champlain and Erie Canal, Albany, and the Hudson river is 456 miles. The Richelieu Canal, which already carries a freight of 350,000 tons annually, is to be enlarged, and a canal is to be constructed from Lake St. Louis at Chaughnawaga, above Lachine, to St. Johns on the Richelieu river, in connection with the Chambly Canal, to connect the St. Lawrence with Lake Champlain by a new channel, which it is proposed should have the same dimensions as the improved Welland Canal. The cost of the proposed Chaughnawaga Canal, which would have a length of 32 miles and a lockage of only 29 feet, is estimated at $5,500,000.

Richelieu river and canal.

Immediately below Sorel the river flows into Lake St. Peter, 20 miles in length by 9 in width, through which prior to 1851 no vessel drawing more than 11 feet could pass. Since then a cutting 300 feet wide has been dredged to a depth of 25 feet. At Three Rivers, 86 miles below Montreal, the St. Lawrence first meets the tide and receives from the north the waters from the St. Maurice, which drains about 16,000 square miles. Nearing Quebec, the river, which maintains an average width of 1½ miles from Lake St. Peter, narrows into a width of three-quarters of a mile at Cape Diamond, on the left bank, 160 miles below Montreal. The depth here is 128 feet and the rise of spring tides 18 feet.

Sorel to Quebec.

The lower town of Quebec, which has extensive harbor accommodation, is built on reclaimed land around the base of the cape, one of its sides being washed by the river St. Charles, which here flows into the St. Lawrence. At the mouth of the St. Charles the Princess Louise embankment, 4000 feet long by 300 wide, encloses a tidal area of 20 acres, having 24 feet of depth at low water. Connected with it is a wet dock, which is to have a permanent depth of 27 feet with an area of 40 acres. On the opposite side, at Pointe Levis, the Lorne graving-dock is nearly completed. Its dimensions are 500 feet in length, 100 in width, and 25½ feet depth of water on its sill. During the year ending June, 1884, the departures for sea of vessels from Quebec were 698, with an aggregate burden of 686,790 tons.

The Canadian Government have sanctioned the proposal to construct a railway bridge across the St. Lawrence within a few miles of Quebec, at a point where the river narrows to a width of 2400 feet at high water. The area of the waterway at high water is 200,000 square feet and at low water 160,000. For a width of about 1400 feet in the centre of the channel the water shelves rapidly from either shore into deep water, until it attains a maximum depth of nearly 200 feet. The proposed bridge, as designed by Messrs. Brunlees, Light & Claxton Fidler, will consist of three principal spans, entirely of steel, resting on masonry piers founded on the rock. The central span will have a clear width of 1442 feet, the underside of the superstructure being 150 feet above high water.

Below Quebec.

Seven miles below Quebec the St. Lawrence is 4 miles wide and divides into two channels at the head of the Island of Orleans, nearly opposite which, on the north shore, are the celebrated falls of Montmorency, with a perpendicular descent of 240 feet and a width of 50 feet. At the foot of the island, which is 22 miles long, the river expands to a width of 11 miles. This width increases to 16 miles 90 miles farther on, at the mouth of the river Saguenay, which drains an area of 23,716 square miles. About 260 miles below Quebec, between Pointe des Monts on the north and Cape Chat on the south, the St. Lawrence has a width of 30 miles, and, as this expanse is doubled 30 miles farther seaward, Cape Chat has been considered by many geographers as the southern extremity of an imaginary line of demarcation between the St. Lawrence river and the gulf of the same name. It may, however, be assumed, with more propriety perhaps, taking the configuration of the gulf into special account, that Cape Gaspé, about 400 miles below Quebec and 430 miles from the Atlantic at the east end of the Straits of Belle Isle, is at the true mouth of the St. Lawrence river.

It has been calculated by Darby, the American hydrographer, that the mean discharge from the St. Lawrence river and gulf, from an area rather largely estimated at 565,000 square miles, must be upwards of 1,000,000 cubic feet per second, taking into account the mean discharge at Niagara, which is 389,000 cubic feet per second from a drainage area of 237,000 square miles, and bearing in mind the well-ascertained fact that the tributaries of the lower St. Lawrence, coming from mountainous woody regions where snow falls from 4 to 8 feet in depth, deliver more water per square mile than its upper tributaries.

The great prosperity and growth of Canada are owing no doubt to its unrivalled system of intercommunication by canal and river with the vast territories through which the St. Lawrence finds its way from the far-off regions of Minnesota to the seaboard. This great auxiliary of the railways (by means of which trade is now carried on at all seasons) must therefore be prominently taken into account in considering the transport routes of the future, their chief use being, as far as the conveyance of traffic over long distances is concerned, to augment, in the shape of feeders, the trade of the river, as long as it keeps open, and when it closes to continue the circulation of commerce by sledges until the ice breaks up and restores the river to its former activity. By the published statistics of the harbor commissioners of Montreal it appears that during the ten years 1870–79 the opening of the navigation at Montreal varied between 30th March and 1st May, and the close of the navigation between 26th November and 2d January, and that, whilst the first arrival from sea varied from 20th April to 11th May, the last departure to sea only varied from 21st November to 29th November during the ten years. (C. A. H.)

According to the chief geographer of the United States Geological Survey, the following were the principal data for the St. Lawrence lakes in 1886. Area of basin of St. Lawrence 457,000 square miles, of which 330,000 belong to Canada and 127,000 to the United States. *Lake Superior*—area 31,200 square miles, length 412 miles, maximum breadth 167 miles, maximum depth 1008 feet, altitude above sea-level 602 feet. *Lake Huron*—area 21,000 square miles, 263 miles long, 101 broad, maximum depth 702 feet, altitude 581 feet. *Lake Michigan*—area 22,450 square miles, maximum breadth 84 miles, length 345 miles, maximum depth 870 feet, altitude 581 feet. *Lake St. Clair*—29 miles long. *Lake Erie*—area 9960 square miles, length 250 miles, maximum breadth 60 miles, maximum depth 210 feet, height above sea-level 573 feet and above Lake Ontario 326 feet. *Lake Ontario*—area 7240 square miles, length 190 miles, breadth 54 miles, maximum depth 738 feet, elevation 247 feet. In 1885 the enrolled vessels on the St. Lawrence lakes belonging to the United States numbered 2497 (steam 1175, sailing 1322) with an aggregate burden of 648,988 tons (steam 335,859 tons, sailing 313,129 tons).

ST. LEONARDS is the name given to the western and more modern part of HASTINGS (*q.v.*), a watering-place on the coast of Sussex, England. St. Leonards proper, which formed only a small part of the district now included under that name, was at one time a separate township. The population of St. Leonards in 1881 was 7165.

ST. LEONARDS, EDWARD BURTENSHAW SUGDEN, LORD (1781–1875), lord chancellor of England, was the son of a hairdresser in Duke Street, Westminster, and was born in February, 1781. After practicing for some years as a conveyancer, he was called to the bar at Lincoln's Inn in 1807, having already published his well-known treatise on the *Law of Vendors and Purchasers*. In 1822 he was made king's counsel and chosen a bencher of Lincoln's Inn. He was returned at different times for various boroughs to the House of Commons, where he made himself prominent by his opposition to the Reform Bill of 1832. He was appointed solicitor-general in 1829, was named lord chancellor of Ireland in 1834, and again filled the same office from 1841 to 1846. Under Lord Derby's first administration in 1852 he became lord chancellor and was raised to the peerage as Lord St. Leonards. In this position he devoted himself with energy and vigor to the reform of the law; Lord Derby on his return to power in 1858 again offered him the same office, which, from considerations of health, he declined. He continued, however, to take an active interest especially in the legal matters that came before the House of Lords, and bestowed his particular attention on the reform of the law of property. He died at Boyle Farm, Thames Ditton, 29th January, 1875.

Lord St. Leonards was the author of various important legal publications, many of which have passed through several editions. Besides the treatise on purchasers already mentioned, they include *Powers, Cases decided by the House of Lords, Gilbert on Uses, New Real Property Laws*, and *Handy-book of Property Law*.

ST. LÔ, a town of France, chef-lieu of the department of Manche, on the right bank of the Vire, 195 miles west by north of Paris by the railway, which here breaks up into two branches for Coutances and Vire respectively. The old town stands on a rocky hill (110 feet high) commanding the river; the modern town spreads out below. Notre Dame is a Gothic building of the 14th century, with portal and two towers of the 15th. In the town-house is the Torigny marble, commemorating the assemblies held in Gaul under the Romans and now serving as a pedestal for the bust of Leverrier the astronomer, who was born at St. Lô. The museum has some good pictures, and in the abbey of St. Croix there are windows of the 14th century. The Champs de Mars is a fine tree-planted *place*. Horse-breeding, cloth and calico weaving, wool-spinning, currying, and tanning, are the local industries. The population in 1881 was 9889 (10,121 in the commune).

St. Lô, founded in the Gallo-Roman period, was originally called Briovira (bridge on the Vire), and afterwards St. Étienne, the present name being from one of its bishops (Lo, Laudus), who lived in the 6th century. By the time of Charlemagne the town was already surrounded with walls and contained the abbey, which was sacked by the Normans. In 1141 it fell into the hands of Geoffrey Planta-

genet. But in 1203 the castle opened its gates to Philip Augustus, and, weaving being introduced, St. Lô soon became a flourishing industrial centre. In the middle of the 14th century Edward III. of England captured the town and according to Froissart obtained immeuse booty. It was again taken by the English in 1417, but the victory of Formigny (1450) restored it permanently to France. The hearty welcome it gave to the Reformatiou brought upon St. Lô new disasters and new sieges. The revocation of the Edict of Nantes led to the emigration of a part of the inhabitants. In 1800 the town was made the centre of the department, but by Napoleon's orders it was deprived of its fortifications.

ST. LOUIS, the capital of Senegambia or Senegal, West Africa, and known to the natives as far as Timbuktu as N'dar, is built on an island 10 sea-miles above the mouth of the Senegal river, near the right bank, which is there a narrow strip of sand —the Langue de Barbarie—occupied by the villages of N'dar Toute and Guet N'dar. Two bridges on piles connect the town with the villages; and the Pont Faidherbe, 2132 feet long and constructed in 1863, affords communication with Bouetville, a suburb and the terminus of the railway, on the left bank. The houses of the European portion of St. Louis have for the most part flat roofs, balconies, and terraces. Besides the governor's residence the most prominent buildings are the cathedral, the great mosque, the court-house, and the various barracks and offices connected with the army. The town also contains the Senegal bank (1855), a Government printing-office (1855), a chamber of commerce (1869), a public library, and an agricultural society (1874). The round beehive huts of Guet N'dar are mainly inhabited by native fishermen. N'dar Toute consists of villas with gardens, and is frequented as a summer watering-place. There is a pleasant public garden in the town, and the neighborhood is rendered attractive by alleys of date-palms. As there are no natural wells on the island, and the artesian well at the north side of the town gives only brackish water, St. Louis used to be dependent on rain-tanks and the river (and except during the rainy season the water in the lower part of the river is salt); but in 1879 1,600,000 francs [$308,800] were appropriated to the construction of a reservoir at a height of 300 feet above the sea, 7½ miles from the town. The mouth of the Senegal being closed by a bar of sand with extremely shifting entrances for small vessels, the steamships of the great European lines do not come up to St. Louis, and passengers, in order to meet them, are obliged to proceed by rail to Dakar, on the other side of Cape Verd. Ordinary vessels have often to wait outside or inside the bar for days or weeks and partial unloading is often necessary. It is proposed to construct a pier opposite Guet N'dar. The population of St. Louis was 15,980 in 1876, and 18,924 in 1883. Though founded in 1662, the town did not receive a municipal government till August, 1872. See SENEGAL.

ST. LOUIS, a city of the United States, chief city of the State of Missouri, is situated on the west bank of the Mississippi river, 20 miles below its confluence with the Missouri river and 200 miles above the influx of the Ohio, in 38° 38′ 3.6″ N. lat. and 90° 12′ 17″ W. long. It is distant by river about 1200 miles from New Orleans, and 729 from St. Paul at the head of navigation on the Mississippi, and occupies a position near the centre of the great basin through which the mingled flood of the Mississippi and Missouri and their extensive system of tributaries is carried to the Gulf of Mexico. The site embraces a series of undulations extending westwards with a general direction nearly parallel to the river, which at this point makes a wide curve to the east. The extreme length in a straight line is 17 miles, the greatest width 6.60 miles, the length of river front 19.15 miles, and the area (including considerable territory at present suburban in character) 62½ square miles. The elevation of the city directrix above the waters of the Gulf of Mexico is 428 feet, that of the highest point of ground in the city above the directrix is 203 feet; the extreme high-water mark above the directrix is 7 feet 7 inches, and the extreme low-water mark below the same is 33 feet 9¾ inches. The elevated site of the city prevents any serious interruption of business by high water, even in seasons of unusual floods.

The plan of the city is rectilinear, the ground being laid out in blocks about 300 feet square, with the general direction of street lines north-south and east-west. The wharf or river front is known as the Levee or Front Street, the next street west is Main Street, and the next Second, and thence the streets going north-south are, with few exceptions, in numerical order (Third, Fourth, etc.). Fifth Street has recently been named Broadway. The east-west streets bear

FIG. 1.—Plan of St. Louis (Central Part).

1. Four Courts.
2. City Hall.
3. Exposition Building.
4. Custom House.
5. Washington University.
6. Court House.
7. Union Depôt.
8. First Presbyterian Church.
9. Temple of the Gates of Truth.
10. St. Peter and Paul Church.
11. Lindell Hotel.
12. Southern Hotel.

regular names (Chestnut, Pine, Washington, Franklin, and the like). Market Street is regarded as the middle of the city, and the numbering on the intersecting streets commences at that line, north and south respectively. One hundred house numbers are allotted to each block, and the blocks follow in numerical order. The total length of paved streets in St. Louis is 316 miles, of unpaved streets and roads 427, total 743 miles. In the central streets, subject to heavy traffic, the pavement is of granite blocks; wood, asphalt, and limestone blocks and Telford pavements are also used. There are nearly 300 miles of macadamized streets, including the roadways in the new limits. The length of paved alleys is about 66 miles. The city has an extensive sewer system (total length 223 miles), and, owing to the elevation of the residence and business districts above the river, the drainage is admirable. The largest sewer, Mill Creek (20 feet wide and 15 feet high), runs through the middle of the city, from west to east, following the course of a stream that existed in earlier days. The water-supply is derived from the Mississippi; the water is pumped into settling basins at Bissell's Point, and thence into the distributing pipes, the surplus flowing to the storage reservoir on Compton Hill, which has a capacity of 60,000,000 gallons. The length of water-pipe is nearly 250 miles; the capacity of the low-service engines which pump the water into the settling basins is 56,000,000 gallons in twenty-four hours, and that of the high-service engines which supply the distributing system 70,000,000 gallons. The average daily consumption in twenty-four hours is nearly 28,000,000 gallons. The works, which are owned by the city, cost over $6,000,000. Among the more important public buildings are the new custom-house and post-office, erected at a cost of over $5,000,000; the merchants' exchange, which contains a grand hall 221 feet 10 inches in length by 62 feet 10 inches in width and 60 feet in height; the court-house, where the civil courts hold their sessions; the four courts and jail, in which building are the headquarters of the police department and the chambers of the criminal courts; the cotton exchange; the new exposition and music-hall building on Olive Street, erected by public subscription; and the Crow Museum of Fine Arts. The present city hall is a large but hardly ornamental edifice. The mercantile library, on Fifth and Locust Streets, contains nearly 65,000 volumes and also a valuable art collection. The public school library in the polytechnic building has about 55,000 volumes. There are six handsome theatres and various other smaller places of amusement. The public school system of St. Louis includes the kindergarten (for which St. Louis has become somewhat celebrated), the grammar-schools (including eight grades, of a year each), and a high school, besides the normal school and a school for deaf mutes. The public schools naturally absorb much the largest number of pupils; but the parochial schools and the private schools gathered about the Washington university are also much frequented. The number of pupils in 1883–84 was in the normal school 64, high school 783, grammar-schools 52,280, total in day schools 53,127; total in day and evening schools 56,366. The total number of public school buildings is 104, and the value of property used for school purposes $3,229,148; all the school edifices are substantial and convenient, and many architecturally attractive. The receipts of the public school system for 1884 were $941,332, and the total expenditure $934,609, the amount paid to teachers being $632,873. Of parochial schools there are about 75. The Washington and St. Louis universities are old and well established institutions. There are also the Mary Institute and the manual training school, both connected with Washington university, the college of the Christian Brothers, convent seminaries, and numerous medical colleges. In addition there are art schools, singing and gymnastic societies, and other similar organizations and establishments. There are published in St. Louis four daily newspapers in English and four in German, and also a number of weekly publications.

There are 16 Baptist churches, 8 Congregational, 13 Episcopal, 25 German Evangelical and Lutheran, 6 Hebrew congregations, 18 Methodist Episcopal, 8 Methodist Episcopal Church (South), 25 Presbyterian, 45 Roman Catholic, and 3 Unitarian. Many of the buildings are of imposing proportions, built of stone, massive in character, and with lofty spires. The Roman Catholic cathedral, built in 1830, is the oldest church now in use. On the high ground in the central-western portion of the city (Stoddard's Addition) will be found most of the costly church buildings, whilst in the northern and southern portions of the city there are very few indeed.

The parks and squares of St. Louis number 19, covering nearly 2100 acres. Tower Grove Park, in the southwestern suburbs, containing about 266 acres, was presented by Mr. Henry Shaw. The smaller parks are situated to the east of Grand Avenue, and the driving parks in the suburbs,—O'Fallon's Park (158 acres) at the northern extremity of the city, Forest Park (1372 acres) west of the central portion, Tower Grove in the southwest, and Carondelet (180 acres) in the south. In the immediate vicinity of Tower Grove Park are the Missouri Botanical Gardens, established by Mr. Henry Shaw, and containing the most extensive botanical collection in the United States. In addition to the parks, the Fair Grounds in the northwest should be mentioned, where the annual fair is held, and where there is a permanent zoological department. An amphitheatre, capable of seating between 20,000 and 30,000 spectators, and a race-course with a most elaborate grand stand, are among the other features. There are various beer-gardens in the city, largely frequented as pleasure-resorts. There are about 120 miles of street railways in operation.

The following table shows the population of St. Louis at different periods:

1799	925	1856	125,200
1810	1,400	1866	204,327
1820	4,928	1870 (United States census)	310,864
1830	5,862	1880	350,518
1840	16,469		
1850	74,439		

The figures of the United States census are strictly confined to municipal limits, and do not include the residents of East St. Louis and of various suburban localities, properly a part of the city population. In 1880 the population (179,520 males, 170,998 females) was divided as follows: native, 245,505; foreign-born, 105,013. Of the latter 36,309 came from Great Britain (28,536 Irish) and 54,901 from Germany. The death-rate per thousand in 1882 was 19.6, and in 1883 it was 20.4, and in 1885 (population being estimated at 400,000) it was 19.7.

The police force, including detectives and employés, numbers about 500 men. The fire brigade numbers 250 men, with 22 engine-houses. The city has three public hospitals, an asylum for the insane, a poorhouse, a workhouse for the confinement and employment of prisoners charged with petty offences, and a house of refuge which is a reformatory institution for juvenile offenders and for the education of children thrown upon the care of the city by abandonment or otherwise. The number of asylums, hospitals, and other institutions supported by private charity is very large.

Government and Finance.—St. Louis is not included in any county of the State, but exists as a separate municipality. It was formerly embraced in St. Louis county, and was within the jurisdiction and taxing power of a city and county government. The State constitution was revised in 1875 and two years later the separation of the city and the county government was effected, the former being reorganized under the present charter. The city levies and collects municipal and State revenues within its limits, and manages its own affairs, free from all outside control, except that of the legislature of the State. The voters of the city have the right to amend the charter at intervals of two years at a general or special election,—provided the pro-

posed amendments have been duly sanctioned and submitted to the people by the municipal assembly. The legislative power of the city is in the hands of a council and a house of delegates, styled collectively the municipal assembly. The council is composed of thirteen members, elected for four years by the voters of the city generally, and the house of delegates consists of one member from each of the twenty-eight wards, elected for two years. The following officers are elected for a term of four years: mayor, comptroller, auditor, treasurer, registrar, collector, recorder of deeds, inspector of weights and measures, sheriff, coroner, marshal, public administrator, president of the board of

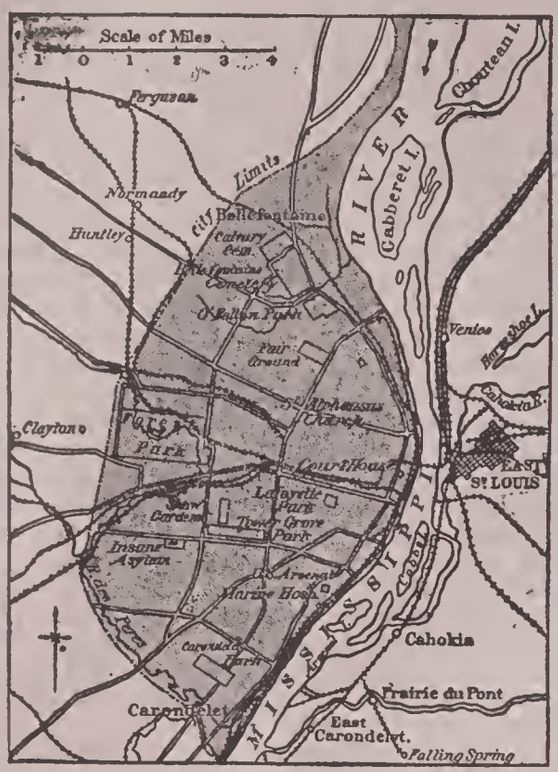


FIG. 2.—St. Louis and environs.

assessors, and president of the board of public improvements. The elective officers, including the members of the board of public improvements, are nominated by the mayor and approved by the council, and the appointments are made at the beginning of the third year of the mayor's term, so as to remove the distribution of municipal patronage from the influences of a general city election. The power of the mayor and council touching appointments to office and removals is subject to certain reciprocal checks.

The bonded debt of St. Louis at the close of the fiscal year, 13th April, 1885, was $22,016,000. This debt is reduced each year by the operation of the sinking fund. The city has no floating debt. The receipts for the fiscal year ending 13th April, 1885, deducting proceeds of revenue bonds and special deposits, were $5,659,086, or with balance in treasury at opening of year $6,514,877. The total expenditure was $5,681,557. The city tax rate for the year 1884 was $1.75 on the $100. During the last few years the rate of interest on the bonded debt has been reduced from 6 and 7 per cent. to 5 per cent., and more recently to 4 per cent. Most of the outstanding bonds are held in England and Germany. All appropriations are rigidly limited to the available means, and the increase of the bonded debt is forbidden by law. In 1860 the taxable valuation was $69,846,845, in 1870 it was $147,969,660, in 1880 $160,493,000, and in 1885 $207,910,350.

Commerce.—Subjoined are a few of the more important facts and figures respecting the commerce of St. Louis. In 1884 there were 6,440,787 tons of freight received by rail and 520,350 by river, making a total of 6,961,137 tons. In the same year there were shipped by rail 3,611,419 tons and by river 514,910 tons (total 4,126,329). The total receipts of grain for 1884, including wheat reduced to flour, were 52,776,832 bushels, as against 51,983,494 bushels in the previous year. During 1884 the amount of flour manufactured was 1,960,737 barrels, and the amount that changed hands 4,757,079 barrels; 302,534 bales of cotton, 19,426 hogsheads of tobacco, and 118,484,220 lb of sugar were received; and 193,875,479 lb of pork in various forms were shipped. There are thirteen tobacco manufactories, with a production in 1884 of 22,631,104 lb. In live stock, lumber, hides, wool, salt, lead, and a long list of other commodities the business is large and increasing. Extensive stock-yards are established in the northern part of the city, and also in East St. Louis, where they are known as the national stock-yards, and cover a space of over 600 acres. In 1884 there were imported—cattle, 450,717; sheep, 380,822; pigs, 1,474,475; horses and mules, 41,870. The shipments in the same year were—cattle, 315,433; sheep, 248,545; pigs, 678,874; horses and mules, 39,544. There are twelve grain elevators with a total capacity for bulk grain of 10,950,000 bushels and 415,000 sacks. The coal received during the year amounted to 52,349,600 bushels. The foreign value of imports for the year was $2,586,876, and the collections at the custom-house were $1,463,495.

Among the more important manufactures may be mentioned those of iron and steel, glass, flour, sugar, beer, bagging, prepared foods, tobacco, boots and shoes, furniture, planed and sawed lumber, wire and wire-work, carriages and wagons, foundry and machine-shop products, hardware, agricultural implements, etc. Meat packing is also an important industry. The summary of manufactures in the United States census of 1880 shows 2924 establishments, having a capital of $50,832,885; amount paid in wages during the year, $17,743,532; value of materials, $75,379,867; value of products, $114,333,375. These figures ought probably to be largely increased now (1886). In the wholesale grocery trade St. Louis is ahead of nearly all the inland cities of the Union. There are between twenty and thirty wholesale houses, and it is estimated that the annual sales exceed $30,000,000. The Belcher sugar refinery is able to turn out 1200 barrels a day. The capital employed in the wholesale and retail dry goods establishments is estimated at between $10,000,000 and $12,000,000, and the annual amount of business at $35,000,000 to $40,000,000. The brewing business of St. Louis has had an astonishing development, and its product is shipped to all parts of the world. It employs over $8,000,000 of capital, and pays out in wages over $2,000,000 per annum. The ale and beer shipments during 1884 numbered 1,834,545 packages. The brick-making industry has recently become important, and the hard red brick for building and the fire brick produced in St. Louis are among the best to be found in the United States. In 1884 there were eighteen State banks and six national banks representing—capital and surplus $14,742,123; savings and time deposits, $9,102,021; current deposits, $29,000,691; circulation, $674,150; total, $53,518,985. The clearings for 1884 amount to $785,202,177, and the balances to $125,260,945, making a total of $910,463,122.

Railways.—St. Louis is one of the most important railroad centres in the United States; the nineteen lines which run trains into the Union depôt represent nearly 20,000 miles of railway. The Union passenger depôt, contiguous to the business centre of the city, is connected with the bridge over the Mississippi by a tunnel. The buildings are of a temporary character, and are not adequate to the enormous business transacted; a new depôt of imposing proportions is now in contemplation. Over 150 passenger trains arrive and depart daily. The tunnel already referred to commences a few hundred yards east of the Union depôt. It has double tracks throughout its length, which is about 1 mile, and is supplied with electric lights, ventilating shafts, and the best appliances for safety and convenience. It is leased by the Wabash, St. Louis and Pacific, and the Missouri Pacific Railroad Companies, which are also the lessees of the bridge. The bridge across the Mississippi river at St. Louis is one of the most remarkable structures in the world in character and magnitude. It consists of three arches, the two side spans being 502 feet in the clear and the centre span 520 feet, and carries a roadway for ordinary traffic 54 feet wide and below this two lines of rail. The dimensions of the abutments and piers are as follows:

	Dimensions at foundation.			Dimensions at top.			Height from foundation to top of M.		Foundation below extreme low water.	
	Length.	Thickness.		Length.	Thickness.					
	Ft.	Ft.	In.	Ft.	In.	Ft. In.	Ft.	In.	Ft.	In.
East abutment	83	70	6	64	3½	47 6	192	9	93	3¼
East pier	82	60	0	63	0	24 0	197	1¼	86	2½
West pier	82	48	0	63	0	24 0	172	1¼	61	2¼
West abutment	94	62	8½	64	3½	47 6	112	8½	13	3¼

The foundations of abutments and piers rest on solid rock. The two piers and the east abutment were sunk by means of pneumatic caissons. The greatest depth below the surface at which work was done was 110 feet, the air-pressure in the caisson being 49 lb. Each arch consists of four equal

ribs; each rib is composed of two circular members, 12 feet apart, which are connected by a single system of diagonal braces. The circular members consist of steel tubes, which are 12 feet long and 18 inches in diameter; each tube is composed of 6 steel staves, varying in thickness between $1\frac{3}{16}$ and $2\frac{1}{8}$ inches. These staves are held together by a steel envelope, a quarter of an inch thick. The tubes are joined together by couplings, and the end tubes are rigidly connected with wrought-iron skewbacks, which are fixed to the masonry by long bolts. The arches were erected without using any false work. Work on the bridge was commenced March, 1868, and it was opened for traffic on 4th of July, 1874. The total cost of bridge and approaches was $6,536,730. The traffic across the bridge is rapidly developing. In 1876 the gross earnings were $448,447 (loaded wagons, 45,027; railway passengers, 496,686); in 1884 the gross earnings were $1,520,483 (loaded wagons, 172,730; railway passengers, 1,333,360); a total of 2,225,994 tons was carried; and the total number of cars which crossed the bridge was 472,324.

History.—The first permanent settlement on the site of St. Louis was made in February, 1764, and was in the nature of a trading post, established by Pierre Laclede Liguest. Long prior to this event there had been some exploration of the vast regions of the Mississippi and its tributaries by Marquette, Joliet, La Salle, Hennepin, and others; but, although a few widely separated military and trading posts had been established, there was no accurate knowledge of the character and resources of the country. Laclede's expedition was nearly contemporaneous with the treaty of Paris, 1763, by which the title of France to the regions in the valley of the Mississippi was practically extinguished, Spain becoming owner of all Louisiana west of the Mississippi, and England of all territory east of that river, excepting New Orleans. The few French forts north of the Ohio were nominally surrendered to the English, including Vincennes, Cahokia, Kaskaskia, and Fort de Chartres; but there was no immediate formal assertion of English control, and French sentiments and manners and customs remained undisturbed. In 1771 St. Louis was formally occupied by a small body of Spanish troops, commanded by Don Pedro Pieruas, and a period of somewhat over thirty years of Spanish rule followed, during which few local events of noteworthy character occurred. On 25th May, 1780—the festival of Corpus Christi—the post, or village, was attacked by Indians, and about thirty of the citizens were killed; but the savages were beaten off and did not renew the attack. In 1800 Spain ceded back to France all her territory of Louisiana, and three years later—30th April, 1803—France ceded to the United States all her right, title, and interest in the territory for eighty million francs.[1] At this time St. Louis and the adjacent districts had a population of not over 3000, and the total population of Upper Louisiana was between 8000 and 9000, including 1300 Negroes. There were not over 200 houses in the embryo city, which consisted mainly of two streets parallel to the river. For fifty or sixty years after the landing of Laclede the progress of the town was necessarily slow. In 1810 the population was less than 1500, and in 1830 it had not reached 6000. From the latter date progress became steady and rapid, and the real growth of the city was compressed within half a century. An extensive conflagration occurred in 1849, which destroyed most of the business houses on the Levee and Main Street. During the Civil War the commercial advancement of St. Louis was seriously retarded; but the city continued to expand in population owing to its advantageous geographical position. (D. H. M'A.)

ST. LUCIA, a West India island, discovered by Columbus in 1502, is situated in 13° 50′ N. lat. and 60° 58° W. long., and has a length of 42 miles and a maximum breadth of 21. Pigeon Island, formerly an important military post, lies at its northern extremity. Originally inhabited by Caribs, St. Lucia was settled by the English in 1639, and, after many alternations of English and French possession, surrendered to the British arms in 1794. Sir John Moore was governor till 1797. St. Lucia was subsequently in French possession, but was finally restored to Great Britain in 1803. The scenery consists of mountain, valley, and forest; two cone-shaped rocks rise out of the sea to a height of 3000 feet, and near them are craters of extinct volcanoes and a solfatara. The island is considered a good coaling station for mail-steamers and warships; there is a good harbor on the west coast, below Castries, the capital (population, 5000). The total population was 40,532 in 1883, of whom 1000 were white, mostly French. St. Lucia forms part of the general government of the Windward Islands (from which Barbados is excluded); it has a legislative council composed of officials and crown nominees. The annual revenue and expenditure were £43,026 [$209,106.36] and £36,652 [$178,128.72] respectively in 1883, the debt (principally for Central Sugar Factory) being £32,400 [$157,464]. The tonnage of vessels entered and cleared was 438,688; the total imports were valued at £191,191 [$929,188.26] and the exports (sugar, 7600 tons; cocoa, 307,120 lb) at £213,823 [$1,039,179.78]. The Usine or Central Factory system has been established with Government assistance.

ST. MALO, a seaport town of France, on the English Channel, on the right bank of the estuary of the Rance, is situated in 48° 39′ N. lat., 51 miles by rail north-northwest of Rennes. It is the administrative centre of an arrondissement in the department of Ille-et-Vilaine and a first-class garrison town, surrounded by ramparts of the 13th, 16th, and 17th centuries, which are strengthened with great towers at the principal gates. The granite island on which St. Malo stands communicates with the mainland only on the northeast by a causeway known as the "Sillon" (furrow), 650 feet long, and at one time only 46 feet broad, though now three times that breadth. This causeway forms part of the site of Rocabey, an industrial suburb more extensive, though less populous, than the town itself. In the sea round about lie other granite rocks, which have been turned to account in the defences of the coast; on the islet of the Grand Bey is the tomb (1848) of Chateaubriand. The rocks and beach in the circuit of St. Malo are continually changing their appearance, owing to the violence of the tides. Equinoctial spring-tides sometimes rise 50 feet above low-water level, and during storms the sea sometimes washes over the ramparts. The harbor of St. Malo lies south of the town in the creek separating it from the neighboring town of St. Servan. It has a wet dock with from 20 to 25 feet of water (30 feet in spring-tides), and a mile of quays. Additional works are projected, to make the area of the dock 42 acres and the length of quays $1\frac{1}{2}$ miles. Among French seaports St. Malo stands twelfth in commercial importance; but first in the number of seamen on its register. The annual imports and exports together amount to 184,000 tons, and 3000 tons of shipping are built yearly. Besides fitting out fishing-boats for Newfoundland, St. Malo exports grain, colza-seed, cider, butter, tobacco, and various kinds of provisions to the Channel Islands, with which it is connected by a regular steamboat service. The coasting vessels have a tonnage of about 30,000. Communication between St. Malo and St. Servan is maintained by a revolving bridge. St. Malo is largely frequented for sea-bathing, but not so much as Dinard, on the opposite side of the Rance. Paramé, to the east of St. Malo, has recently sprung into importance. The interior of St. Malo presents a tortuous maze of narrow streets and of small squares lined with high and sometimes quaint buildings. The old house in which Duguay-Trouin was born deserves to be noted. Above all rises the stone spire which since 1859 terminates the central tower of the cathedral. The castle, which defends the town towards the "Sillon," is flanked with four towers, and in the centre rises the great keep, an older and loftier structure, which was breached in 1378 by the duke of Lancaster. St. Malo has statues to Chateaubriand and Duguay-Trouin. The museum contains remains of the ship "La Petite Hermine," in which Jacques Cartier sailed for the discovery of Canada; and the natural history museum possesses a remarkable collection of from 6000 to 7000 European birds. The population of St. Malo in 1881 was 10,891 (commune, 11,212).

In the 6th century the granite island on which St. Malo now stands was the retreat of Abbot Aaron, who gave asylum

[1] [Inclusive of the French spoliation claims down to 1800.—Am. Ed.]

in his monastery to Malo (Maclovius or Malovius), a Cambrian priest, who came hither to escape the episcopal dignity, but afterwards became bishop of Aleth (now St. Servan); the see was transferred to St. Malo only in the 12th century. Jealous of their independence, the inhabitants of St. Malo played off against each other the dukes of Brittany and the kings of France, who alternately sought to bring them under subjection. During the troubles of the League they hoped to establish a republican government in their city, and on the night of 11th March, 1590, they exterminated the royal garrison and imprisoned their bishop and the canons. But four years later they surrendered to Henry IV. of France. During the following century the maritime power of St. Malo attained some importance. In November, 1693, the English vainly bombarded St. Malo for four consecutive days. In July, 1695, they renewed the attempt, but were equally unsuccessful. The people of St. Malo had in the course of a single war captured upwards of 1500 vessels (several of them laden with gold and other treasure) and burned a considerable number more. Enriched by these successes and by the wealth they drew from Peru, the shipowners of the town not only supplied the king with the means necessary for the famous Rio de Janeiro expedition conducted by Duguay-Trouin in 1711, but also lent him £1,200,000 [$5,832,000] for carrying on the War of the Spanish Succession. In June, 1758, the English sent a third expedition against St. Malo under the command of Marlborough, and inflicted a loss of £480,000 [$2,332,800] in the harbor. But another expedition undertaken in the following September received a complete check. In 1778 and during the wars of the empire the St. Malo privateers resumed their activity. In 1789 St. Servan was separated from St. Malo and in 1790 St. Malo lost its bishopric. During the Reign of Terror the town was the scene of sanguinary executions. Among the celebrities born in St. Malo are Jacques Cartier, Duguay-Trouin, Surconf, and Mahé de la Bourdonnais—all four of naval fame—Maupertuis, Chateaubriand, the Abbé de Lamennais, and Broussais.

ST. MARTIN, one of the Lesser Antilles (West Indies), part of which (20 square miles) belongs to France and forms a dependency of Guadeloupe, while the remainder (18 square miles) belongs to Holland and along with Saba, etc., is a dependency of Curaçao. Situated in 18° N. lat. and 63° W. long., it ascends to a height of 1380 feet above the sea, and has a comparatively small cultivable area. The great saltpans of the Dutch portion produced in 1882 276,434 tons of salt, and there are similar saltpans in the French portion. Sugar and live-stock (horses, cattle, sheep, goats, and pigs) are also exported. The chief settlement and anchorage in the French portion is Marigot, in the Dutch Philippsburg. The population in 1882 was 7083 (French portion 3724, Dutch 3359). Occupied by French freebooters in 1638 and by the Spaniards between 1640 and 1648, St. Martin was divided between the French and Dutch in this latter year.

SAINT-MARTIN, Louis Claude de (1743–1803), known as "le philosophe inconnu" from the fact that all his works were published under that name, was born at Amboise of a poor but noble family, on the 18th January, 1743. By his father's desire he tried first law and then the army as a profession. While in garrison at Bordeaux, he came under the influence of Martinez Pasqualis, a Portuguese Jew, who taught a species of mysticism drawn from cabalistic sources, and endeavored to found thereon a secret cult with magical or theurgical rites. In 1771 Saint-Martin left the army in order to become a social preacher of mysticism. His conversational powers made him welcome in the most aristocratic and polished Parisian salons; but his missionary zeal led him to England, Italy, and Switzerland, as well as to the chief towns of France. At Strasburg in 1788 he met Charlotte de Boecklin, who initiated him in the writings of Jacob Boehme, and at the same time inspired in his breast a semi-romantic attachment. His later years were devoted almost entirely to the composition of his chief works and to the translation of those of Boehme. He died at Aunay, near Paris, on the 23d October, 1803.

His chief works are—*Lettre à un ami sur la Révolution Française; Éclair sur l'association humaine; De l'esprit des choses; Ministère de l'homme-esprit.* Other treatises appeared in his *Œuvres posthumes* (1807). Saint-Martin regarded the French Revolution as a sermon in action, if not indeed a miniature of the last judgment; its result was to be the regeneration of society by a destruction of its abuses. His ideal society was "a natural and spiritual theocracy," in which God would raise up men of mark and endowment, who would regard themselves strictly as "divine commissioners" to guide the people through the crises of their history. This mystical dictatorship was to rest entirely upon persuasion. In like manner all ecclesiastical organization was to disappear, giving place to a purely spiritual Christianity, the doctrines of which constitute a species of theosophy. Their philosophical basis in Saint-Martin is the assertion of a faculty superior to the reason, which he calls the moral sense, and from which we derive our knowledge of God. In man, and not elsewhere, is to be found the key to the divine nature. God exists as an eternal personality, and the creation is an overflowing of the divine love, which was unable to contain itself. The human soul, the human intellect or spirit, the spirit of the universe, and the elements or matter are the four stages of this divine emanation, man being the immediate reflection of God, and nature in turn a reflection of man. Man, however, has fallen from his high estate, and matter is one of the consequences of his fall. But the divine love, united to humanity in Christ, will work the final regeneration or restoration of all things.

Comp. Gence, *Notice Biographique* (1824); Caro, *Essai sur la vie et les doctrines de Saint-Martin* (1852); Sainte-Beuve, *Causeries de Lundi*, vol. x. p. 190; Matter, *Saint-Martin, le philosophe inconnu* (1862); Franck, *La philosophie mystique en France à la fin du dix-huitième siècle* (1866).

ST. MAUR-SUR-LOIRE, founded by St. Maurus (see Maurus), was the first Benedictine monastery in Gaul. It was situated on the left bank of the Loire about 15 miles below Saumur. About the middle of the 9th century it was reduced to ruins by the Normans; shortly before the event and in anticipation of it the relics of the saint were transferred to St. Maur-les-Fossés near Paris. St. Maur-sur-Loire was afterwards restored and fortified, but the only extant remains consist of a part of the church and a few shattered columns.

ST. MICHAEL'S. See Azores, vol. iii. p. 148–9.

ST. NAZAIRE, a town of France, in the department of Loire Inférieure, and a port on the right bank of the Loire near its mouth. It has rapidly grown since the new docks rendered it the outport or detached harbor of Nantes (*q.v.*), from which it is distant 29 miles west-northwest by water and 40 by rail. Begun in 1845 and opened in 1857, the first basin has an area of 26 acres and 1 mile of quays; and the depth varies from 20 to 25 feet. To the north of the first basin a new dock (Penhouet), 56 acres in extent and with 1½ miles of quay, was constructed between 1864 and 1881, at a cost of nearly £1,000,000 [$4,860,000]. It communicates with the older basin by a passage 82 feet wide and 673 long. The harbor can admit vessels of 23 feet draught at every tide, the depth of water on the sill varying from 26 to 30 feet at high tide, and never being less than 13. The town is the terminus of the General Transatlantic Company, whose steamers connect France with Mexico, the Antilles, and the Isthmus of Panama. The total imports and exports amount to about 1,600,000 tons annually, valued at £24,000,000 [$116,640,000]. The staple articles imported are coals from Great Britain (500,000 tons), grain, sugar, coffee, rice, timber (from the North), phosphates, and guano. Pit-props, salt, and preserved foods are exported. The town being of recent origin, its industries are only in process of development; but it already contains shipbuilding yards, large ironworks, artificial fuel factories, sawmills, a flourmill, and extensive commercial warehouses. There are no edifices of historical or architectural note with the exception of a granite dolmen, 10 feet long and 5 broad, resting horizontally on two other stones sunk in the soil, above which they rise 6½ feet. The population was 16,314 in 1881 (19,626 in the commune).

According to certain remains discovered on excavating the docks, St. Nazaire seems to occupy the site of the ancient Corbilo, placed by Strabo among the more important

maritime towns of Gaul, and probably founded by the Phœnicians. It was in the harbor of Corbilo that Crassus by Cæsar's order built the fleet by which, in 56 B.C., Brutus routed the 220 vessels of the Venetian insurgents. At the close of the 4th century the site of Corbilo was occupied by Saxons, and their conversion to Christianity being effected one or two hundred years later by St. Felix of Nantes, the place took the name of St. Nazaire. It was still only a little "bourg" of 3000 inhabitants when it was chosen as the site of the new harbor for Nantes, because the ascent of the Loire was becoming more and more difficult. In 1868 the sub-prefecture was transferred to St. Nazaire from Savenay.

ST. NICOLAS, a town of Belgium, in the district of Dendermonde, in the province of East Flanders, 19½ miles from Ghent by the railway to Antwerp. It is a well-built, modern-looking place, with a very spacious market-place, famous as the spot where Philip the Fair swore in 1497 to maintain the privileges of Waesland, of which St. Nicolas was the capital. From a comparatively small village, with only 5000 inhabitants in 1661, it has grown into a large manufacturing centre, with wool and cotton mills, needle-factories, etc., and a population (in 1876) of 24,729. The more conspicuous buildings are the town-hall and two of the churches.

ST. OMER, a town and fortress of France, chef-lieu of the department of Pas-de-Calais, situated on the Aa (which flows into the North Sea), 177 miles north of Paris by the railway to Arras, Hazebrouck, and Calais, at the junction of a line to Boulogne. Before the modifications made in the defensive system of the frontier the place was a fortress of the first class. At St. Omer begins the canalized portion of the Aa, which reaches the sea at Gravelines, and under its walls it connects with the Neuffossé, which ends at the Lys. There are two harbors outside and one within the city. St. Omer has wide streets and spacious squares, but little stir of life. The old cathedral is the most curious church in Artois; it belongs almost entirely to the 13th, 14th, and 15th centuries. Of its four portals the finest, dating from the 13th and 14th centuries, was decorated with statuettes, unfortunately mutilated during the Revolution. In spite of the spoliations of the 18th century, the contents of the church still comprise interesting paintings, a Virgin in wood of the 12th century (the object of numerous pilgrimages, and solemnly crowned in 1875), a colossal statue of Christ seated between the Virgin and St. John (13th century, originally belonging to the cathedral of Thérouanne and presented by Charles V.), fine stained glass and mosaics, interesting tombstones, the cenotaph of St. Omer, and numerous ex-votos, distinguished by their antiquity, originality, and delicacy of workmanship. The clearing of the church from the encroachments of other buildings has led to the reconstruction of the apsidial chapel of the Sacred Heart in the purest Gothic style. Of St. Bertin, the church of the abbey (built between 1326 and 1520 on the site of previous churches), where Childeric III. retired to end his days, nothing now remains but some arches and a tower, 190 feet high, which serves to adorn the public gardens (once possessed by the monks). Several other churches or convent chapels are of interest, but it is enough to mention St. Sepulchre's (14th century) for the sake of its beautiful stone spire and stained-glass windows. A fine collection of records, a picture gallery, and a theatre are all accommodated in the town-hall, built of the materials of the abbey of St. Bertin. Among the five hospitals the military hospital is of note as occupying the college opened by the English Jesuits in 1592 and known as the place where O'Connell received his education. The old Episcopal palace is used as a court-house. Several learned societies exist in the town; the public library contains 20,000 volumes and 1000 MSS. The arsenal is an extensive series of buildings. Besides 30,000,000 to 40,000,000 tobacco-pipes exported to America and the colonies, St. Omer manufactures cloth, hosiery, and tulle, cambric, and muslin embroideries. Its trade (and it is the seat not only of a tribunal, but also of a chamber of commerce) is mainly in provisions for England, the products of the local industry, and those of the paper-mills, flour-mills, distilleries, and sugar-factories in the vicinity, especially along the banks of the Aa. The suburb of Haut Pont to the north of St. Omer is inhabited by a special stock, which has remained faithful to the Flemish tongue, its original costume, and its peculiar customs, and is distinguished by honesty and industry. The ground which these people cultivate has been reclaimed from the marsh, and the lègres (*i.e.*, the square blocks of land) communicate with each other only by boats floated on the ditches and canals that divide them. At the end of the marsh, on the borders of the forest of Clairmarais, are the ruins of the abbey founded in 1140 by Thierri d'Alsace, to which Thomas a Becket betook himself in 1164. To the south of St. Omer on a hill commanding the Aa lies the camp of Helfaut, often called the camp of St. Omer. On 15th June, 1884, a statue was erected to Jacquelin Robin, a heroine who in the time of Louis XIV. saved St. Omer from foreign occupation. The population of the town was 20,479 in 1881 (21,556 in the commune).

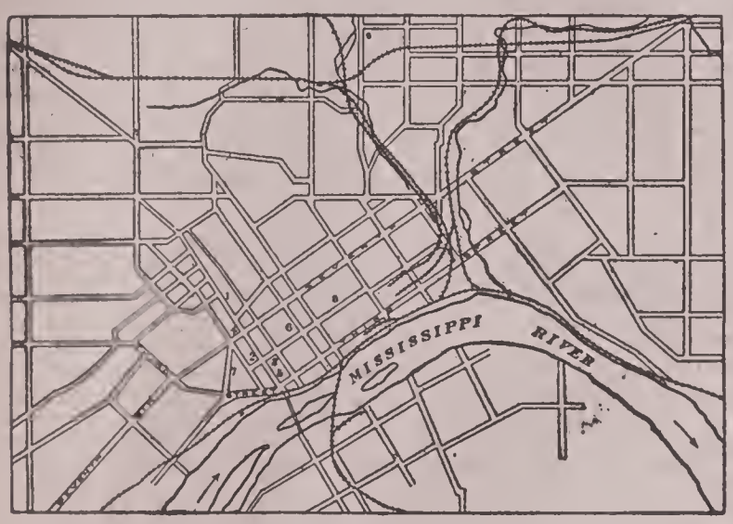
Near a castle named Sithiu, Omer, bishop of Thérouanne, erected churches and the monks of Luxeuil established monasteries in the 7th century; and in the 9th century the village thus originated took the name of its founder St. Omer. The Normans laid the place waste in 861 and 881, but ten years later found town and monastery surrounded by walls and safe from their attack. Situated on the borders of territories frequently disputed by French, Flemish, English, and Spaniards, St. Omer long continued subject to siege and military disaster. In 1071 Philip I. put all to sword and flame. Burned in 1136, captured in 1198 by Richard and Baldwin IX., attacked in 1214 by Ferrand of Portugal, in 1302 and 1303 by the Flemish, in 1337 and 1339 by the English, and in 1477 by Louis XI., St. Omer at last fell in 1487 into the hands of Charles VIII. Two years later it was recovered by the arch-duke Maximilian; and Charles V. strengthened its ramparts with bastions. The French made five futile attempts against it between 1551 and 1596, and had no better success in 1638 (under Richelieu) or in 1647. But on the 26th April, 1677, after seventeen days' siege, Louis XIV. forced the town to capitulate; and the peace of Nimeguen permanently confirmed the conquest. From time to time the people of St. Omer (Audomarois) still celebrate the entrance into the town of William Cliton, count of Flanders, from whom in 1127 they obtained a communal charter granting them numerous privileges. St. Omer ceased to be a bishopric in 1790.

SAINTONGE (*Santonia*, *Santonensis tractus*), an old province of France, of which SAINTES (*q.v.*) was the capital, was bounded on the N.W. by Aunis, on the N.E. by Poitou, on the E. by Angoumois, on the S. by Guienne, and on the W. by Guienne and the Atlantic. It now forms a small portion of the department of Charente and the greater part of that of Charente Inférieure.

ST. OUEN, an industrial district in the outskirts of Paris, on the right bank of the Seine, 1 mile above St. Denis. It had 17,718 inhabitants in 1881. The docks (6 acres in area), where the boats from the lower Seine discharge, are connected by rail with the Northern and Eastern lines at Paris and with the circular railway near Batignolles. The importance of St. Ouen is mainly due to its industrial establishments, —foundries and forges, steam-engine factories, dye-works, waxcloth works, potteries, etc.; it has also the steam-pumps for supplying the upper quarters of Paris with water from the river, a racecourse, and a fine castle, occupying the site of the building in which Louis XVIII. signed (2d May, 1814) the declaration by which he promised a charter to France.

ST. PAUL, a city of the United States, second city of Minnesota, a port of entry and the capital of the State and of Ramsey county, is situated in 44° 52′ 46″ N. lat. and 93° 5′ W. long., on the Mississippi river, 2150 miles from its mouth, 10 below the falls of St.

Anthony, the natural head of navigation, and 360 northwest of Chicago. The ground on which the city is built rises from the river in a series of terraces, the ascent being in many places precipitous and not easily adapted to urban uses. The city is mainly confined to the second and third terraces, but is gradually spreading over the elevated plateau beyond. The difficulties of the situation have much increased the cost of erecting large business structures, circumscribed the business quarter, and impeded the railway companies in securing convenient and adequate facilities. The city site is underlaid with a thick stratum of bluish limestone, which comes near the surface, and which, while it renders excavation expensive, furnishes unlimited supplies of building material of a fair quality. The streets of the older portions are uncomfortably narrow, but the newer streets are better laid out. The chief



Plan of St. Paul.

1. State Capitol.
2. U. S. Custom-House and Post-Office.
3. City Hall.
4. City Market.
5. Opera House.
6. Chamber of Commerce.
7. Rice Park.
8. Smith Park.

public buildings are the State capitol (built in 1882), the United States custom-house and post-office, the city-hall, and the city-market. A handsome opera-house and a chamber of commerce building are conspicuous features. In 1885 there were seventy-one church organizations,—9 Episcopal, 7 Presbyterian, 4 Congregational, 12 Methodist, 12 Lutheran, 2 Jewish, 7 Baptist, 11 Roman Catholic, 1 Unitarian, 4 Evangelical, 1 Swedenborgian, and 1 Disciples of Christ. Besides the charitable institutions connected with the church organizations there are an orphan asylum, a home for the friendless, a Swedish hospital, a women's Christian home, and a Magdalen home. Of periodical publications there were issued in 1885 5 dailies, 17 weeklies, and 7 monthlies. The city has (1886) eleven banks, of which six are national with an aggregate paid-up capital of $5,200,000, and five State institutions with a paid-up capital of $1,150,000. St. Paul is an important railway centre, dividing with Minneapolis the terminal and distributing business of no less than fifteen lines owned by six different corporations and having an aggregate length of 15,818 miles. The navigation of the upper Mississippi acts as a check upon the rates charged by the railway companies. The traffic at the port of St. Paul in 1884 was: tons landed, 45,800; tons shipped, 13,300; passengers carried, 34,625. Two lines of steamers ply between St. Paul and St. Louis and intermediate points. The average season of navigation lasts six and a half months. The city has within its corporate limits, but removed some miles from the city proper, two colleges,—Macalester (Presbyterian) and Hamline (Methodist)—both only partially endowed or supplied with buildings. There are twenty-two public school buildings, built at an aggregate cost of $663,000. There are also several academies and seminaries under private or denominational management. The public park system of St. Paul is as yet undeveloped, but an area of 250 acres has been secured near Lake Como to be laid out as pleasure-grounds. Rice Park and Smith Park are public squares in the central portion of the city, tastefully adorned with walks and shrubbery. The population of St. Paul, according to the United States census, was 840 in 1850, 10,600 in 1860, 20,300 in 1870, and 41,473 in 1880 (males 22,483, females 18,990). According to the State census it was 111,334 in 1885.

St. Paul is a commercial rather than a manufacturing city. The jobbing trade for the year 1884 reached a total of about $65,000,000, an increase of 50 per cent. in four years. In the same year manufactures valued at $20,000,000 were produced, the principal items being agricultural implements, boots and shoes, machinery, sash, doors, and blinds, wagons, and carriages. There is a large flour-mill, capable of producing 700 barrels daily. The lack of water-power and the high cost of fuel are drawbacks to the growth of manufactures. The main thoroughfares have recently been paved, for the most part with blocks of white cedar, and stone sidewalks are rapidly replacing wooden ones. The water-supply is obtained from a group of small lakes lying north of the city limits, and the works are owned and managed by the city. The drainage is excellent. For governmental purposes the city consists of eight wards, each of which elects three members of council. The chief of police and all subordinate members of the force are appointed by the mayor, who is elected by popular vote in May of each alternate year. The aggregate assessed valuation of real and personal property in St. Paul was $60,463,000 in 1884. The total bonded debt of the city on 31st March, 1885, was officially stated at $3,027,141.

The first settlement on the site of St. Paul was in 1838, when an unimportant trading-post was established there by adventurers. In 1841 a Jesuit missionary built a log chapel and dedicated it to St. Paul (whence the name of the hamlet). The site of the future city was surveyed and laid out in 1849–50. About this time (1851) the Sioux Indians ceded to the United States all lands held by them between the Mississippi and Big Sioux rivers. Prior to this cession the white population in the then Territory of Minnesota had not reached a total of 6,000, but the removal of the aborigines was promptly followed by a notable influx of white settlers. With a population of some 2800 in 1854, the town obtained a fully organized city government. Upon the admission of Minnesota to the Union in 1858 St. Paul was designated as the capital. The city was originally confined to the east bank of the river, but in 1874 by popular vote a portion of Dakota county was transferred to Ramsey county, and West St. Paul on the west bank of the Mississippi, then containing some 3,000 inhabitants, became a part of St. Paul proper. In 1884 an Act of the State legislature extended the geographical boundaries of the city so as to embrace all territory in Ramsey county westward to the line of Hennepin county, and virtually to the corporate limits of the "sister" city Minneapolis, 10 miles distant.

ST. PAUL, a remarkable volcanic island which, along with the island of New Amsterdam, is situated in the Indian Ocean about midway between Africa and Australia, a little to the north of the ordinary route of the steamers from Plymouth (*via* Cape Town) to Adelaide. Its exact position as determined by the Transit of Venus Expedition in 1874 is 38° 42′ 50″ S. lat. and 77° 32′ 29″ E. long. Though the distance between the two islands St. Paul and New Amsterdam is only 50 miles, they belong to two separate eruptive areas characterized by quite different products; and the comparative bareness of St. Paul is in striking contrast to the dense vegetation of New Amsterdam. St. Paul is 1½ miles long from northwest to southeast and its coast line is estimated at 5 nautical miles. In shape it is almost an isosceles triangle with a circle inscribed tangentially to the northeast side,—the circle (3940 feet in diameter) being the volcanic crater which previous to 1780 formed an inland lake, but which, since the sea broke down its eastern barrier, has become practically a land-locked bay entered by a narrow but gradually widening passage not quite 6 feet

deep. The highest ridge of the island is not more than 820 feet above the sea. On the southwest side the coasts are inaccessible. According to M. Vélain, the island originally rose above the ocean as a mass of rhyolithic trachyte similar to that which still forms the Nine Pin rock to the north of the entrance to the crater. Next followed a period of activity in which basic rocks were produced by submarine eruptions—lavas and scoriæ of anorthitic character, palagonitic tuffs, and basaltic ashes: and finally from the crater, which must have been a vast lake of fire like those in the Sandwich Islands, poured forth quiet streams of basaltic lavas. The island has been rapidly cooling down in historic times. Dr. Gillian (Lord Macartney's visit, 1793) mentions spots still too warm to walk on where no trace of heat is now perceptible; and the remarkable zone of hot subsoil extending westwards from the crater has lost most of the more striking characteristics recorded by Hochstetter in 1857, though it is still easily distinguished by its warmth-loving vegetation,—*Sphagnum lacteolum* and *Lycopodium cernuum*.

The general flora of the island is exceedingly meagre. If we leave out of view the potato, carrot, parsley, cabbage, etc., introduced by temporary inhabitants, the list comprises *Umbelliferæ*, 1; *Compositæ*, 2; *Plantaginaceæ*, 2; *Cyperaceæ*, 2; *Graminaceæ*, 2; *Lycopodiaceæ*, 1; ferns, 2; and from 35 to 40 species of mosses and lichens. The only plants really abundant are an *Isolepis nodosa* (*Cyperaceæ*) and one or two grasses. None of the trees (oak, apple, mulberry, pine, etc.) introduced at different periods have succeeded. The cabbage, which grows pretty freely in some parts, shows a tendency to become like the Jersey variety. The pigs mentioned by Hochstetter have died out; but goats, cats, rats, and mice continue to flourish,—the cats, which feed mainly on birds and fish, living in apparent amity and in the same holes with the rats. House-flies, bluebottles, elaters, etc., literally swarm. But nothing is so characteristic of St. Paul as the multitude of its sea-fowl,—albatrosses, petrels of many kinds, puffins, penguins, etc. The neighboring waters teem with life, and, while the various genera of the seal family are no longer a source of wealth, a number of vessels (50 to 80 tons) from the Mascarene Islands still yearly carry on the fisheries off the coasts, where *Cheilodactylus fasciatus* (in shoals), *Latris hecateia* (*cabot* or *poisson de fond*), and *Mendosoma elongatum*[1] afford a rich harvest. The stories told about gigantic sea creatures were curiously confirmed by the Venus Expedition finding on the shore a Cephalopod (since named *Mouchezis sancti pauli*) which measured upwards of 22 feet from the end of its body to the tip of its longest arm.

The island now known as New Amsterdam was probably that sighted on 18th March, 1522, by the companions of Magellan as they sailed back to Europe under the command of Sebastian del Cano; and in 1617 the Dutch ship "Zeewolf" from Texel to Bantam discovered the island which, instead of the name "Zeewolf" then bestowed on it, soon after began to be called on the charts St. Paul. The designation "New Amsterdam" is derived from the vessel in which Van Diemen sailed between the islands in 1633. The first navigator to set foot on St. Paul was Willem van Vlaming in 1696. Lord Macartney spent a day exploring it in 1793, his guide being a marooned Frenchman, Captain Péron, whose narrative of his sojourn from 1st September, 1792, to 16th December, 1795, is a document of great value (*Mémoires du Capitaine Péron*, vol. i., Paris, 1824). In 1843 the governor of Réunion took possession of the islands with a detachment of marines,—seal-catching and the fisheries having attracted to them a considerable floating population. In June, 1871, the British frigate "Megæra" was wrecked at the mouth of the crater and most of the 400 souls on board had to reside on the island for upwards of three months. Landing on 23d September, 1874, a French Transit of Venus expedition remained on St. Paul till 8th January, 1875, and a visit of much importance was paid to New Amsterdam.

See Vélain, *Description géol. de la presqu'île d'Aden, des îles de la Réunion, de St. Paul*, etc. (Paris, 1878), and his papers in *Archives de la zoologie experimentale*, 1877, and in *Comptes Rendus, Acad. des Sc.*, 1875; Sauvage on the fishes in *Arch. Zool. Exp.*, 1879–80.

ST. PAUL DE LOANDA. See LOANDA.

ST. PAUL'S ROCKS, not to be confounded with the island of St. Paul in the Indian Ocean, are a number of small islands in the Atlantic, nearly 1° north of the equator and 540 miles from South America, in 29° 15′ W. long. Their outline is irregular, and as they are only separated by narrow but deep chasms they have the appearance of being one island. The whole space occupied does not exceed 1400 feet in length by about half as much in breadth. Besides sea-fowl—two species of noddy (*Anous stolidus* and *Anous melanogenys*) and a booby or gannet (*Sula leucogaster*)—the only terrestrial inhabitants are insects and spiders. Fish are abundant, seven species (one, *Holocentrum sancti pauli*, peculiar to the locality) being collected by the "Challenger" during a brief stay. Darwin (*On Volcanic Islands*, p. 32) decided that St. Paul's Rocks were not of volcanic origin; more modern investigators—Renard, A. Geikie, and Wadsworth—maintain that they probably are eruptive. See *Reports of the Voyage of H.M.S. Challenger: Narrative of the Cruise*, vol. i.

ST. PETER PORT, the capital of the island of GUERNSEY (*q.v.*); its population was 16,658 in 1881.

ST. PETERSBURG, a government of northwestern Russia, at the head of the Gulf of Finland, stretching along its southeastern shore and the southern shore of Lake Ladoga. It is bounded by Finland and Olonetz on the N., Novgorod and Pskoff on the E. and S., Esthonia and Livonia on the W., and has an area of 20,750 square miles. It is hilly only on its Finland border, the remainder being flat and covered with marshy forests, with the exception of a plateau of about 350 feet high in the south, the Duderhof hills at Krasnoye Selo reaching 550 feet. A great number of parallel ridges of glacier origin intersect the government towards Lake Peipus and northwards of the Neva. Silurian and Devonian rocks appear in the south, the whole covered by a thick glacial deposit with boulders (bottom moraine) and by thick alluvial deposits in the valley of the Neva. The government skirts the Gulf of Finland for 130 miles. The bays of Cronstadt, Koporye, Luga, and Narva afford good anchorage, but the coast is for the most part lined with reefs and sandbanks; to the east of Cronstadt the water becomes very shallow (18 to 20 feet). The chief river is the Neva, which receives only a few small tributaries; the Luga and the Narova also enter the Gulf of Finland. The feeders of Lake Ladoga—the Volkhoff, the Syass, and the Svir, the last two forming part of the system of canals connecting the Neva with the Volga—are important channels of commerce, as also is the Narova (see PSKOFF). Marshes and forests cover about 40 per cent. of the surface (70 per cent. at the end of the 18th century).

The population (apart from the capital) was 635,780 in 1882, 82.7 per cent. being Russians, 15.0 Finns, 0.5 Esthonians, and 1.8 per cent. German colonists who have immigrated since 1765. Twenty per cent. are Protestants; the remainder mostly belong to the Greek Church; but there are also more than 20,000 Nonconformists, about 6000 Catholics, and 1500 Jews. Agriculture is at a low stage and very unproductive; the Germans, however, get advantage from it. The Finns rear cattle to some extent. Manufactures are especially developed in the districts of Tsarskoye Selo and Yamburg,—cottons, silks, paper, ironware, and machinery (at Kolpino) being the chief products. Several large manufacturing establishments—especially at Cronstadt—are maintained by the state for military purposes. The government is subdivided into eight districts, the chief towns of which are St. Petersburg (see below), Gdoff (3150 inhabitants), Luga (1650), Novaya Ladoga (4100), Peterhof (7950), Schlüsselburg (10,400), and Yamburg (3250). Gatchina (10,100), Narva (8610), Oranienbaum (3600), and Pavlovsk (3400) have no districts. Cronstadt and the capital form separate governorships. Okhta, Kolpino, Pulkova, and Krasnoye Selo, though without municipal institutions, are worthy of mention.

ST. PETERSBURG, capital of the Russian empire, is situated in a thinly-peopled region at the head of the Gulf of Finland, at the mouth of the Neva, in 59° 56′ N. lat. and 30° 40′ E. long.,[2] 400 miles from Moscow, 696 from Warsaw, 1138 from Odessa, and 1338

[1] [For the exclusively Chilean distribution of the *Mendosoma* see Vol. XII. p. 720.—AM. ED.]

[2] [Keith Johnston gives 30° 18′ 22″ East as the longitude of the observatory.—AM. ED.]

from Astrakhan. The city covers an area of 21,195 acres, of which 12,820 belong to the delta proper of the Neva ; 1330 acres are under water. The Neva, which leaves Lake Ladoga at its southwest angle, flows in a wide and deep stream for 36 miles southwest and northwest, describing a curve to the south. Before entering the Gulf of Finland, it takes for 2½ miles a northerly direction; then it suddenly turns and flows southwest and west, forming a peninsula on which the main part of St. Petersburg stands, itself subdividing into several branches. It discharges a body of remarkably pure water at the rate of 1,750,000 cubic feet per second, by a channel from 400 to 650 yards in width, and so deep (maximum depth, 59 feet) that large vessels approach its banks. The chief branch is the Great Neva, which flows southwest with a width of from 400 to 700 yards and a maximum

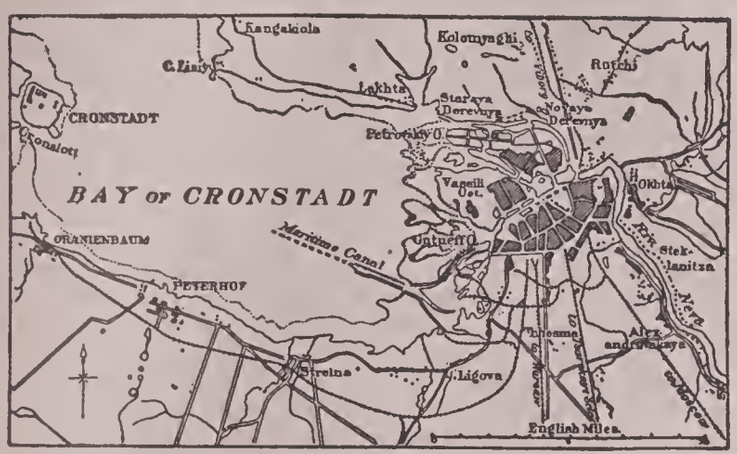


FIG. 1.—Environs of St. Petersburg.

depth of 49 feet (discharge, 1,267,000 cubic feet per second). The other branches are the Little Neva, which along with the Great Neva forms Vasilyevskiy (Basil's) Island, and the Great Nevka, which with the Little Neva forms Peterburgskiy Island and sends out three other branches, the Little Nevka, the Middle Nevka, and the narrow Karpovka, enclosing the islands Elaghin, Krestovskiy, Kamennyi, and Aptekarskiy (Apothecaries' Island). Smaller branches of the Great and the Little Nevas form the islands Petrovskiy, Goloday, and numerous smaller ones; while a broader navigable channel forms the Gutueff and several islands of less size in the southwest. Two narrow canalized channels or rivers—the Moika and the Fontanka—as also the Catherine, Ligovskiy, and Obvodnyi Canals (the last with basins for receiving the surplus of water during inundations), intersect the mainland. All the islands of alluvial origin are very low, their highest points rising only 10 or 11 feet above the average level of the water. Their areas are rapidly increasing (572 acres having been added between 1718 and 1864), and the wide banks which continue them towards the sea are gradually disappearing. The mainland is not much higher than the islands. At a height of from 7 to 20 feet (seldom so much as 29) the low marsh land stretches back to the hills of the Forestry Institute (45 to 70 feet) on the right and to the Pulkova and Tsarskoye Selo hills on the left. The river level being subject to wide oscillations and rising several feet during westerly gales, extensive portions of the islands, as also of the mainland, are flooded every winter; water in the streets of Vasilyevskiy Island is a common occurrence. In 1777, when the Neva rose 10.7 feet, and in 1824, when it rose 13.8 feet, nearly the whole of the city was inundated. But, owing to the construction of canals to receive a large amount of surplus water, and still more to the secular rising of the sea-coast, no similar occurrence has since been witnessed.

Broad sand-banks at the mouth of the river, leaving but a narrow channel 7 to 20 feet deep, prevent the entrance of larger ships: their cargoes are discharged at Cronstadt and brought to St. Petersburg in smaller vessels. A ship canal, completed in 1885 at a cost of 10,265,400 roubles (£1,026,500 [$4,988,790]), is intended to make the capital a seaport. Beginning at Cronstadt, it terminates at Gutueff Island in a harbor capable of accommodating fifty sea-going ships at a time. It is 22 feet deep, 17½ miles in length, and from 70 to 120 yards broad at the bottom, and is protected by huge submarine dams.

Communication between the banks of the Neva is maintained by only two permanent bridges,—the Nicholas and the Alexander or Liteinyi, the latter 467 yards long ; both are fine specimens of architecture. Two other bridges—the Palace and the Troitskiy (720 yards)—across the Great Neva connect the left bank of the mainland with Vasilyevskiy Island and the fortress of St. Peter and St. Paul ; but, being built on boats, they are removed during the autumn and spring, and intercourse with the islands then becomes very difficult. Several wooden or floating bridges connect the islands, while a number of stone bridges span the smaller channels; their aggregate number is ninety. In winter, when the Neva is covered with ice 2 to 3 feet thick, temporary roadways for carriages and pedestrians are made, and artificially lighted. Numerous boats also maintain communication, and small steamers ply in summer between the more distant parts of the capital. A network of tramways (about 80 miles) intersects the city in all directions, reaching also the remoter islands and suburbs, and carrying about 45,000,000 passengers yearly. Omnibuses and public sledges maintain the traffic in winter. In 1882 hackney carriages numbered 7930 in summer and rose to 14,780 in winter, when thousands of peasants come in from the neighboring villages with their small Finnish horses and plain sledges.

The Neva continues frozen for an average of 147 days in the year (25th November to 21st April). It is unnavigable, however, for some time longer on account of the ice from Lake Ladoga, which is sometimes driven by easterly winds into the Neva during several days at the end of April or in the beginning of May. The climate of St. Petersburg is very changeable and unhealthy. Frosts are made much more trying by the wind which accompanies them ; and westerly gales in winter bring with them oceanic moisture and warmth, and so melt the snow before and after hard frosts. The summer is hot, but short, lasting hardly more than five or six weeks; a hot day, however, is often followed by cold weather : changes of temperature amounting to 35° Fahr. within twenty-four hours are not uncommon. In autumn a cold dampness continues for several weeks, and in spring cold and wet weather alternates with a few warm days. The following figures will give a more complete idea of the climate :

	January.	July.	The Year.
Mean temperature, Fahr.	15.4°	64.0°	38.6°
Rainfall, inches	0.9	2.6	18.8
Amount of cloud, percentage	80	53	67
Prevailing winds	S.W.	W.	W.
Number of rainy days	12.5	12.7	150.6
Aver. daily range of temperature, Fahr.	2.2°	10.2°	7.7°
Relative humidity	89	74	81

The bulk of St. Petersburg is situated on the mainland, on the left bank of the Neva, including the best and busiest streets, the richest shops, the great bazaars and markets, the palaces, cathedrals, and theatres, as well as all the railway stations, except that of the Finland Railway. From the Liteinyi bridge to that of Nicholas I. a granite embankment runs along the left bank of the Neva, bordered by palaces and large private houses. About midway, behind a range of fine houses, stands the admiralty, the very centre of the capital. Formerly a wharf, on which Peter I. caused his first Baltic ship to be built in 1706, it is now the seat of the ministry of marine and of the hydrographical department, the new admiralty standing farther down the Neva on the same bank. A broad square, now partly a garden, surrounds the admiralty on the west, south, and east. To the west, opposite the senate, stands the fine memorial to Peter I., erected in 1782, and now backed by the cathedral of St. Isaac. A bronze statue, a masterpiece by Falconet, represents the founder of the city on horseback, at full

gallop, ascending a rock and pointing to the Neva; the pedestal is a huge granite monolith, 44 feet long, 22 wide, and 27 high, brought from Lakhta, a village on the shore of the Gulf of Finland. To the south of the admiralty are several buildings of the ministry of war and to the east the Winter Palace, the work of Rastrelli (1764), a fine building of mixed style; but its admirable proportions hide its huge dimensions. It communicates by a gallery with the Hermitage Fine Arts Gallery. A broad semicircular square, adorned by the Alexander I. column, separates the palace from the general staff and foreign ministry buildings; the column, the work of Montferrant, is a red granite monolith, 84 feet high, supported by a huge pedestal. Being of Finnish *rappa-kivi* (from Piterlaks), it disintegrates rapidly, and has had to be bound with massive iron rings concealed by painting. The range of palaces and private houses facing the embankment above the admiralty is interrupted by the large macadamized "Field of Mars," formerly a marsh, but transformed at incredible expense into a parade-ground, and the Lyetniy Sad (summer-garden) of Peter I.

FIG. 2.—Plan of St. Petersburg.

1. Stock Exchange.
2. Academy of Sciences.
3. University.
4. Academy of First Corps of Cadets.
5. Academy of Arts.
6. Mining Institute.
7. Physical Observatory.
8. Winter Palace.
9. Statue of Peter I.
10. Senate and Synod.
11. Cathedral of St. Isaac.
12. General Staff Buildings.
13. Hermitage Gallery of Art.
14. Cathedral of Virgin of Kazan.
15. Town-house.
16. Gostinyi Dvor.
17. Public Library.
18. Anitchkoff Palace.
19. Orphanage.
20. General Post-Office.
21. Military Storerooms.
22. Theatres (Great and Marlinski).
23. Moscow Railway Station.
24. Medical Academy.
25. Hospital.
26. Courts of Justice.
27. House of Detention.

The Neva embankment is continued to the west to a little below the Nicholas bridge under the name of "English embankment," and farther down by the new admiralty buildings.

The topography of St. Petersburg is very simple. Three long streets, the main arteries of the capital, radiate from the admiralty—the Prospekt Nevskiy (Neva Prospect), the Gorokhovaya (Peas' Street), and the Prospekt Voznesenskiy (Ascension Prospect). Three girdles of canals, roughly speaking concentric, cross these three streets,—the Moika, the Catherine, and the Fontanka; to these a number of streets run parallel,—the Great and the Little Morskaya, the Kazanskaya, the Sadovaya (Garden Street), and the Liteinaya, continued west by Prospekts Zagorodnyi and Rizhskiy (Riga). The Prospekt Nevskiy is a very broad street running straight east-southeast for 3200 yards from the admiralty to the Moscow railway station, and thence 1650 yards farther, bending a little to the south, to the Smolnyi convent, again reaching the Neva at Kalashnikoff harbor. The part first mentioned owes its picturesque aspect to its width, its rich shops, and still more its animation. But the houses which border it architecturally leave very much to be desired. And neither the cathedral of the Virgin of Kazan (an ugly imitation on a small scale of St. Peter's in Rome), nor the still uglier Gostinyi Dvor (a two-storied quadrilateral building filled with second-rate shops), nor the Anitchkoff Palace (which looks like immense barracks), nor even the Catholic and Dutch churches do anything to embellish it. About midway between the public library and the Anitchkoff Palace an elegant square conceals the old-fashioned Alexandra theatre; a profusely adorned memorial to Catherine II. does not beautify it much. The Gorokhovaya is a narrow and badly paved street between gloomy houses, occupied mostly by artisans. The Voznesenskiy, on the contrary, though as narrow as the last, has better houses. In its north part it passes into a series of large squares connected with that on which the monument of Peter I. stands. One of them is occupied by the cathedral of St. Isaac (of Dalmatia) and another by the memorial to Nicholas I., the gorgeousness and bad taste of which strangely contrast with the simplicity and significance of that of Peter I. The general aspect of the cathedral is undoubtedly imposing both without and within; its red granite colonnades are not devoid of a certain grandiose character; but on the whole this architectural monument, built between 1818 and 1858 according to a plan of Montferrant, under the personal direction of Nicholas I., does not correspond either with its costliness (23,000,000 roubles [$11,178,000]) or with the efforts put forth in its decoration by the best Russian

artists. The pictures of Brüloff, Bruni, and many others which cover its walls are deteriorating rapidly and their place is being taken by mosaics. The entire building, notwithstauding its vast fouudations and pile-work, is subsiding uuequally iu the marshy ground, aud the walls threaten soon to give way.

The eastern extremity of Vasilyevskiy Island is the centre of commercial activity; the stock exchange is situated there as well as the quays and storehouses. The remainder of the island is occupied chiefly by scientific and educatioual institutions—the academy of science, with a small observatory (where some astronomical observations are carried ou, notwithstanding the tremors of the earth), the university, the philological institute, the academy of the first corps of cadets, the academy of arts, the marine academy, the mining institute, and the central physical observatory, all facing the Neva. Peterburgskiy Island contains the fortress of St. Peter and St. Paul, opposite the Winter Palace, separated by a channel from its "kronverk," the glacis of which is used as a park. The fortress is now merely a state prison. · A cathedral which stands within the fortress is the burial-place of the emperors and the imperial family. The mint is also situated within the fortress. The remainder of the island is meanly built, and is the refuge of the poorer officials (*tchinovniks*) and of the intellectual proletariat. Its northern part, separated from the main island by a narrow channel, bears the name of Apothecaries' Island, and is occupied by a botanical garden of great scientific value and several fine private gardens and parks. Krestovskiy, Elaghin, aud Kamennyi Islands, as also the opposite right bank of the Great Nevka (Staraya and Novaya Derevnya), are occupied by public gardens and parks and by summer houses (*datchis*). Owing to the heat and dust during the short summer the middle-class inhabitants and the numerous officials and clerks emigrate to the *datchis*, the wealthier families to the islands, aud the poorer to Staraya and Novaya Derevnya, Polustrovo, Kusheleva, and as far as the first two or three railway stations of the principal railways, especially that of Finland. The mainland on the right bank of the Neva above its delta is known as Vyborgskaya Storona (Viborg Side), and is connected with the main city by the Liteinyi bridge, closely adjoining which are the buildings of the military academy of medicine and spacious hospitals. The small streets (many of them unpaved), with numerous wooden houses, are inhabited by students and workmen; farther north are great textile and iron factories. Vast orchards and the yards of the artillery laboratory stretch northeastwards, while the railway and the highroad to Finland, running north, lead to the park of the Forestry Institute. The two villages of Okhta, on the right bank, are suburbs; higher up, on the left bank, are several factories (Alexandrovsk) which formerly belonged to the crown,where playing cards, cottons, glass, chiua, ironware, and so on are made. The true boundary of St. Petersburg on the south is the Obvodnyi Canal; but wide tracts covered with orchards, cemeteries, and factories, or even uuoccupied spaces, are included in the city in that direction, though they are being rapidly covered with buildings.

Of the 21,195 acres covered by St. Petersburg 1160 remain unoccupicd. The gardens and parks, public and private, take up 798 acres, to which must be added Aptekarskiy, Petrovskiy, Elaghin, aud Krestovskiy Islands, which are almost quite covered with parks. Nearly 30 per cent. of the total area of the most densely populated parts are squares and streets, the aggregate length of the latter being 283 miles. More than half of them are lighted by gas, the remainder with kerosene. Except in a few principal streets, which are paved with wood or asphalt, the pavement is usually of granite boulders, and is bad and very difficult to keep iu order. Many streets and embankments in the suburbs are unpaved. Nearly all the more populous parts have water led into the houses (4733 houses in 1883), and the same begins to extend also to the right bank of the Neva. In 1883 7,091,500,000 gallons of water, mostly from the Neva, very pure on the whole,[1] were supplied by seventeen steam-engines to the left-bank portion of the city (9423 gallons per iuhabitant). The number of houses in 1881 was 22,229 inhabited and 16,983 uninhabited,. Of the former 18,816 belonged to private persons and 3148 to societies or the crown. The houses are mostly very large; of the private houses no fewer than 169 had from 400 to 2000 inhabitants each; the contrary holds good of the out-lying parts, where 2005 houses had fewer than 20 inhabitants each.

On 27th December, 1881, the population of St. Petersburg was 861,303, exclusive of the suburbs, and 929,100 including them, thus showing an increase of 29 per cent. since 1869.

[1] For analyses, *see Journ. Russ. Chemical Soc.*, vol. xv. 567.

The census of 1881 having been made with great accuracy, the following interesting results may be relied upou.[2] The density of population varies from 1 inhabitant per 93 square feet to 1 per 17,346 square feet (ou Peterburgskiy Islaud); the average is 1 per 1068 square feet. Less thau a third of the aggregate population (29.3 per cent.) were born in the capital, the remainder coming from all parts of Russia, or being foreigners. The males are to the females in the proportion of 122 to 100; at the same time the married men aud women constitute respectively 49 and 39 per cent. of the population, the uumbers of the unmarried or widowed being respectively 48 and 3 per ceut. for meu, and 56 and 5 for women. The proportiou of children is small. The distribution of the population according to age is as follows:

Under 5 years.....7.9 p. ct.	From 16 to 20 years .....12.2 p. ct.
From 6 to 10 years.....5.7 "	" 21 to 50 " .....55.2 "
" 11 to 15 " .....8.6 "	Above 50 years.....10.4 "

The mortality at St. Petersburg being very high (34.2 in 1883, from 29.7 to 38.6 in 1868-82), and the number of births only 31.1 per 1000, the deaths are in excess of the births by 2500 to 3000 in average years; in 1883 there were 26,320 births (1151 still-born) aud 30,150 deaths. It must not be inferred, however, from these figures that the populatiou of St. Petersburg would die out if not recruited from without. The larger number of thc workmeu who come every year to the capital leave their families in the provinces, and the births which occur do not appear amoug the births of the capital, while the deaths very ofteu do. The chief mortality is due to chest diseascs, which prove fatal ou the average to 9000 persons annually; diseases of the digestive organs also prevail largely; European and perhaps also Asiatic cholera is almost endemic, an average of 3700 deaths annually being due to this cause. Infectious diseases such as typhus (from 4280 to 5100 deaths duriug the last few ycars), diphtheria, aud scarlet fever (3500 deaths) are common. Owiug to a notable increase of thesc three infectious diseases the mortality figures for the last few years are above the average. Of 28,212 deaths nearly two-fifths (12,369) were among children under five. Another critical age seems to be that betwecn 21 and 25. The number of marriages in 1883 was 6183 (only 7.1 per 1000 inhabitants); out of a total of 26,320 births 7977 (30 pcr cent.) were illegitimate; and no fewer than 31 per cent. of all children, both legitimatc and illegitimate, born at St. Petersburg are nursed in the foundlings' home, which sends most of them to be brought up in villages. More than 100,000 persons enter the public hospitals annually.[3]

An interesting feature of the Russian capital is the very high proportion of people living on their own earniugs or income ("independent"), as compared with those who live ou the earnings or income of some one else ("dependent"). Whereas at Paris and Berlin only 34 and 50 per cent. respectively belong to the former category, the proportion is reversed at St. Petersburg: only 33 per cent., 282,678 persons in all, have not their own means of support (18 per cent. of the men and 51 of the women). The proportion of employers to employed, as also the exteut of their respective families, are as follows:

	Trade.	Various industries.	Total.
Employers.....	8,858	19,508	28,366
Their families.....	20,857	38,153	59,010
Clerks.....	3,597	5,581	9,178
Their families.....	4,163	7,491	11,654
Workmen.....	37,559	195,850	233,409
Their families.....	11,997	56,856	68,853
Iudependent workers...	8,336	28,954	37,290
Their families.....	4,470	17,806	22,276

Only a few industrial establishments employ more than twenty workmen, the average being less than teu and the figure seldom falliug below five. Thc great factories are beyond the limits of St. Petersburg, which contains a busy population of artisans grouped in small workshops. The proportions of various professions to the total population are as follows: workmen, 1 in 3; servants, 1 in 10; scholars,

[2] *See St. Petersburg according to the Census of* 1881, and the *Statistical Yearbook of St. Petersburg for* 1883, St. Petersburg, 1884.

[3] Full mortality tables according to the separate diseases are given in the *Statistical Yearbook*. Very careful researches into the sanitary conditions of the city are given in the now suppressed *Sbornik Sudebnoi Meditsiny* (Mag. of Med. Jurisprudence) and *Zdorovye* (Health).

1 in 12; soldiers, 1 in 25; officials, 1 in 61; "rentiers," 1 in 76; female teachers, 1 in 186; male teachers, 1 in 291; policemen, 1 in 208; surgeons, 1 in 608; advocates, 1 in 1261; apothecaries, 1 in 1538; pawnbrokers, 1 in 1846; *savants* or *littérateurs*, 1 in 2121; lawyers, 1 in 2700. In respect of classes, 40.7 per cent. of the aggregate population belong to the "peasants," 20.0 are *myeshchane* (burgesses) and artisans, 12.3 are "nobles," 2.4 "merchants," and 3.1 foreigners. The various religions are represented by 84.9 per cent. Orthodox Greeks, 9.9 Protestants, 3.3 Roman Catholics, and 1.9 various (16,826 Jews). On the whole, the Orthodox population are not great frequenters of the churches, which are far less numerous than in Moscow.

St. Petersburg is well provided with scientific and educational institutions, as also with libraries and museums. The intellectual life of the educated classes is vigorous, and, although 36 per cent. of the population above six years old are unable to read, the workmen must be counted among the most intelligent classes in Russia. Notwithstanding the hardships and prosecutions it is periodically subjected to, the university exercises a pronounced influence on the life of St. Petersburg. In 1882 it had eighty professors and 2165 students (968 in physics and mathematics, 776 in law). The medical faculty forms a separate academy, under military jurisdiction, with about 1500 students. There are, moreover, a philological institute, a technological institute, a forestry academy, an engineering academy, two theological academies (Greek and Roman Catholic), an academy of arts, five military academies, a high school of law and a lyceum. Higher instruction for women is represented by a medical academy (now ordered to be closed), by a free university with 914 students in 1882, the standards of instruction and examination in both being equal to those of the other universities, and by higher pedagogical courses. For secondary education there are twelve classical gymnasia for boys and nine for girls, with four private gymnasia and three progymnasia, eight "real schools," five seminaries for teachers, ten military schools, three German gymnasia, and five other schools. For primary education there are 156 municipality schools (7225 scholars in 1883), 16 schools of the *zemstvo*, and about 450 others maintained either by public institutions or by private persons; 19,400 boys and girls received instruction in 431 public schools in 1884, the aggregate cost being £24,765 [$120,357.90]; about 70 institutions for receiving the younger children of the poorer classes and several private "kindergartens" must be added to the above. The scientific institutions are numerous. The academy of sciences, opened in 1726, has rendered immense service in the exploration of Russia.[1] The oft-repeated reproach that it keeps its doors shut to Russian *savants*, while opening them too widely to German ones, is not without foundation; but the services rendered to science by the Germans in connection with the academy are undoubtedly very great. The Pulkova astronomical observatory, the chief physical (meteorological) observatory (with branches throughout Russia and Siberia), the astronomical observatory at Vilna, the astronomical and magnetical observatory at Peking, and the botanical garden,[2] all attached to the academy of sciences, issue every year publications of the highest scientific value. The Society of Naturalists and the Physical and Chemical Society, though less than twenty years old, have already issued most valuable publications, which are not so well known abroad as they deserve to be. The still more recently founded geological committee is ably pushing forward the geological survey of the country; the Mineralogical Society was founded in 1817. The Geographical Society, with four sections (923 members) and branch societies for West and East Siberia, Caucasus, Orenberg, the northwestern and southwestern provinces of Europeau Russia, all liberally aided by the state, is well known for its valuable work, as is also the Entomological Society. There are four medical societies, and an Archæological Society (since 1846), an Historical Society, an Economical Society (120 years old), Gardening, Forestry, Technical, Navigation Societies, and others, as also several scientific committees appointed at the ministries. The scientific work of the hydrographical department and of the general staff is well known. On the whole, there is access to all these societies, as well as to their museums and libraries. At St. Petersburg classical music always finds first-rate performers and attentive hearers. The conservatory of music gives a superior musical instruction. The Musical Society is also worthy of notice. Art, on the other hand, has not freed itself from the old scholastic methods at the academy. Several independent artistic societies seek to remedy this drawback, and are the true cradle of the Russian *genre* painters.

The imperial public library, open free for 347 days in the year, though far behind the British Museum and the Bibliothèque Nationale in the number of volumes, nevertheless contains rich collections of books and MSS. Its first nucleus was the library of the Polish republic seized in 1795 (262,640 volumes and 24,574 prints), collected mostly by Archbishop Zalusski of Kieff. It has been much enriched since then by purchases and donations, and now (1886) contains more than 1,000,000 volumes, a remarkable collection of 50,000 "Rossica" (everything published in Russia), and 40,000 MSS., some of which are very valuable and unique. The library of the academy of sciences, also open every day, contains more than 500,000 volumes, 13,000 MSS., rich collections of works on Oriental languages, and valuable collections of periodical publications from scientific societies throughout the world. The library of the council of state is also open to the public; while several libraries of scientific societies and departments of the ministries, very rich in their special branches, are easily accessible. Those of the hydrographical department, the academy of art, the musical conservatory, the university (150,000 vols.), are especially valuable to the student. Nearly thirty private circulating libraries, which have to contend with many restrictions, supply the students for a small fee with everything printed in Russia, if not prohibited by Government. The museums of the Russian capital have a marked place among those of Europe. That of the academy of science, with more than 100,000 systematically classified natural history specimens; that of the Mineralogical Society, giving a full picture of the geology of Russia; the Asiatic museum, with its rich collections of Asiatic MSS. and coins; and several others are of great scientific value. The Hermitage Art Gallery contains a first-rate collection of the Flemish school, some pictures of the Russian school (the remainder being at the academy of arts), some good specimens of the Italian, Spanish, and old French schools, and especially invaluable treasures of Greek and Scythian antiquities, as also a good collection of 200,000 engravings. The old Christian and old Russian arts are well represented at the museum of the academy of arts. Besides these there are many other museums—pedagogical, medical, engineering, agricultural, forestry, marine, technical.

The press is represented by about 120 periodicals, including those of the scientific societies; the right of publishing political papers is a monopoly in the hands of the very few editors who are able to procure the necessary authorization. The publication of literary and scientific works, after having developed rapidly in 1859–69, is now greatly on the decrease owing to the oppressive measures of the censorship. In the development of the Russian drama St. Petersburg has played a far less important part than Moscow, and the stage at St. Petersburg has never reached the same standard of excellence as that of the older capital. On the other hand, St. Petersburg is the cradle of Russian opera and Russian music. There are only four theatres of importance at St. Petersburg—all imperial—two for the opera and ballet, one for the native drama, and one for the French and German drama.

St. Petersburg is much less of a manufacturing city than Moscow or Berlin. The annual production of all the manufactures of the government of St. Petersburg, chiefly concentrated in or around the capital, was in 1879 valued at £16,768,600 [$81,495,396] out of £110,294,900 [$536,033,214] for the empire, against £19,500,000 [$94,770,000] in the government of Moscow. The chief manufactured goods are cottons (£3,073,000 [$14,934,780]) and other textile fabrics (altogether £3,762,500 [$18,285,750]), machinery (£2,355,800 [$11,449,188]), rails (£1,342,300 [$6,523,578]), tobacco and spirits (about £1,200,000 [$5,832,000] each), leather, sugar, stearine, candles, copper and gum wares (from £850,000 [$4,131,000] to £450,000 [$2,187,000] each), and a variety of smaller articles. The minor trades are greatly developed. No exact statistics of the internal trade can be given except for the import and export of articles of food. In 1883 31,176,000 cwts. of grain and flour were imported by rail or river, of which 18,680,450 were reëxported and 2,809,900 sent to the interior. The exports in 1882 were valued at £1,864,980 [$9,063,802.80] from St. Petersburg and at £6,557,017 [$31,867,102.62] from Cronstadt, the aggregate thus being £8,421,997 [$40,930,905.42], in which articles of food, chiefly corn, represented £4,214,312 [$20,481,556.32], raw and half raw produce £4,009,446 [$19,485,907.56], and manufactured wares £197,520 [$959,947.20]. The value of the imports was —to St. Petersburg £8,616,383 [$41,875,645.68], and to Cronstadt £116,316 [$565,295.76]. Among the total imports articles of food were valued at £1,941,393 [$9,435,169.98], raw and half raw produce at £4,009,090 [$19,484,177.40] (chiefly coal), and manufactured wares at £1,082,698 [$5,-

[1] Sukhomlinoff, "History of the Academy of Sciences," in its *Memoirs* (Russian), vol. xxvi., 1876, and the same year in its *Mémoires* in German.

[2] Trautvetter, "History of the Botanical Garden," in *Memoirs* of the same, 1873, vol. ii.

261,912.28]. Cronstadt and St. Petersburg were visited in the same year by 2195 ships of 951,000 tons (730 ships, 152,730 tons, from Great Britain). The coasting trade was represented by 702 vessels (119,300 tons) entered. The commercial fleet numbered only 43 steamers (14,000 tons) and 49 sailing vessels (8200 tons).

Six railways meet at St. Petersburg. Two run westwards along both banks of the Gulf of Finland to Hangöudd and to Port Baltic; two short lines connect Oranienbaum opposite Cronstadt, and Tsarskoye Selo (with Pavlovsk) with the capital; and two great trunk-lines run southwest and southeast to Warsaw (with branches to Riga and Smolensk) and to Moscow (with branches to Novgorod and Rybinsk). All are connected in the capital, except the Finland railway, which has its station on the right bank of the Neva. Moreover, the Neva is the great channel for the trade of St. Petersburg with the rest of Russia, by means of the Volga and its tributaries. The importance of the traffic may best be seen from the following figures, showing in cwts. the amount imported by different channels:

	Corn and flour.	Firewood.	All kinds of wares.
Neva	11,061,000	20,891,000	59,331,000
Baltic Railway	311,000	301,000	3,532,000
Moscow Railway	12,558,000	482,000	21,056,000
Warsaw Railway	312,000	157,000	2,353,000

No less than 1,162,230 pieces together with 7,337,000 cwts. of timber were supplied in the same year *via* the Neva. The aggregate exports by rail and the Neva amounted to 11,382,000 cwts.

The average income of the St. Petersburg municipality was £581,425 [$2,825,725.50] in 1880–82 (£577,856 [$2,808,380.16] in 1884),—that is 13.7s. [$3.33] (6.84 roubles) per inhabitant, as against 35.8s. [$8.70] at Berlin, and 98.2s. [$23.86] at Paris. The indirect taxes yield but 1s. [24.3 cts.] per inhabitant (57s. [$13.85] at Paris. The average expenses for the same years reached £574,479 [$2,791,967.94] (£572,162 [$2,780,707.32] in 1884), distributed as follows: 20 per cent. of the whole for the police (10 at Paris and 27.5 at Berlin), 8 for administration, 16 for paving, 7 for lighting, 5 for public instruction, 2.6 for charity, and 3 for the debt (7 at Berlin and 37 at Paris). The municipal affairs are in the hands of a municipality, elected by three categories of electors (see RUSSIA), and is practically a department of the chief of police. The city is under a separate governor-general, whose authority, like that of the chief of police, is all the more unlimited since it has not been accurately defined by law.

St. Petersburg is surrounded by several fine residences, mostly imperial palaces with large and beautiful parks. Tsarskoye Selo, 16 miles to the southeast, and Peterhof, on the Gulf of Finland, are summer residences of the emperor. Pavlovsk has a fine palace and parks, open to the public, where summer concerts attract thousands of people. Oranienbaum is now a rather neglected place. Pulkova, on a hill 5 miles from St. Petersburg, is well known for its observatory; while several villages north of the capital, such as Pargolovo, Murino, etc., are visited in summer by the less wealthy inhabitants.

History.—The region between Lake Ladoga and the Gulf of Finland was inhabited in the 9th century by Finns and some Slavonians. Novgorod and Pskoff made efforts to retain their dominion over this region, so important for their trade, and in the 13th and 14th centuries they built the forts of Koporye (in the present district of Peterhof), Yam (now Yamburg), and Oryeshek (now Schlüsselburg) at the point where the Neva issues from Lake Ladoga. They found, however, powerful opponents in the Swedes, who erected the fort of Landskrona at the junction of the Okhta and the Neva, and in the Livonians, who had their fortress at Narva. Novgorod and Moscow successfully were able by continuous fighting to maintain their supremacy over the region south of the Neva throughout the 16th century; but early in the 17th century Moscow was compelled to cede it to Sweden, which erected a fortress (Nyönschanz) on the Neva at the mouth of the Okhta. In 1700 Peter I. began his wars with Sweden. Oryeshek was taken in 1702, and next year Nyönschanz. Two months later (29th June, 1703) Peter I. laid the foundations of a cathedral to St. Peter and St. Paul, and of a fort which received his own name (in its Dutch transcription, "Piterburgh"). Next year the fort of Cronslott was erected on the island of Kotlin, as also the admiralty on the Neva, opposite the fortress. The emperor took most severe and almost barbarous measures for increasing his newborn city. Thousands of people from all parts of Russia were removed thither and died in erecting the fortress and building the houses. Great numbers of artisans and workmen were brought to St. Petersburg to form the Myeshchanskaya villages, which raised the population to 100,000 inhabitants. All proprietors of more than "500 souls" were ordered to build a house at St. Petersburg and to stay there in the winter. The construction of stone-houses throughout the rest of Russia was prohibited, all masons having to be sent to St. Petersburg. After Peter I.'s death the population of the capital rapidly decreased; but foreigners continued to settle there. Under Elizabeth a new series of compulsory measures raised the population to 150,000, which figure was nearly doubled during the reign of Catherine II. Since the beginning of the present century the population has steadily increased (364,000 in 1817, 468,600 in 1837, 491,000 in 1856, and 667,000 in 1869). The chief embellishments of St. Petersburg were effected during the reigns of Alexander I. (1801–25) and Nicholas I. (1825–55).

When Peter I., desirous of giving a "European" capital to his empire, laid the first foundations of St. Petersburg on the marshy islands of the Neva, in land not fully conquered and remote from the centres of Russian life, it is hardly possible that he could have foreseen the rapid development it has since undergone: it has now a population approaching a million and commands more than one-sixth of the foreign trade and manufactures of Russia. In point of fact, there is no capital in Europe so disadvantageously situated with regard to its own country as St. Petersburg. Desolate wildernesses begin at its very gates and extend for hundreds of miles to the north and east. To the south it has the very thinly peopled regions of Pskoff and Novgorod,—the marshy and woody tracts of the Valdai Heights. For 400 miles in each of these three directions there is not a single city of any importance; and towards the west, on both shores of the Gulf of Finland, are foreign peoples who have their own centres of gravitation in cities on or nearer to the Baltic. With the provinces of Russia the capital is connected only by canals and railways, which have to traverse vast tracts of inhospitable country before reaching them. But St. Petersburg possesses, on the other hand, one immense advantage in its site, which has proved of great moment, especially in the present century of development of international traffic. Ruled by the idea of creating a new Amsterdam—that is, a meeting-place for traders of all nationalities—and a great export market for Russia, Peter I. could have selected no better place. St. Petersburg has been for nearly 150 years the chief place of export for raw produce from the most productive parts of Russia. The great central plateau which forms the upper basins of all the chief Russian rivers had no other outlet to the sea than the estuary of the Neva. The natural outlet might indeed have been the Black Sea; but the rivers to the southward are either interrupted by rapids like the Dnieper, or are shallow like the Don; while their mouths and the entire coast-region remained till the end of the 18th century in the hands of Turkey. As for the Caspian, it faced Asia, and not Europe. The commercial outlet of the central plateau was thus the reverse of the physical. From the earliest years of Russian history trade had taken this northern direction. Novgorod owed its wealth to this fact; and as far back as the 12th century the Russians had their forts on Lake Ladoga and the Neva. In the 14th and 15th centuries they already exchanged their wares with the Dantzic merchants at Nu or Nü,—the then name for what is now Vasilyevskiy Island. By founding St. Petersburg Peter I. only restored the trade to its old but discarded channels. The system of canals for connecting the upper Volga and the Dnieper with the great lakes of the north completed the work; the commercial mouth of the Volga was transferred to the Gulf of Finland, and St. Petersburg became the export harbor for more than half Russia. Foreigners hastened thither to take possession of the growing export trade, to the exclusion of the Russians; and to this circumstance the Russian capital is indebted for its cosmopolitan character. But its present extensive and west-European aspect has not been achieved, nor is it maintained, without a vast expenditure of national resources. It cost hundreds of thousands of human lives before the marshy islands at the mouth of the Neva could be rendered fit to receive a million inhabitants and be brought into connection with the remainder of Russia; and very many more are annually sacrificed for the maintenance of this capital on its unhealthy site, under the 60th parallel, hundreds of miles distant from the centres of Russian life.

The development of the railway system and the rapid colonization of southern Russia now operate, however, adversely to St. Petersburg. Its foreign trade is not actually decreasing, but the very rapid growth in the exports

of Russia within the twenty years before 1886 was entirely to the benefit of other ports more highly favored by nature, such as Riga and especially Libau, while the rapid increase of population in the Black Sea region is tending to shift the Russian centre of gravity: new centres of commercial, industrial, aud iutellectual life are beiug developed at Odessa and Rostoff. The revival of Little Russia is another influence operating in the same direction.

Another important factor in the growth of the influence of St. Petersburg on Russian life was the coucentration of all political power in the hands of an absolute Goverument and in the narrow circles surrounding the chief of the state. As Yuriy Dolgorukiy felt the necessity of creating for a new phase of national history—that of a centralized state—a new capital, Moscow, free from the municipal and republican traditions of the old Russian towns, so Peter I. felt the necessity of again creatiug a fresh capital for a third phase of the country's progress,—a capital where the rising imperial power would be free from the control of the old boyar families. St. Petersburg fully answers to this need. For more than a ceutury and a half it was the real centre of political life aud of political thought, impregnated with the conception of a powerful central Government. In so strongly centralized a state as Russia was, and still is, and for the phase of life which the empire has passed through during the last two centuries, it mattered little whether the capital was some hundred miles away from the natural centres of life and without the support of a dense and active surroundiug population. Bureaucracy, its leading feature, was simply reinforced by the remoteuess of the capital. But these circumstauces are at preseut undergoing a change. Since the abolition of serfdom and in consequence of the impulse giveu to Russian thought by this reform, the provinces are comiug more and more to dispute the right of St. Petersburg to guide the political life of the country. It has beeu often said that St. Petersburg is the head of Russia aud Moscow its heart. The first part at least of this sayiug is true. In the development of thought and in naturalizing in Russia the results of west European reflection St. Petersburg has played throughout the present century a prominent part. Attracting to itself from the provinces the best intellects of the country, it has powerfully contributed towards familiarizing the reading public with the teachings of west European science and philosophy, and towards giving to Russiau literature that liberality of mind and freedom from the trammels of tradition that have so ofteu been noticed by west Europeans. St. Petersburg has no traditions, no history beyond that of the palace couspiracies, aud nothing iu its past can attract the writer or the thiuker. But, as new centres of intellectual movement aud new curreuts of thought develop again at Moscow aud Kieff or arise anew at Odessa and in the eastern provinces, these places claim the right to their own share in the further development of intellectual life in Russia; and it would not be surprising if the administrative and intellectual centre of the empire, after its migrations successively from Kieff, Novgorod, and Pskoff to Moscow, and thence to St. Petersburg, were again to follow a new movement towards the south. (P. A. K.)

ST. PIERRE. See RÉUNION, vol. xx. p. 507.

ST. PIERRE. See MARTINIQUE, vol. xv. p. 593.

SAINT-PIERRE, CHARLES IRÉNÉE CASTEL, ABBÉ DE (1658-1743), a French writer of much ingenuity and influence, who is not unfrequently confounded with the author of *Paul et Virginie*, was born near Barfleur on the 18th of February, 1658. His father was bailli of the Cotentin, and Saint-Pierre, who was educated by the Jesuits, appears to have had an easy entrance to the best literary and political society of the capital. He was presented to the abbacy of Tiron, which a century before the poet Desportes had held, and was elected to the Academy in 1695. But in 1718, in consequence of the political offence given by his *Polysynodie*, he suffered the very rare penalty of expulsion from that body. He died at Paris in 1743.

Saint-Pierre's works (collected shortly before his death in eighteen volumes and originally published chiefly in the second and third decades of the 18th century) are almost entirely occupied with an acute and inventive, though generally visionary, criticism of politics, law, and social institutions. They had a great influence on Rousseau, who has left elaborate examinations of some of them, aud has reproduced not a few of their ideas in his own work. The titles are almost sufficient to show their nature. The chief are *Projet de Paix Perpetuelle* (appositely published at Utrecht in 1713) and *Polysynodie* (a severe stricture on the Government of Louis XIV., with projects for the administration of France by a system of councils for each department of government), together with a crowd of memorials aud projects for stopping duelling, for equalizing taxation, for treating mendicancy, for reforming educatiou and spelling, etc. Unlike the later reforming abbés of the *philosophe* period, Saint-Pierre was a man of very unworldly character and quite destitute of the Frondeur spirit. He was also a man of not a little intellectual power, and, as in the case of every such man who gives his fancy free course in the construction of political Utopias, not a few of his wishes and ideas have been realized iu course of time. But it is difficult to give him much credit for practical grasp of politics.

SAINT-PIERRE, JACQUES HENRI BERNARDIN DE (1737-1814), French man-of-letters, was born at Havre on 19th January, 1737, and was educated at Caen. After a fashion commoner with English than with French boys, he took an early fancy to the sea, and his uncle, a ship captain, gave him the opportunity of gratifying it. But a single voyage to Martinique was enough for him and he went back to school. He next wanted to be a missionary; but his parents, who had probably taken the measure of his enthusiasms from his sea experiences, objected, and he became an engineer. He served in the army, but was dismissed for insubordination, and, after quarrelling with his family, was in some difficulty. But in 1761 he obtained an appointment at Malta, which also he did not hold long. The most rolling of stones, he appears at St. Petersburg, at Warsaw, at Dresden, at Berlin, holding brief commissions as an engineer and rejoicing in romantic adventures. But he came back to Paris at the age of thirty even poorer than he set out. He then passed two years in literary work, supporting himself in an unknown fashion, and in 1768 (for he seems to have been as successful in obtaining appointments as in losing them) he set out for the Isle of France (Mauritius) with a Government commission and remained there three years, returning home in 1771. These wanderings supplied Bernardin with the whole of what may be called his stock-in-trade, for, though he lived more than forty years longer, he never again quitted France. He was very poor, and indeed it is not easy to discover from his biographers what he lived upon, for, though he was an unwearied solicitor of employments and "gratifications," he received but little, and his touchy and sensitive temperament frequently caused him to quarrel with what little he did receive. On his return from Mauritius he was introduced to the society of D'Alembert and his friends, and continued to frequent it. But he took no great pleasure in the company of any literary man except Rousseau, of whom in Jean Jacques's last years he saw much, and on whom he formed both his own character and still more his style to a considerable degree. His first work of any importance, the *Voyage à l'Île de France*, appeared in 1773 and gained him some reputation. It is the soberest and therefore the least characteristic of his books. The *Études de la Nature*, which made his fame and assured him of literary success, did not appear till ten years later, his masterpiece *Paul et Virginie* not till 1787, and his other masterpiece (which, as much less sentimental and showing not a little humor, some persons may be allowed to prefer), the *Chaumière Indienne*, not till 1790. In 1792 he married a very young girl, Félicité Didot. For a short time in 1792 he was superintendent of the Jardin des Plantes, and again for a short time professor of morals at the École Normale in 1794. Next year he became a member of the Institute. After his first wife's death he married, in 1800, when he was sixty-three, another young girl, Désirée de Pelleport, and is said to have been very happy with her. He still continued to publish, and was something of a favorite with Napoleon. On the 21st of January, 1814, he died at Éragny near Pontoise, where he had in his last years chiefly lived and where he had a house, so that he cannot have been ill off.

It has been hinted that Bernardin de Saint-Pierre's personal character was not entirely amiable; it may be added that his literary character has not in all English eyes sufficed to atone for it. Englishmen, and not Englishmen only, have been found to pronounce *Paul et Virginie* gaudy in style and unhealthy, not to say unwholesome, in tone. Perhaps Bernardin is not fairly to be judged by this famous story, in which the exuberant sensibility of the time finds equally exuberant expression. The *Chaumière* and some passages in the *Études de la Nature* proper may be thought to exhibit the real merits of his style to greater advantage. The historic estimate (the sole estimate that is of much worth in comparative literary criticism) at once disengages the question from its difficulties. Where Bernardin is of merit and importance is in his breaking away from the dull and arid vocabulary and phrase which more than a century of classical writing had brought upon France, in his genuine and vigorous preference of the beauties of nature to the mere charms of drawing-room society, and in the attempt which he made, with as much sincerity as could fairly be expected from a man of his day, to reproduce the aspects of the natural world faithfully. After Rousseau, and even more than Rousseau, Bernardin was in French literature the apostle of the return to nature, and, though in him and his immediate follower, Chateaubriand, there is still much mannerism and unreality, he should not and will not lack the credit due.

Aimé Martin, disciple of Bernardin and the second husband of his second wife, published a complete edition of his works in 18 volumes (Paris, 1818-20), afterwards increased by additional correspondence, etc. *Paul et Virginie*, the *Chaumière Indienne*, etc., have been separately reprinted in innumerable forms.

ST. PIERRE AND MIQUELON, two islands 10 miles off the south coast of Newfoundland (see vol. xvii. pl. V.), at the entrance of Fortune Bay, are, with five lesser islets, the last remnant of the North American colonies of France. Both are rugged masses of granite, with a few small streams and lakelets, a thin covering of soil, and scanty vegetation. Miquelon (area 45,542 acres) consists of Great Miquelon in the north and Little Miquelon, Langlade, or Langley in the south; previous to 1783 they were separate islands divided by a navigable channel, but they have since become connected by a dangerous sand-bar. St. Pierre (6420 acres) has a good harbor and roadstead, the latter, protected by Ile aux Chiens, affording shelter, except in northeast storms, to the largest vessels. The small but busy town of St. Pierre climbing the steep hill above the harbor is mainly built of wood; but it has a cathedral (of wood), an English chapel, a governor's residence, and various administrative offices, including the American terminus of the French Atlantic Cable. Cod-fishing, to which the settlement owes its prosperity, was prosecuted in the five years 1878-82, on an average, by 4560 fishermen (mainly from Dunkirk and other French ports), and produced 3876 tons of dried and 157,754 tons of undried cod, with 450 tons of cod-liver oil. The total exports and imports were valued respectively at 9,218,278 [$1,779,127.65] and 4,441,817 francs [$857,270.68] in 1865, and 17,164,153[1] [$3,312,681.53] and 11,062,617 francs [$2,135,085.08] in 1883. The foreign trade in 1883 was valued at 10,218,473 francs [$1,972,165.29]. The population of the islands was 5564 (town of St Pierre 4365) in 1883; but the number is often above 10,000 in the fishing season.

St. Pierre and Miquelon, with 3000 inhabitants, were ceded to England along with Newfoundland in 1713; but on the English conquest of Canada they were assigned to France as a fishery depôt. Destroyed by the English in 1778, restored to France in 1783, again depopulated by the English in 1793, recovered by France in 1802 and lost in 1803, the islands have remained an undisputed French possession since 1816.

ST. PIERRE-LÈS-CALAIS, a suburb of CALAIS (*q.v.*), with a population of 30,786 in 1881.

ST. POL DE LÉON, a town of France, in the arrondissement of Morlaix and department of Finistère, not far from the shores of the English Channel, 13¾ miles northwest of Morlaix by the railway to Roscoff. This quiet episcopal city, old but modernized, is mainly of interest on account of its cathedral and the church of Notre Dame, though it also contains an episcopal palace (1712-50), a seminary (1691), and a hospital (1711). The cathedral, classed as an historical monument, belongs largely to the 13th century. Besides the west front, with its portico and its two towers with granite spires 180 feet high, the principal points of architectural interest are the traceried window of the south transept (with its glass) and the rectangular apse, and in the interior the stalls of the choir (16th century) and the fascicled pillars and vault-arches of the nave. On the right of the high altar is a wooden shrine containing the bell of St. Pol de Léon (6 lb 10 oz. in weight), which has the repute of curing headache and diseases of the ear, and at the side of the main entrance is a huge baptismal font, popularly regarded as the stone coffin of Conan Mériadec, king of the Bretons. Notre Dame de Creizker has a 15th-century spire, 252 feet high, which crowns the central tower. The north porch is a fine specimen of the flamboyant style. The population of the town in 1881 was 3739 and of the commune 6659.

St. Pol de Léon, or *Fanum Sancti Pauli Leonini*, was formerly a place of considerable importance. The barony of Léon, in the possession of the dukes of Rohan, gave them the right of presiding in the provincial states alternatively with the duke of La Trémouille, baron of Vitré.

ST. QUENTIN, a manufacturing town of France, the chef-lieu of an arrondissement and in population (45,697 in 1881) the largest town in the department of Aisne, stands on the right bank of the Somme, at the junction of the Somme Canal with the St. Quentin Canal (which unites the Somme Canal with the Scheldt), 95½ miles northeast of Paris by the railway to Brussels and Cologne, with branch lines to Guise (on the Oise) and Epéhy on the Flanders and Picardy railway. Built on a slope, with a southern exposure, the town is crowned by the collegiate church of St. Quentin, one of the finest Gothic buildings of the north of France, which was erected between 1114 and 1477, and has, like some English cathedrals, the somewhat rare peculiarity of double transepts. The length of the church is 436 feet and the height of the nave 131. The magnificent clerestory windows are supported by a very elegant triforium. The baptismal chapel contains a fine stone retable. The choir has a great resemblance to that of Rheims, and, like the chapels of the apse, has been decorated with polychromic paintings. Under the choir is a crypt, occupying the site of an older crypt constructed in the 9th century, of which only the three vaults with the tombs of St. Quentin and his fellow-martyrs remain. The town-house of St. Quentin is a splendid building of the 15th and 16th centuries, with a flamboyant façade, adorned with curious sculptures. Behind the central gable rises a bell-tower with chimes. The council-room is a fine hall with a double wooden ceiling and a huge chimney-piece half Gothic half Renaissance. The old buildings of the Bernardines of Fervaques now provide accommodation for the courts, the learned societies, the school of design, the museum, and the library, and contain a large hall for public meetings. St. Quentin is the centre of an industrial district which employs 130,000 workmen in 800 factories, and manufactures the fortieth part of the cotton imported into France, producing goods to the value of about £3,500,000 [$17,010,000], mainly calicoes, percales (glazed cottons), cretonnes, jaconets, twills, piqués, muslins, cambrics, gauzes, wool-muslins, Scotch cashmeres, and merinos. Other industries are the making of embroideries by machinery and by hand, turning billiard-balls, and engine-building.

St. Quentin, the *Augusta Veromanduorum* of the Romans, stood at the meeting-place of five roads of military importance. In the 3d century it was the scene of the martyrdom of Caius Quintinus, who had come as a preacher of Christianity, and in the reign of Dagobert the martyr's tomb

[1] [*Almanach de Gotha* gives the exports for 1883 at 30,800,000 francs.—AM. ED.].

became under the influence of St. Éloi a place of pilgrimage. After it had been thrice ravaged by the Normans the town was surrounded by walls in 883. It became under Pippin, grandson of Charlemagne, one of the principal domains of the county of Vermandois, and in 1103 was constituted a commune. In 1195 it was incorporated with the royal domain and about the same time received an increase of its privileges. From 1420 to 1471 St. Quentin was occupied by the Burgundians. Its capture by the Spaniards on the day of St. Lawrence, 1557, was the success which Philip II. of Spain commemorated by building the Escorial. Two years later the town was restored to the French, and in 1560 it was assigned as the dowry of Mary Stuart. The fortifications erected under Louis XIV. were demolished between 1810 and 1820. During the Franco-Prussian War St. Quentin repulsed the German attacks of 8th October, 1870; and on 19th January, 1871, it was the centre of the great battle fought by General Faidherbe, one of the last episodes of the campaign.

ST. SEBASTIAN. See San Sebastian.

ST. SERVAN, a cantonal town of France, in the department of Ille-et-Vilaine, on the right bank of the Rance to the south of St. Malo, from which it is separated by a creek at least a mile wide (see St. Malo). In population (10,691 inhabitants in 1881 ; 12,867 in the commune) St. Servan is slightly the smaller town of the two. It is not enclosed by walls, and with its new houses, straight wide streets, and numerous gardens forms quite a contrast to its neighbor. In summer it attracts a number of seaside visitors. The floating dock will when finished have an area of 27 acres and one mile of quays. The creek on which it opens is dry at low water, but at high water is 30 to 40 feet deep. Another port on the Rance, to the southwest of the town at the foot of the tower of Solidor, is used by the local guard-ship. This tower, erected in the close of the 14th century by Duke John IV. for the purpose of contesting the claims of Josselin de Rohan, bishop of St. Malo, to the temporal sovereignty of the town, consists of three distinct towers formed into a triangle by loop-holed and machicolated curtains. At the northwest point of St. Servan stands the "city fort" and near by are the ruins of the cathedral of St. Peter of Aleth, the seat of a bishopric from the 6th to the 12th century. The church is modern (1742–1842).

The northern quarter of St. Servan, called "the City," occupies the site of the city of Aleth, which at the close of the Roman empire supplanted Corseul as the capital of the Curiosolites. Aleth was a bulwark of Druidism in those regions and was not Christianized till the 6th century, when St. Malo became its first bishop. On the removal of the bishopric to St. Malo Aleth declined; but the houses that remained standing became the nucleus of a new community which placed itself under the patronage of St. Servan, apostle of the Orkneys. In 1758 the place was occupied by Marlborough. It was not till 1789 that St. Servan became a separate commune from St. Malo with a municipality and police of its own.

SAINT-SIMON, Claude Henri, Comte de (1760–1825), the founder of French socialism, was born at Paris on 17th October, 1760. He belonged to a younger branch of the family of the celebrated duke of that name. His education, he tells us, was directed by D'Alembert. At the age of nineteen he went as volunteer to assist the American colonies in their revolt against Britain. From his youth Saint-Simon felt the promptings of an eager ambition. His valet had orders to awake him every morning with the words, "Remember, monsieur le comte, that you have great things to do"; and his ancestor Charlemagne appeared to him in a dream foretelling a remarkable future for him. Among his early schemes was one to unite the Atlantic and the Pacific by a canal, and another to construct a canal from Madrid to the sea. He took no part of any importance in the Revolution, but amassed a little fortune by land speculation,—not on his own account, however, as he said, but to facilitate his future projects. Accordingly, when he was nearly forty years of age he went through a varied course of study and experiment, in order to enlarge and clarify his view of things. One of these experiments was an unhappy marriage, which, after a year's duration, was dissolved by the mutual consent of the parties. Another result of his experiments was that he found himself completely impoverished, and lived in penury for the remainder of his life. The first of his numerous writings, *Lettres d'un Habitant de Genève*, appeared in 1803; but his early writings were mostly scientific and political. It was not till 1817 that he began in a treatise entitled *L'Industrie* to propound his socialistic views, which he further developed in *L'Organisateur* (1819), *Du Système Industriel* (1821), *Catéchisme des Industriels* (1823). The last and most important expression of his views is the *Nouveau Christianisme* (1825). For many years before his death in 1825 (at Paris on 19th May) Saint-Simon had been reduced to the greatest straits. He was obliged to accept a laborious post for a salary of £40 [$194.40] a year, to live on the generosity of a former valet, and finally to solicit a small pension from his family. In 1823 he attempted suicide in despair. It was not till very late in his career that he attached to himself a few ardent disciples.

As a thinker Saint-Simon was entirely deficient in system, clearness, and consecutive strength. But his great influence on modern thought is undeniable, both as the historic founder of French socialism and as suggesting much of what was afterwards elaborated into Comtism. Apart from the details of his socialistic teaching, which are vague, inconsistent, and unsystematic, we find that the ideas of Saint-Simon as to the reconstruction of society are very simple. His opinions were conditioned by the French Revolution and by the feudal and military system still prevalent in France. In opposition to the destructive liberalism of the Revolution he insisted on the necessity of a new and positive reorganization of society. So far was he from advocating fresh social revolt that he appealed to Louis XVIII. to inaugurate the new order of things. In opposition, however, to the feudal and military system, the former aspect of which had been strengthened by the restoration, he advocated an arrangement by which the industrial chiefs should control society. In place of the mediæval church the spiritual direction of society should fall to the men of science. What Saint-Simon desired, therefore, was an industrialist state directed by modern science. In short, the men who are fitted to organize society for productive labor are entitled to bear rule in it. The social aim is to produce things useful to life; the final end of social activity is "the exploitation of the globe by association." The contrast between labor and capital so much emphasized by later socialism is not present to Saint-Simon, but it is assumed that the industrial chiefs, to whom the control of production is to be committed, shall rule in the interest of society. Later on the cause of the poor receives greater attention, till in his greatest work, *The New Christianity*, it becomes the central point of his teaching and takes the form of a religion. It was this religious development of his teaching that occasioned his final quarrel with Comte. Previous to the publication of the *Nouveau Christianisme*, Saint-Simon had not concerned himself with theology. Here he starts from a belief in God, and his object in the treatise is to reduce Christianity to its simple and essential elements. He does this by clearing it of the dogmas and other excrescences and defects which have gathered round both the Catholic and Protestant forms of it, which he subjects to a searching and ingenious criticism. "The new Christian organization will deduce the temporal institutions as well as the spiritual from the principle that all men should act towards one another as brethren." Expressing the same idea in modern language, Saint-Simon propounds as the comprehensive formula of the new Christianity this precept: "The whole of society ought to strive towards the amelioration of the moral and physical existence of the poorest class; society ought to organize itself in the way best adapted for attaining this end." This prin-

ciple became the watchword of the entire school of Saint-Simon; for them it was alike the essence of religion and the programme of social reform.

During his lifetime the views of Saint-Simon had very little influence; and he left only a very few devoted disciples, who continued to advocate the doctrines of their master, whom they revered as a prophet. An important departure was made in 1828 by Bazard, who gave a "complete exposition of the Saint-Simonian faith" in a long course of lectures at Paris in the Rue Taranne. In 1830 Bazard and Enfantin were acknowledged as the heads of the school; and the fermentation caused by the revolution of July of the same year brought the whole movement prominently before the attention of France. Early next year the school obtained possession of the *Globe* through Pierre Leroux, who had joined the school, which now numbered some of the ablest and most promising young men of France, many of the pupils of the École Polytechnique having caught its enthusiasm. The members formed themselves into an association arranged in three grades, and constituting a society or family, which lived out of a common purse in the Rue Monsigny. Before long, however, dissensions began to arise in the sect. Bazard, a man of logical and more solid temperament, could no longer work in harmony with Enfantin, who desired to establish an arrogant and fantastic sacerdotalism with lax notions as to marriage and the relation of the sexes. After a time Bazard seceded and many of the strongest supporters of the school followed his example. A series of extravagant entertainments given by the society during the winter of 1832 reduced its financial resources and greatly discredited it in character. They finally removed to Menilmontant, to a property of Enfantin, where they lived in a communistic society, distinguished by a peculiar dress. Shortly after the chiefs were tried and condemned for proceedings prejudicial to the social order; and the sect was entirely broken up (1832). Many of its members became famous as engineers, economists, and men of business. The idea of constructing the Suez Canal, as carried out by Lesseps, proceeded from the school.

In the school of Saint-Simon we find a great advance both in the breadth and firmness with which the vague and confused views of the master are developed; and this progress is dne chiefly to Bazard. In the philosophy of history they recognize epochs of two kinds, the critical or negative and the organic or constructive. The former, in which philosophy is the dominating force, is characterized by war, egotism, and anarchy; the latter, which is controlled by religion, is marked by the spirit of obedience, devotion, association. The two spirits of antagonism and association are the two great social principles, and on the degree of prevalence of the two depends the character of an epoch. The spirit of associatiou, however, tends more and more to prevail over its opponent, extending from the family to the city, from the city to the nation, and from the nation to the federation. This principle of association is to be the keynote of the social development of the future. Hitherto the law of humanity has been the "exploitation of man by man" in its three stages, slavery, serfdom, the proletariat; in the future the aim must be "the exploitation of the globe by man associated to man." Under the present system the industrial chief still exploits the proletariat, the members of which, though nominally free, must accept his terms under pain of starvation. This state of things is consolidated by the law of inheritance, whereby the instruments of production, which are private property, and all the attendant social advantages are transmitted without regard to personal merit. The social disadvantages being also transmitted, misery becomes hereditary. The only remedy for this is the abolition of the law of inheritance, and the union of all the instruments of labor in a social fund, which shall be exploited by association. Society thus becomes sole proprietor, entrusting to social groups and social functionaries the management of the various properties. The right of succession is transferred from the family to the state. The school of Saint-Simon insists strongly on the claims of merit; they advocate a social hierarchy in which each man shall be placed according to his capacity and rewarded according to his works This is, indeed, a most special and pronounced feature of the Saint-Simon socialism, whose theory of government is a kind of spiritual or scientific autocracy, degenerating into the fantastic sacerdotalism of Enfantin. With regard to the family and the relation of the sexes the school of Saint-Simon advocated the complete emancipation of woman and her entire equality with man. The "social individual" is man and woman, who are associated in the exercise of the triple function of religion, the state, and the family. In its official declarations the school maintained the sanctity of the Christian law of marriage. On this point Enfantin fell into a prurient and fantastic latitudinarianism, which made the school a scandal to France, but many of the most prominent members besides Bazard refused to follow him. Connected with these doctrines was their famous theory of the "rehabilitation of the flesh," deduced from the philosophic theory of the school, which was a species of Pantheism, though they repudiated the name. On this theory they rejected the dualism so much emphasized by Catholic Christianity in its penances and mortifications, and held that the body should be restored to its due place of honor. It is a vague principle of which the ethical character depends on the interpretation; and it was variously interpreted in the school of Saint-Simon. It was certainly immoral as held by Enfantin, by whom it was developed into a kind of sensual mysticism, a system of free love with a religious sanction.

An excellent edition of the works of Saint-Simon and Enfantin was begun by survivors of the sect in Paris (1865), and now numbers forty vols. See Reybaud, *Études sur les Réformateurs modernes* (7th edition, Paris, 1864); Janet, *Saint-Simon et le Saint-Simonisme* (Paris, 1878); A. J. Booth, *Saint-Simon and Saint-Simonism* (London, 1871). (T. K.)

SAINT-SIMON, Louis de Rouvray (or Rouvroy), Duc de (1675–1755), was born at Versailles on 16th January, 1675. He was a son of Claude de Saint-Simon, who represented a family which had been established for many centuries at La Ferté Vidame, between Mortagne and Dreux, and which claimed descent from Charlemagne. Claude de Saint-Simon had been a page of Louis XIII., and, gaining the king's favor as a sportsman, had received various preferments and was finally created *duc et pair*. This peerage is the central fact in Saint-Simon's history, and it is impossible to understand him without understanding it. To speak, as one of his few biographers in English has spoken, of "a young duke of recent creation," and of the apparent absurdity of such a young duke taking the aristocratic views which characterized Saint-Simon through life, is to show the most deplorable ignorance of the facts. The French peerage under the old *régime* was a very peculiar thing, difficult to comprehend at all, but quite certain to be miscomprehended if any analogy of the English peerage, such as is implied in the observation just quoted, is imported into the consideration. No two things could be more different in France than ennobling a man and making him a peer. No one was made a peer who was not ennobled, but men of the noblest blood in France and representing their houses might not be, and in most cases were not, peers. Derived at least traditionally and imaginatively from the *douze pairs* of Charlemagne, the peers were supposed to represent the chosen of the noblesse, and gradually, in an indefinite and constantly disputed fashion, became associated with the parlement of Paris as a quasi-legislative (or at least law-registering) and directly judicial body. But the peerage was further complicated by the fact that not persons but the holders of certain fiefs were made peers. Strictly speaking, neither Saint-Simon nor any one else in the same case was made a peer, but his estate was raised to the rank of a *duché pairie* or a *comté pairie* as the case might be. If all analogies were not deceptive, the nearest idea of a French peerage of the old kind may be obtained by an English reader if he takes the dignity of a Scotch or Irish representative peer, then supposes that dignity to be made hereditary, and then limits the heritableness of it not merely to descent but to the tenure in direct succession of certain estates. It must of course be understood that the peers were not elected but nominated. Still they were in a way a

standing committee representative of the entire body of nobles, and it was Saint-Simon's lifelong ideal and at times his practical effort to convert them into a sort of great council of the nation. These remarks are almost indispensable to illustrate his life, to which we may now return. His mother, Claude de Saint-Simon's second wife, was Charlotte de l'Aubespine, who belonged to a family not of the oldest nobility but which had been distinguished in the public service at least since the time of Francis I. Her son Louis was well educated, to a great extent by herself, and he had had for godfather and godmother no less persons than Louis XIV. and the queen. After some tuition by the Jesuits (especially by Sanadon, the editor of Horace), he betook himself in 1692, at the age of seventeen, to the career of arms, entering the *mousquetaires gris*. He was present at the siege of Namur, and next year his father died. He still continued in the army and was present at the battle of Neerwinden. But it was at this very time that he chose to begin the crusade of his life by instigating, if not bringing, an action on the part of the peers of France against Luxembourg, his victorious general, on a point of precedence. He fought, however, another campaign or two (not under Luxembourg), and in 1695 married Gabrielle de Durfort, daughter of the maréchal de Lorges, under whom he latterly served. He seems to have regarded her with a respect and affection not very usual between husband and wife at the time; and she sometimes succeeded in modifying his aristocratic crotchets. But as he did not receive the promotion he desired he flung up his commission in 1702. Louis, who was already becoming sensitive on the point of military ill-success, and who was not likely to approve Saint-Simon's litigiousness on points of privilege, took a dislike to him, and it was only indirectly and by means of establishing interest with the dukes of Burgundy and Orleans that he was able to keep something of a footing at court. He was, however, intensely interested in all the transactions of Versailles, and by dint of a most heterogeneous collection of instruments, ranging from dukes to servants, he managed to obtain the extraordinary secret information which he has handed down to us about almost every event and every personage of the last twenty years of the "grand monarque." His own part appears to have been entirely subordinate. He was appointed ambassador to Rome in 1705, but the appointment was cancelled before he started. At last he attached himself to the duke of Orleans and, though this was hardly likely to conciliate Louis's good will to him, it gave him at least (what was of the first importance in that intriguing court) the status of belonging to a definite party, and it eventually placed him in the position of tried friend to the acting chief of the state. He was able, moreover, to combine attachment to the duke of Burgundy with that to the duke of Orleans. Both attachments were no doubt all the more sincere because of his undying hatred to "the bastards," that is to say, the illegitimate sons of Louis XIV. It does not appear that this hatred was founded on moral reasons or on any real fear that these bastards would be intruded into the succession. The true cause of his wrath was that they had precedence of the peers.

The death of Louis seemed to give Saint-Simon a chance of realizing his hopes. The duke of Orleans was at once acknowledged regent and Saint-Simon was of the council of regency, but no steps were taken to carry out his favorite vision of a France ruled by the nobles for its good (it must always be understood that Saint-Simon's ideal was in no respect an aristocratic tyranny except of the beneficent kind), and he had little real influence with the regent. He was indeed gratified by the degradation of "the bastards," and in 1721 he was appointed ambassador to Spain to arrange for the marriage (not destined to take place) of Louis XV. and the infanta. His visit was splendid; he received the grandeeship, and, though he also caught the smallpox, he was quite satisfied with the business. After his return he had little to do with public affairs. His own account of the cessation of his intimacy with Orleans and Dubois, the latter of whom had never been his friend, is, like his own account of some other events of his life, obscure and rather suspicious. But there can be little doubt that he was practically ousted by the favorite. He survived for more than thirty years; but little is known of his life. His wife died in 1743, his eldest son a little later; he had other family troubles, and he was loaded with debt. When he died, at Paris on 2d March, 1755, he had almost entirely outlived his own generation (among whom he had been one of the youngest) and the prosperity of his house, though not its notoriety. This last was in strange fashion revived by a distant relation born five years after his own death, Claude Henri, Comte de Saint-Simon, the subject of the preceding article.

It will have been observed that the actual events of Saint-Simon's life, long as it was and high as was his position, are neither very numerous nor very noteworthy. If nothing more had been known about him than was known at the time of his death he would certainly not have deserved mention at length here. Saint-Simon is, however, an almost unique example of a man who has acquired great literary fame entirely by posthumous publications. He was an indefatigable writer, and not merely from the time he left the army but much earlier he began to set down in black and white all the gossip he collected, all his interminable legal disputes of precedence, and a vast mass of unclassified and almost unclassifiable matter. Most of his manuscripts came into the possession of the Government, and it was long before their contents were published in anything like fulness. Extracts and abstracts, however, leaked out and parts of the manuscript were sometimes lent to privileged persons, so that some notion of the unique value of Saint-Simon got abroad within twenty or thirty years of his death. Partly in the form of notes on Dangeau's *Journal*, partly in that of original and independent memoirs, partly in scattered and multifarious tracts and disquisitions, he had committed to paper an amount of matter which has probably never been excceded by any one except a professional journalist, if indeed the parallel will hold even there. The new edition now publishing of the *Memoirs* with the notes on Dangeau is estimated to contain thirty large octavo volumes. Besides this, M. Drumont, M. Faugère, and other independent workers are bringing out series of *Œuvres Inédites* of a less gossiping and more technical character found in different receptacles of the public archives. But the mere mass of these productions is their least noteworthy feature, or rather it is most remarkable as contrasting with their character and style. The voluminous writer is usually thought of as least likely to be characterized by an original and sparkling style. Saint-Simon, though careless and sometimes even ungrammatical, ranks among the most striking memoir writers of France, the country richest in memoirs of any in the world. His pettiness, his absolute injustice to his private enemies and to those who espoused public parties with which he did not agree, the bitterness which allows him to give favorable portraits of hardly any one, his omnivorous appetite for gossip, his lack of proportion and perspective, are all lost sight of in admiration of his extraordinary genius for historical narrative and character-drawing of a certain sort. He has been compared to Tacitus, and for once the comparison, so often made and generally so ludicrously out of place, is just. In the midst of his enormous mass of writing phrases scarcely inferior to the Roman's occur frequently, and here and there passages of sustained description equal for intense concentration of light and life to those of Tacitus or of any other historian. As may be expected from the vast extent of his work, it is in the highest degree unequal. But he is at the same time not a writer who can be "sampled" easily, inasmuch as his most characteristic phrases sometimes occur in the midst of long stretches of quite uninteresting matter. Hence he has been even since his discovery more praised than read, and better liked by critics than by the general reader. A few critical studies of him, especially those of Sainte-Beuve, are in fact the basis of much, if not most, that has been written about him. Yet no one is so little to be taken at second-hand. Even his most famous passages, such as the account of the death of the dauphin or of the bed of justice where his enemy the duke of Maine was degraded, will not give a fair idea of his talent. These are his gallery pieces, his great "machines," as French art slang calls them. Much more noteworthy as well as more frequent are the sudden touches which he gives. The bishops are "cuistres violets"; M. de Caumartin "porte sous son manteau toute la fatuité que M. de Vil-

leroy étale sur son baudrier;" another politician has a "mine de chat faché;" a third is hit off as "comptant faire" ("he would still be doing," though Saint-Simon certainly did not know that phrase). In short, the interest of the *Memoirs*, independent of the large addition of positive knowledge which they make, is one of constant surprise at the novel and adroit use of word and phrase. It is not superfluous to inform the English reader that some of Macaulay's most brilliant portraits and sketches of incident are adapted and sometimes almost literally translated from Saint-Simon.

The 1st edition of Saint-Simon (some scattered pieces may have been printed before) appeared in 1788. It was a mere selection in three volumes and was much cut down before it was allowed to appear. Next year four more volumes made their appearance, and in 1791 a new edition, still further increased. The whole, or rather not the whole, was printed in 1829–30 and reprinted some ten years later. The real creator of Saint-Simon, as far as a full and exact text is concerned, was M. Chéruel, whose edition in 20 volumes dates from 1856 and was reissued again revised in 1872. So immense, however, is the mass of Saint-Simon's MSS. that still another recension has been found necessary, and is now being published by M. de Boislisle in the series of *Grands Écrivains*, but with M. Chéruel's sanction and assistance. Even this, as above noted, will not exhaust available Saint-Simoniana, and it may be doubted whether it will be possible for many years to place a complete edition on the shelves. It must, however, be admitted that the matter other than the *Memoirs* is of altogether inferior interest and may be pretty safely neglected by any one but professed antiquarian and historical students. For criticism on Saint-Simon there is nothing better than Sainte-Beuve's two sketches in the 3d and 15th volumes of the *Causeries du Lundi*. The latter was written to accompany M. Chéruel's 1st edition. In English by far the most accurate treatment is in a recent Lothian prize essay by E. Cannan (Oxford and London, 1885).

(G. SA.)

ST. THOMAS, one of the Danish West India Islands, lies 36 miles east of Porto Rico (Spanish) and 40 north-northwest of St. Croix (Danish), with its principal town (Charlotte Amalie) in 18° 20′ 27″ N. lat. and 64° 55′ 40″ W. long. It is 13 miles long from east to west, with an average breadth of 3, and is estimated to have an area of 33 square miles. The highest point, West Mountain, is 1586 feet above the sea. Previous to the abolition of slavery in 1848 the island was covered with sugar plantations and dotted with substantial mansions; but now a few vegetables, a little fruit, and some guinea grass are all that it produces. Green-groceries are imported from the United States, poultry and eggs from the neighboring islands. Nor is the exceptional position which St. Thomas has hitherto enjoyed as a commercial depôt any longer secure; the value of the imports in 1880 was less than one-half of what it was in 1870, and the merchants of Venezuela, Porto Rico, San Domingo, Hayti, etc., who used to purchase in St. Thomas, now go direct to the markets of the United States and Europe. The Royal Mail Company, which at an early date chose the island as the principal rendezvous for its steam-packets in that part of the world, and whose example was followed by other important lines, removed its headquarters to Barbados in 1885. The harbor lies about the middle of the south coast and is nearly landlocked; its depth varies from 36 to 18 feet. A floating dock, 250 feet in length, was completed in 1875; there is in addition a steam-slip capable of taking up a vessel of 1200 tons. Along the north side of the harbor lies Charlotte Amalie, popularly known as St. Thomas, the only town on the island. In 1880 the inhabitants of the island numbered 14,389 (males 5757, females 8632), of whom about a sixth are white, of various nationalities; the rest have nearly all more or less of Negro blood. English has gradually become almost the exclusive language of the educated classes, and is used in the schools and churches of all the various communities. The curious Creole speech of the Negroes, which contained a mixture of broken Dutch, Danish, English, etc., though it was reduced to writing by the Moravian missionaries subsequent to 1770, is rapidly dying out.[1] About a third of the population are Roman Catholics, and the rest mainly Protestants of the Lutheran, Dutch Reformed, Moravian, and English Episcopal Churches. The Jewish community, 500 or 600 strong, has a synagogue. There are in the town two hospitals, a public reading-room and library, a Government college (1877), a Roman Catholic college (St. Thomas), a Moravian school, and a small theatre. A quarantine lazaretto is maintained on Lighthouse or Muhlenfeldt Point. The general health of the town is good. The climate varies little all the year round, the thermometer seldom falling below 70° or rising above 90°. In the "hurricane" months—August, September, and October—south winds, accompanied by sultry heat, rain, and thunder, are not uncommon; throughout the rest of the year the wind blows between east and north. Earthquakes are not unfrequent, but they do little damage in comparison with cyclones, which sometimes sweep over the island.

St. Thomas was discovered by Columbus in 1493, and at that time was inhabited by two tribes, the Caribs and the Arrowauks. In 1657 it was colonized by the Dutch, and after their departure for New York it was held by the English in 1667. The Danish West India and Guinea Company took possession in 1671, and some eight years later began the introduction of slave labor. It was succeeded in 1685 by the so-called Brandenburgh Company, the principal shareholders of which were Dutch. The colony was strengthened by French refugees from St. Christopher's after the revocation of the edict of Nantes. The neutrality of Denmark led to the prizes of the various belligerents being brought to its port for sale. In 1754 the king of Denmark took the management of the colony into his own hands, and in 1764 he threw open the port to vessels of all nations. The neutrality of Denmark again favored it in the war of 1792; and it became the only market in the West Indies from which the products of the colonies could be conveyed to the north of Europe. In 1801 the island was held by the British for ten months, and it was again in their possession from the latter part of 1807 to 1815. At that time the harbor was three or four times a year the rendezvous for homeward-bound English ships, from 200 to 400, as the case might be, which waited there for their convoys. The South American War of Independence led a number of Spaniards to settle at St. Thomas. A great but temporary stimulus was given to its commerce during the American Civil War. In 1871 the Danish Government removed the headquarters of their West India possessions from St. Croix to St. Thomas.

ST. THOMAS (Portuguese, *São Thomé*), a volcanic island in the Gulf of Guinea (West Africa), lies immediately north of the equator and in 6° 40′ E. long. From the Gaboon, the nearest point of the mainland, the distance is 166 miles, and from the Cameroons 297. The extreme length of the island is 32 miles and the breadth from west to east 21; the area is estimated at 355 square miles. From the coast it rises pretty uniformly towards the lofty and verdant mountains, in the midst of which the peak of St. Thomas towers to a height of 6000 feet. At least a hundred streams great and small rush down the mountain sides through deep-cut ravines, many of them forming beautiful waterfalls, such as those of Blu-blu, etc., on the Agua Grande. The bi-seasonal climate of the tropics obtains a comparatively normal development on the island, which, however, has a very evil repute of unhealthiness, probably owing to the fact that the chief town occupies a peculiarly malarial site on the coast. The first object of European cultivation in St. Thomas was sugar, and to this the colony owed its prosperity in the 16th century; but now it is quite displaced by coffee and cocoa, introduced in the beginning of the 19th century. In 1879–80 the export of coffee was 3,778,580 lb and of cocoa 1,026,746 lb. Vanilla and cinchona bark both succeed well, the latter between 1800 and 3300 feet of altitude. Though nearly the whole surface of the island is fitted for cultivation, only about a fifth part is really turned to account. Along with Principe, St. Thomas forms a Portuguese province, to which are attached the little island of Rolas and the petty fort of Ajuda on the Guinea coast.

The town of St. Thomas, the capital of the province, is situated on the northeast coast of the island, and the neighboring districts form the only well-peopled region. In 1878 the population in the island was 18,266, of whom 1200 were white. The great bulk consisted of a mixture of Negroes from various parts of the West Coast, mainly introduced as

[1] See specimens and analysis by Dr. E. Pontoppidan, in *Ztschr. f. Ethnol.*, Berlin, 1881.

slaves, and now all using a Negro Portuguese—"lingua de S. Thomé." On the southwest coast are about 1200 Angolares, descendants of a shipload of Angola slaves wrecked at Sete Pedras in 1544, who still retain their Bunda speech and peculiar customs.

St. Thomas was discovered about the close of 1470 by the Portuguese navigators João de Santarem and Pero de Escobar, who in the beginning of the following year discovered Annobom ("Good Year"). They found St. Thomas uninhabited. The first attempts at colonization were João de Paiva's in 1485; but nothing permanent was accomplished till 1493, when a body of criminals and of young Jews torn from their parents to be baptized were sent to the island, and the present capital was founded by Alvaro de Carminha. Considerable progress had been made by the 16th century; but in 1567 the settlement was attacked by the French, and in 1574 the Angolares began those raids which only ended with their subjugation in 1693. In 1595 there was a slave revolt; and from 1641 to 1844 the Dutch, who had plundered the capital in 1600, held possession of the island. The French did great damage in 1709; and in the course of the century internal anarchy reduced St. Thomas to a deplorable state.

See Dr. Greeff's papers in *Petermann's Mittheilungen*, 1884, and *Globus*, 1882, vol. xlii.

SAINT-VICTOR, Paul de (1827–1883), one of the chief masters of a very ornate style in recent French literature, was born at Paris in 1827 and died there in 1883. He was of noble birth and inherited the title of count, but rarely used it, his political principles being democratic. Saint-Victor began as a dramatic critic on the *Pays* in 1851 and subsequently wrote in many journals. In 1870, during the last days of the second empire, he was made inspector-general of fine arts. Almost all Saint-Victor's work consists of reprinted articles, the best known, and on the whole the best, being the collection entitled *Hommes et Dieux* (1867). His death interrupted the publication of an elaborate work, partly reprinted, partly developed from formerly printed papers, entitled *Les Deux Masques*, in which the author intended to survey the whole dramatic literature of ancient and modern times. Saint-Victor's actual critical faculty was considerable, though rather one-sided; but his position in French literature is likely to be, in an inferior degree, something like that of Mr. Ruskin in English. He owed a good deal to Théophile Gautier, but he carried orateness to a pitch far beyond Gautier's,—a pitch which may sometimes deserve the epithet "barbaric."

ST. VINCENT, an island in the West Indies, discovered by Columbus in 1498, is situated in 13° 10′ N. lat. and 60° 57′ W. long., 100 miles to the west of Barbados; it is 18 miles in length, 11 in breadth, and has an area of 132 square miles. Volcanic hills cross the island from north to south, intersected by beautiful and fertile valleys. In the northwest is the Souffriere, a volcanic mountain (3000 feet), of which the last violent eruption was in 1812; the crater is 3 miles in circumference and 500 feet in depth. The climate is humid and tolerably healthy (average rainfall nearly 80 inches). In 1627, when Charles I. granted St. Vincent to the earl of Carlisle, it was peopled by Caribs; in 1672 it was given to Lord Willoughby, and in 1722 was granted, along with other islands, to the duke of Montagu by George I. After hostilities with the French and Caribs, it passed definitively to Great Britain in 1783. Immigrants were afterwards introduced and plantations cultivated; the chief products are sugar, rum, molasses, and arrowroot. The capital is Kingstown (population, 5593), the total population of the island being 42,200, including 2700 Europeans and 30,000 Africans. The island was formerly under the general government of the Windward Islands, Barbados being headquarters; but in 1885 Barbados was made a separate government, and Grenada, St. Vincent, Tobago, and St. Lucia were placed under a governor. The legislative council of St. Vincent is composed of official members and others nominated by the crown. In 1883 the revenue and expenditure were respectively £34,509 [$167,713.34] and £32,962 [$160,195.32] the debt being £2840 [$13,802.40]. The tonnage entered and cleared was 172,989, the imports and exports being valued at £148,286 [$720,669.96] and £166,752 [$810,414.72] respectively (sugar exports, 9250 tons).

ST. VINCENT, Sir John Jervis, Earl (1734–1823), a distinguished naval officer, was born at Meaford, Staffordshire, on 9th January, 1734. His father was counsel and solicitor to the admiralty and treasurer of Greenwich hospital. Young Jervis was destined for the law, but early showed such a strong predilection for the sea that he ran away from school in order to become a sailor. Accordingly in 1748 he was placed on board the "Gloucester" under Commodore Townsend. Six years later he rose to be lieutenant, and in 1759 he distinguished himself so much at the siege and capture of Quebec that he was promoted to the rank of commander. In the following year he was made a post-captain. He commanded the "Foudroyant" in July, 1778, when the memorable *rencontre* took place between Admiral Keppel and Count d'Orvilliers, and bore a very distinguished part in that action. In 1782, while in command of the same vessel, he captured the French ship "Pégase," of 74 guns and 700 men, off Brest Harbor, and was rewarded for his exploit by being made Knight Companion of the Bath. In 1784 he entered parliament as member for Launceston, and he afterwards sat for Yarmouth. Conjointly with Sir Charles Grey, Jervis was appointed to command an expedition sent out in 1793 against the French Caribbee islands, and, though the rainy season and the yellow fever prevented the full success of the British, they were able to obtain possession of Martinique and St. Lucia, and to hold Guadaloupe for a short time. In 1795 Jervis became full admiral and succeeded Lord Wood in command of the British fleet in the Mediterranean, where he rendered important service in blockading the French fleet in Toulon, and protecting English trade in the Levant. On 14th February, 1797, he won his most celebrated victory. With only fifteen ships of the line, seven frigates, and two sloops he encountered off Cape St. Vincent a Spanish fleet of twenty-six sail of the line, twelve frigates, and a brig, and completely defeated it, capturing four of the enemy's largest ships. For this great triumph, which had a most important effect on the prosecution of the war, Jervis was created a peer by the title of Earl St. Vincent. He still further distinguished himself some months later by his resolute and sagacious conduct in repressing a mutiny in his fleet when off Cadiz. In June, 1799, he resigned his command in consequence of ill-health, but was shortly afterwards placed at the head of the Channel fleet. On the formation of the Addington ministry in 1801 he was made first lord of the admiralty, and in that important office, which he held for three years, the great capacity for business with which he was endowed by nature shone forth in all its lustre. By means of the celebrated commission of naval inquiry he was enabled to expose a vast extent of corruption in the public service and to lay the foundation of a system of economical administration. He grappled boldly with the monstrous and deep-rooted abuses brought to light, and by his vigor, honesty, and energy succeeded in rectifying them. In 1806, at the age of seventy-two, Lord St. Vincent was again called upon to take the command of the Channel fleet and to head an expedition to the court of Portugal, in which he displayed great talents and address. Advanced age and impaired health led to his final retirement from public life in 1807, but he survived till 13th March, 1823, when he died in his ninetieth year.

See Brenton, *Life of Earl St. Vincent;* Lord Brougham, *Statesmen of the Times of George III.*

ST. VITUS'S DANCE,[1] or Chorea, a disorder of the

[1] This name was originally employed in connection with those remarkable epidemic outbursts of combined mental and physical excitement which for a time prevailed among the inhabitants of some parts of Germany in the Middle Ages. It is stated that

nervous system occurring for the most part in children, and characterized mainly by involuntary jerking movements of the muscles throughout almost the entire body. It is to be regarded as a functional nervous disorder of wide extent, the manifestations of which appear not merely in disturbance affecting the motor apparatus but in various associated morbid phenomena of cerebral origin. Among the predisposing causes age is important, chorea being essentially an ailment of childhood and more particularly of the period in which the second dentition is taking place. The greater number of the cases occur between the ages of nine and twelve. It is not often seen in very young children nor after puberty; but there are many exceptions to this rule. It is twice as frequent with girls as with boys. Hereditary predisposition to nervous troubles is apt to find expression in this malady in youth, more especially if the general health becomes lowered. Of exciting causes strong emotions, such as fright, ill-usage, or hardship of any kind, insufficient feeding, overwork or anxiety, are among the most common; while, again, some distant source of irritation, such as teething or intestinal worms, appears capable of giving rise to an attack. It is an occasional but rare complication of pregnancy. The connection of chorea with rheumatism is now universally recognized, and is shown not merely by its frequent occurrence before, after, or during the course of attacks of rheumatic fever in young persons, but even independently of this by the liability of the heart to suffer in a similar way in the two diseases.[1]

The symptoms of St. Vitus's dance are in some instances developed suddenly as the result of fright, but much more frequently they come on insidiously. They are usually preceded by changes in the temper and disposition, the child becoming sad, irritable, and emotional, while at the same time the general health is somewhat impaired. The first thing indicative of the disease is a certain awkwardness or fidgetiness of manner together with restlessness, the child being evidently unable to continue quiet, but frequently moving the limbs into different positions. In walking, too, slight dragging of one limb may be noticed. The convulsive muscular movements usually first show themselves in one part, such as an arm or a leg, and in some instances they may remain localized to that limited extent, while in all cases there is a tendency for the disorderly symptoms to be more marked on one side than on the other. When fully developed the phenomena of the disease are very characteristic. The child when standing or sitting is never still, but is constantly changing the position of the body or limbs in consequence of the sudden and incoördinate action of muscles or groups of them. The shoulder is jerked up, the head and trunk twisted about, the limbs crossed suddenly and changed again, the fingers keep moving restlessly, while the face is distorted with grimaces, frowning and smiling irregularly. These symptoms are aggravated when purposive movements are attempted or when the child is watched. Speech is affected both from the incoördinate movements of the tongue and from phonation sometimes taking place during an act of inspiration. The taking of food becomes a matter of difficulty, since much of it is lost in the attempts to convey it to the mouth, while swallowing is also interfered with owing to the irregular action of the pharyngeal muscles. When the tongue is protruded it comes out in a jerky manner and is immediately withdrawn, the jaws at the same time closing suddenly and sometimes with considerable force. In locomotion the muscles of the limbs act incoördinately and there is a marked alteration of the gait, which is now halting and now leaping, and the child may be tripped by one limb being suddenly jerked in front of the other. In short, whether at rest or in motion the whole muscular system is seen to be deranged in its operations, and the term "insanity of the muscles" not inaptly expresses the condition, for they no longer act in harmony or with purpose, but seem, as Trousseau expresses it, each to have a will of its own and to be exercising this for different objects at one time. The muscles of organic life (involuntary muscles) appear scarcely, if at all, affected in this disease, as, for example, the heart, the rhythmic movements of which are not as a rule impaired. But the heart may suffer in other ways, especially from inflammatory conditions similar to those which attend upon rheumatism and which frequently lay the foundation of permanent heart-disease. In severe cases of St. Vitus's dance the child comes to present a distressing appearance from the constant restlessness and disorderly movement, and the physical health declines. Usually, however, there is a remission of the symptoms during sleep. The mental condition of the patient is more or less affected, as shown in emotional tendencies, irritability, and a somewhat fatuous expression and bearing, but this change is in general of transient character and ceases with convalescence.

This disease occasionally assumes a very acute and aggravated form, in which the disorderly movements are so violent as to render the patient liable to be injured and to necessitate forcible control of the limbs or the employment of anæsthetics to produce unconsciousness. Such cases are of very grave character, if, as is common, they are accompanied with sleeplessness, and they may prove rapidly fatal by exhaustion. In the great majority of cases of St. Vitus's dance, however, complete recovery is to be anticipated sooner or later, the symptoms usually continuing for from one to two months, or even sometimes much longer.

The nature of this disease has given rise to much discussion and there still remains considerable difference of opinion as to its true pathology. The fact that the vast majority of cases recover would seem to show that there could have been no profound change in the structural integrity of the nerve-centres, while in those instances where a fatal result takes place *post-mortem* examination reveals no constant morbid condition. A theory supported by high authority has referred the cause of the malady to the plugging up of minute bloodvessels in the motor centres of the brain (a condition not unlikely to occur in rheumatic inflammation affecting the lining membrane of the heart), and such a change has been seen in a few instances. In a still larger number, however, no appearances of this kind have been observed, but simply vascular changes of a congestive character widely diffused throughout the central nervous system, accompanied with evidences of slight inflammatory action. Dr. Dickinson, whose views, founded upon carefully conducted investigations, are those most widely accepted, concludes as follows: "We see in chorea a widely distributed hyperæmia [*i.e.*, congestion] of the nervous centres, not due to any mechanical mischance, but produced mainly by causes of two kinds,—one a morbid, probably a humoral influence, which may affect the nervous centres as it affects other organs and tissues; the other, irritation in some mode usually mental but sometimes what is called reflex, which especially belongs to and disturbs the nervous system, and affects persons differently, according to the inherent mobility of their nature."

For the treatment of St. Vitus's dance the remedies proposed have been innumerable, but it is doubtful whether any of them have much control over the disease, which under suitable hygienic conditions tends

sufferers from this dancing mania were wont to resort to the chapels of St. Vitus (more than one in Swabia), the saint being believed to possess the power of curing them. The transference of the name to the disease now under consideration was a manifest error, but so closely has the association now become that the original application of the term has been comparatively obscured.

[1] [Dr. Morris J. Lewis, corroborating the observations of Dr. S. Weir Mitchell, in several hundred cases of chorea noted a marked monthly parallelism between the onsets of this disease and the occurrence of storms, and that in the United States the month (April) of most frequent rheumatic attacks follows next after that of the largest number of choreic attacks. See *Medical News*, 13 November, 1886.—Am. Ed.]

to recover of itself. These conditions, however, are all-important, and embrace the proper feeding of the child with nutritious light diet, the absence of all sources of excitement and annoyance, such as being laughed at or mocked by other children, and the rectification of any causes of irritation and of irregularities in the general health. For a time, and especially if the symptoms are severe, confinement to the house or even to bed may be necessary, but as soon as possible the child should be taken out into the open air and gently exercised by walking. Of medicinal remedies the most serviceable appear to be zinc, arsenic, and iron, especially the last two, which act as tonics to the system and improve the condition of the blood. They should be continued during the whole course of the disease and convalescence, if they do not disagree. As sedatives in cases of sleeplessness, bromide of potassium and chloral are of use. Many other agents, such as conium, belladonna, strychnia, the salts of silver, etc., have been recommended, but they do not seem to possess any special advantages. In long-continued cases of the disease much benefit will be obtained by a change of air as well as by the employment of moderate gymnastic exercises. Bearing in mind the weakened condition of the muscles as the result of the choreic movements, the employment of friction and of electricity is also likely to be beneficial. After recovery the general health of the child should for a long time receive attention, and care should be taken to guard against excitement, excessive study, or any exhausting condition, physical or mental, from the fact that the disease is apt to recur and that other nervous disorders still more serious may be developed from it.

In the rare instances of the acute form of this malady, where the convulsive movements are unceasing and violent, the only measures available are the use of chloral or chloroform inhalation to produce insensibility and muscular relaxation, but the effect is only palliative and does not prevent the fatal result which in most such cases quickly supervenes. (J. O. A.)

ST. UBES. See SETUBAL.

SAIS. See EGYPT, vol. vii. p. 666.

SALADIN. See EGYPT, vol. vii. pp. 653–4.

SALAMANCA, a province of Spain, which until 1833 formed part of that of Leon, is bounded on the N. by Zamora and Valladolid, on the E. by Avila, on the S. by Caceres, and on the W. by Portugal. It has an area of 4940 square miles. The population in 1877 was 285,500; but by the year 1886 it was estimated that it had decreased to about 270,000. Salamanca belongs almost entirely to the basin of the Douro, its principal rivers being the Tormes, which follows the general slope of the province towards the northwest, and after a course of 135 miles flows into the Douro, which forms part of the northwest boundary; the Yeltes and the Agueda, also tributaries of the Douro; and the Alagon, an affluent of the Tagus. The northern part of the province is flat, and at its lowest point (on the Douro) is 488 feet above sea-level. The highest point (in the Sierra de Peña de Francia) is 5692 feet above the sea. The rainfall is irregular; but where it is plentiful the soil is productive and there are good harvests of wine, oil, hemp, and cereals of all kinds. The corn harvest is always good, rain or no rain. The principal wealth of the province consists in the forests of oak and chestnut, which cover the hills in its southern part. Sheep and cattle also find good pasturage there; and wool and merino of medium quality are grown. Gold is found in the streams, and iron, lead, copper, zinc, coal, and rock crystal in the hills, but owing to the difficulties of transport and other causes the mines are only partially developed. The manufactures of the province are few and mostly of a low class, intended for home consumption, such as frieze, coarse cloth, hats, and pottery. The cloth manufactories of Bejar turn out a material of superior quality. The tanning of hides is carried on pretty extensively, and cork and flour are exported *via* Santander and Barcelona. The province is traversed by a railway line to Portugal, passing Medina del Campo and Ciudad Rodrigo to Figueira da Foz. Administratively the province is divided into eight partidos judiciales, and it has 388 ayuntamientos; of these last only two besides Salamanca, the capital, have a population exceeding 5000,—Bejar (11,099) and Ciudad Rodrigo (6856). It is represented in the cortes by three senators and seven deputies. Apart from that of Leon the province has little history till the Peninsular War, when the battles of Ciudad Rodrigo, Fuentes de Oñoro, and Salamanca were fought on its soil.

SALAMANCA (*Salmantica*, *Elmantica*), the capital of the above province, lies on the banks of the Tormes, 172 miles northwest of Madrid by rail. The river is here crossed by a bridge 500 feet in length[1] built on twenty-six arches, fifteen of which are of Roman origin, while the remainder date from the 16th century. The town was of importance in times as remote as 222 B.C., when it was captured by Hannibal from the Vettones; and it afterwards became under the Romans the ninth station on the Via Lata from Merida to Zaragoza. It passed successively under the rule of the Goths and the Moors, till the latter were finally driven out about 1055. The city is still much the same in outward appearance as when its tortuous streets were thronged with students. The university was naturally the chief source of wealth to the town, the population of which in the 16th century numbered 50,000. Its decay of course reacted on the townsfolk, but it fortunately also arrested the process of modernization, so that the city retains most of its old features and is now one of the most picturesque in Spain. The ravages of war alone have wrought serious damage, for the French in their defensive operations at the siege almost destroyed the western quarter. The ruins still remain, and give an air of desolation which is not borne out by the real condition of the inhabitants, however poverty-stricken they may appear. The magnificent Plaza Mayor, built by Andres Garcia de Quiñones at the beginning of the 18th century, and capable of holding 20,000 people to witness a bull-fight, is one of the finest squares in Europe. It is surrounded by an arcade of ninety arches on Corinthian columns, one side of the square being occupied by the municipal buildings. The decorations of the façades are in the Renaissance style, and the plaza as a whole is a fine sample of plateresque architecture. But the old and new cathedrals (see below) are the chief objects of interest in the city.

In the Middle Ages the trade of Salamanca was not insignificant, and the stamped leather-work produced there is still sought after. Its manufactures are now of little consequence, and consist of china, cloth, and leather. The transport trade of the town is, however, of more importance, and shows signs of increasing. But any great revival can only take place when communication with the coast is considerably improved, a result which will no doubt be promoted by the recent opening of the line to the coast of Portugal. The population within the municipal boundaries in 1877 was 18,007, and in 1886 was estimated at about 20,000.

The old cathedral is a cruciform building of the 12th century, begun by Bishop Gerónimo, the confessor of the Cid. Its style of architecture is that Late Romanesque which prevailed in the south of France, but the builder showed much originality in the construction of the dome, which covers the crossing of the nave and transepts. The inner dome is made to spring, not from immediately above the arches, but from a higher stage of a double arcade pierced with windows. The thrust of the vaulting is borne by four massive pinnacles, and over the inner dome is an outer pointed one covered with tiles. The whole forms a most effective and graceful group. On the vault of the apse is a fresco of Our Lord in Judgment by Nicolas Florentino. The reredos, which has the peculiarity of fitting the curve of the apse,

[1] [Larousse's *Dictionnaire Universel* gives 400 metres or over 1300 feet as the length of this bridge.—AM. ED.]

contains fifty-five panels with paintings mostly by the same artist. There are many fine monuments in the south transept and cloister chapels. An adjoining building, the Capilla de Talavera, is used as a chapel for service according to the Mozarabic rite, which is celebrated there six times a year. On the north of and adjoining the old church stands the new cathedral, built from designs by Juan Gil de Ontañon. Begun in 1513 under Bishop Francisco de Bobadilla, but not finished until 1734, it is a notable example of the late Gothic and Platerесque styles. Its length is 340 feet and its breadth 160 feet. The interior is fairly Gothic in character, but on the outside the Renaissance spirit shows itself more clearly, and is fully developed in the dome. Everywhere the attempt at mere novelty or riches results in feebleness. The main arch of the great portal consists of a simple trefoil, but the label above takes an ogee line, and the inner arches are elliptical. Above the doors are bas-reliefs, foliage, etc., which in exuberance of design and quality of workmanship are good examples of the latest efforts of Spanish Gothic. The church contains paintings by Navarrete, Becerra, and Morales, and some overrated statues by Juan de Juni. The treasury is very rich, and amongst other articles possesses a custodia which is a masterpiece of goldsmith's work, and a bronze crucifix, of undoubted authenticity, which was borne before the Cid in battle.[1] The tower is too unsafe to allow of the ringing of its great bell, which weighs over 23 tons. The interest of Salamanca centred in its university, founded by Alphonso IX. about 1200 and for four centuries one of the chief seats of European learning. Of the university buildings the façade of the library (80,000 volumes, exclusive of MSS.) is a peculiarly rich example of late 15th-century Gothic. The cloisters are light and elegant; the grand staircase ascending from them has a fine balustrade of foliage and figures. The Colegio de Nobles Irlandeses, formerly Colegio de Santiago Apostol, was built in 1521 from designs by Ibarra. The double arcaded cloister is a fine piece of work of the best period of the Renaissance. The Jesuit College is an immense and ugly Renaissance building begun in 1614 by Juan Gomez de Mora. The Colegio Viejo, also called San Bartolomé, was rebuilt in the 18th century, and now serves as the governor's palace. The convent of Santo Domingo, sometimes called San Esteban,[2] shows a mixture of styles from the 13th century onwards. The church is Gothic with a platerесque façade of great lightness and delicacy. It is of purer design than that of the cathedral; nevertheless it shows the tendency of the period. The reredos, one of the finest Renaissance works in Spain, contains statues by Salvador Carmona, and a curious bronze statuette of the Virgin and Child on a throne of champlevé enamel of the 12th century. The chapter-house, built by Juan Moreno in 1637, and the staircase and sacristy are good examples of later work. The convent of the Augustinas Recoletas, begun by Fontana in 1616, is in better taste than any other Renaissance building in the city. The church is rich in marble fittings and contains several fine pictures of the Neapolitan school, especially the Conception by Ribera over the altar. The convent of the Sancti Spiritu has a good door by Berruguete. There is also a rather effective portal to the convent of Las Dueñas. The church of S. Marcos is a curious circular building with three eastern apses; and the churches of S. Martin and S. Matteo have good early doorways. Many of the private houses are untouched examples of the domestic architecture of the prosperous times in which they were built. Such are the Casa de las Conchas, the finest example of its period in Spain; the Casa de la Sal, with a magnificent courtyard and sculptured gallery; and the palaces of Maldonado, Monterey, and Espinosa. (H. B. B.)

SALAMANDRA. In the nomenclature of zoology this name designates a genus of animals belonging to the vertebrate class *Amphibia*. The genus was first defined under this name by Laurenti.[3] It will be seen on referring to the taxonomic synopsis of the class given at the end of the article AMPHIBIA that the genus *Salamandra* belongs to the first tribe *Mecodonta* of the fifth division *Salamandrida*. The diagnosis of the genus is as follows: no fronto-squamosal arch in the skull; tongue large, adherent below, free at the sides and slightly so behind; toes five; tail cylindrical. There are three species, distinguished as follows: (1) *S. maculosa*, Laurenti, tail not so long as rest of body, color black with yellow spots; (2) *S. atra*, Laurenti, tail not so long as rest of body, color uniform black; (3) *S. caucasica*, Waga, tail longer than rest of body. In all the species the body is plump and rounded, and there is no dorsal crest or fin; the head is depressed, its greatest width being at the angle of the jaws; the snout is rounded. The vent is a longitudinal slit, the borders of which in the male are slightly swollen. The skin is smooth and shining; at the junction of the head and neck is a pronounced fold of skin called the gular fold. The swollen patches of skin behind the tympana, caused by the presence of large cutaneous glands, and known as parotids, are well developed and exhibit the openings of the glands as distinct pores. Similar gland-openings form a series along either side of the body. In the first two species there is also a longitudinal series of warts on each side; these are wanting in *S. caucasica*. Depressions of the skin between the vertebræ are present, and are known as costal grooves. The palatine teeth series are **S**-shaped, and the anterior ends of the two series do not meet.[4] *S. maculosa* is the largest of the three species, attaining a length of 7 to 8½ inches. *S. atra* is about 4⅓ and *S. caucasica* about 6 inches in length.

The genus is confined to the western sub-region of the palæarctic region, extending over almost the whole of Europe, especially the central and southern parts, and occurring also in Algiers and Syria. The spotted species is the commonest and most widely distributed, being found in nearly all parts of Germany, France, Italy, and Spain. The genus is entirely absent from the British Islands. The black salamander, *S. atra*, is confined to the Alps of Central Europe, and there only occurs between the limits of 2500 to 10,000 feet of altitude; it is found in the mountains of South Germany, France, Switzerland, and Austria. *S. caucasica* is only known from one specimen, which was obtained from the Caucasus and was sent to the Paris Museum by Dr. Waga.[5]

The food of *Salamandra* consists of worms and insects, and, like British frogs and toads, the animals can only exist in damp shady localities. As in all *Salamandrida*, the process of reproduction is commenced by a true copulation, which takes place in spring and summer. The seminal fluid is passed into the female cloaca, where it is received into a tube-shaped receptaculum seminis. The eggs are thus fertilized in the oviduct, but the development takes place under somewhat different conditions in the two species *S. maculosa* and *S. atra*. Both species are viviparous; in the former thirty to forty eggs undergo development in the oviducts at one time, and they are brought forth and deposited in stagnant or sluggishly-flowing water when they have reached a stage similar to that of adult *Perennibranchiata*, the newly-born larvæ having long feather-like external gills and a length of 12 to 15 mm. (one-third to one-half an inch). After a period of aquatic life, the larvæ pass through a metamorphosis: the limbs appear; the gill slits close up; and the young animals, having reached the adult condition, leave the water for a terrestrial life. In *S. atra* only the two lowest eggs which pass into the oviducts, one in the duct of each side, undergo development. The rest of the eggs fuse into a mass of yolk material and are devoured by the two developing larvæ. In this way the larvæ are provided with nutriment during the later stages of development, for in this species they are retained within the body of the mother until they have reached the air-breathing condition and are in all respects similar to the parents. This peculiarity in the process of reproduction bears an obvious relation to the physical conditions of the habitat of *S. atra*. In the elevated regions that the

[1] [*Wanderings in Spain*, by A. J. C. Hare, p. 257, says that this crucifix of the Cid is now "not to be found even in the Relicario, but the canons know of its hiding place."—AM. ED.]

[2] [For the connection of Columbus with this monastery see vol. vi. p. 154. He also gilded its reredos with the first virgin gold imported from America in recognition of its hospitalities to him. —AM. ED.]

[3] *Synopsis reptilium emendata*, etc., Vienna, 1768.

[4] For a figure of *S. maculosa*, see Latreille, *Hist. Nat. des Sal. de France*, Paris, 1800, pl. i.; Daudin, *Hist. Nat. d. Reptiles*, pl. xcvii. f. 1. For *S. atra*, see Laur. *op. cit.*, pl. i. f. 2.

[5] See Waga, *Rev. Mag. Zool.*, 1876, p. 326.

species inhabits stagnant and sluggish waters are wanting, and therefore the process of reproduction that occurs in *S. maculosa* is rendered impossible. The black *Salamandra* has become adapted to its environment (1) by the slight changes in color and structure which distinguish it from the spotted, and (2) by a modification in its reproductive processes, which eliminates the aquatic stage of existence from the life-history of the individual. It is to be noted that the stage characterized by the presence of pinnate external gills is exhibited by the larva during its development in the oviduct, and the gills doubtless there perform their function. Fräulein von Chauvin[1] made the experiment of taking the larvæ of *S. atra* from the pregnant female when they were in the branchiate condition, and placing them in water to see if they would survive and pass through their metamorphosis under these circumstances. On one occasion the experiment was perfectly successful in the case of one specimen; the rest of the larvæ died.

The tailed *Amphibia* of Europe have from the very earliest times down to the present day been almost universally known in popular language as salamanders, and identified in the popular mind with the salamander of myth and fable.[2] Besides the species of *Salamandra* there are, according to Boulanger (*Brit. Mus. Cat.*, 1881), eighteen other species of *Urodela* in Europe, of which fourteen belong to the genus TRITON (*q. v.*). *Chioglossa lusitanica*, Bocage, is distinguished by having a tongue supported anteriorly by a protractile median pedicle and free everywhere else, and by having its tail cylindrical at the base but compressed at the end. It occurs in Spain and Portugal. *Salamandrina perspicillata*, Tschudi, occurs in Italy; like *Chioglossa*, it belongs to the *Mecodonta* and is distinguished by the following characters: tongue large, subtriangular, free everywhere except on anterior median line; toes four; tail slightly compressed; a strong bony fronto-squamosal arch. *Spelerpes fuscus*, Strauch, occurs in Italy and in France in the Alpes Maritimes.[3]

SALAMIS, in modern times called by the people Κολοῦρι (a ring-shaped cake), and by purists Σαλαμίς, is an island in the Saronic Gulf, off the coast of Attica, Greece. It is said to have been called in ancient times by other names,—Sciras, which associates it with the worship of Athena Sciras; Cychreia, which connects it with the Eleusinian cultus and the sacred serpent (Κυχρεΐδης ὄφις) of Demeter; and Pityussa. There was a small stream, Bocarus or Bocalia, in the island. The city, which bore the same name as the island, was originally situated on the south coast opposite Ægina, but was afterwards transferred to a promontory on the east side nearer Athens. The transference corresponds to a total change in the political relations of Salamis. It was originally connected, not with Attica, but with Ægina and with Megara, the competitors of Athens in the struggle for supremacy in the Saronic Gulf. The most prominent heroes of the island, Telamon, Ajax, and Teucer, were Æacidæ from Ægina. But about the end of the 7th century B.C. the war between Athens and Megara for the possession of Salamis was, under the guidance of Solon, determined in favor of Athens. A line of the *Iliad* (ii. 558) is said to have been interpolated by the Athenians in support of their claim to the island, while the Megarian version of the passage was quite different. The priestess of Athena Polias might not eat Attic cheese, but it was lawful for her to eat foreign or Salaminian cheese. Salamis, having come so late into the hands of the Athenians, retained, like Eleusis, more local independence than the other demes. The island remained subject to Athens in later history, except during the period 318 to 232 B.C., when it was abandoned to the Macedonian rule. The name of Salamis is famous chiefly on account of the great sea-fight, 480 B.C., in which the allied Greeks defeated the Persians under Xerxes. The battle took place beside the town of Salamis and the island of Psyttaleia, at the southeastern end of the straits.

A city on the east coast of Cyprus, near the river Pediæus, said to have been founded by the Salaminian Teucer, son of Telamon, was also called Salamis.

SAL AMMONIAC. See AMMONIAC, vol. i. p. 650.

SALDANHA, JOÃO CARLOS SALDANHA DE OLIVEIRA E DAUN (1791–1876). See PORTUGAL, vol. xix. p. 568.

SALE, an urban sanitary district of Cheshire, England, on the Bridgewater Canal and the Mersey, about 5 miles south of Manchester. At the beginning of the 19th century the greater part of the township was still waste and unenclosed. It owes its increase in population to the neighborhood of Manchester and contains a number of handsome villas belonging to the wealthier classes. The Moorsland pleasure-grounds in the neighborhood cover 10½ acres. There are national and British schools and a literary institute. Market gardening is extensively carried on. The population of the urban sanitary district (area, 2006 acres) in 1871 was 5573, and in 1881 it was 7915.

SALE is one of the forms of CONTRACT (*q. v.*). The law of contract is accordingly applicable as a whole to the law of sale. But the importance of the contract of sale demands a fuller treatment. The law of the United Kingdom and of the United States is based upon the Roman law in its later stage, as modified by the prætors and by legislation. But there are some considerable differences. In Roman law sale originally meant nothing more than barter; but the introduction of coined money converted the contribution of one of the contracting parties into price (*pretium*), as distinguished from article of sale (*merx*) contributed by the other (see ROMAN LAW, vol. xx. pp. 718–19). Sale fell under the head of consensual contracts, *i. e.*, those in which the *causa* or that which made the contract enforcible was consent. In all contracts of this class (except *mandatum*) consent really denoted valuable consideration. The law in the case of movables and immovables was as far as might be the same. The price must be definite. Reduction of the terms to writing was optional; if a writing was used, either party was at liberty to withdraw before the completion of the writing. If earnest or deposit (*arrha*)—often a ring, sometimes a part of the price—was given, it was by the legislation of Justinian made the measure of forfeit on rescission, the buyer losing what he had given as *arrha*, the seller restoring double its value. The seller did not warrant title; his contract was not *rem dare*, to give the thing, but *præstare emptori rem habere licere*, to guarantee the buyer possession; the transfer was of *vacua possessio*, not of property. The buyer was secured by a covenant *duplæ stipulatio* against eviction by a superior title, limited to double the price where

[1] See *Zeitschr. f. wiss. Zoologie*, vol. xxvii. p. 534, and C. von Siebold, *ibid.*, p. 536; M. v. Chauvin, *ibid.*, vol. xxiv.

[2] Aristotle (*H. A.*, v. 19) cites the salamander, which "when it walks through fire extinguishes it," as a proof that some animal frames are incombustible, and Ælian (*Nat. An.*, ii. 31) will have it that those who work with forges are familiar with this fact and when their bellows fail to quicken the flame know to look for a salamander and put things right by killing it. According to this form of the fable the salamander, as Ælian expressly says, is not born of fire, nor does it live therein. On the contrary, according to Pliny (*H. N.*, x. 67 *sq.*, xxix. 4) it is of a cold complexion and emits a cold venom like aconite, but so virulent that even bread baked with wood of a tree on which a salamander has crept is poisonous. The touch of its saliva even on the foot, says Pliny, causes the hair to fall out. So Dioscorides speaks of salamander prepared in oil as a depilatory; comp. Petronius, c. 107, and Burman's notes, and for late survivals in Europe of the belief in a deadly lizard, identified with the salamander, Bochart, *Hierozoicon*, bk. iv. c. 1. That the salamander extinguishes fire appears also in the PHYSIOLOGUS (*q. v.*), and so became a common part of mediæval animal lore; but the Arabic *Physiologus* (Land, *Anec. Syr.*, iv. 166) speaks instead of a stone that quells fire. This stone is asbestos, the salamander of Marco Polo (i. 215, Yule), of whose fibres a sort of incombustible cloth was made, which was represented in the East as made of the hair of the salamander or of its plumage; for the Arabs mixed up the salamander fable with that of the PHŒNIX (*q. v.*) and were not sure whether it was beast or bird. In later story the salamander is represented as born and living in fire and so the name is used by cabalistic moderns for the spirits of that element. Salamander's wool or hair as a name for asbestos occurs in Bacon and other English writers. Francis I. chose as his emblem a salamander with the motto, "J'y vis et je l'éteins."

[3] [For distribution of the salamanders in America, see vol. i. pp. 675–6. Also a list of American authorities on Herpetology can be found in vol. xx. p. 454.—AM. ED.]

there was no fraud by the seller. There was a warranty of quality by the seller. He was bound to suffer rescission or to give compensation at the option of the buyer if the thing sold had undisclosed faults which hindered the free possession of it. The damages to which he was liable differed according as he was guilty of bad faith (*dolus*) or not. If guilty he was liable for all consequential damage, if innocent only for the diminution in the value of the thing sold by reason of its unsoundness. Thus, if a seller knowingly sold an infected sheep and the whole flock caught the disease and died, he would be liable for the value of the flock; if he was ignorant of the defect, he would be liable only for the difference in value between a sound and an unsound sheep. Mere overpraise did not amount to *dolus;* nor was inadequacy of price in itself a ground of rescission. When the agreement was complete it was the duty of the seller to deliver the thing sold (*rem tradere*). In case of a sale on credit, the delivery must be made at the time appointed. Prior to delivery the seller must take due care of the thing sold, the care which a reasonably prudent householder (*bonus paterfamilias*) was expected to exercise. Delivery did not pass property in the full sense of the word, but rather *vacua possessio* secured by *duplæ stipulatio*. Risk of loss (*periculum rei venditæ*) after agreement but before delivery fell upon the buyer. On the other hand, he was entitled to any advantage accruing to the thing sold between those dates. It was the duty of some one to pay the price; the obligation was discharged if payment were made by the debtor or by any other person, whether authorized or not by the debtor, and even against his will. The duties of buyer and seller might be varied by agreement, the only restriction being that the seller could not by any agreement be relieved from liability for *dolus*.

Sale in English law may be defined to be "a transfer of the absolute or general property in a thing for a price in money" (Benjamin, *On Sales*, p. 1). The words "absolute or general" are inserted because there may be both a general and a special property in certain cases, and a transfer of the special property would not be a sale. The above definition, though applied in the work cited only to sales of personalty, seems to be fully applicable to sales of any kind of property. The rules as to legality, capacity of parties, assent, and fraud depend upon the law of CONTRACT (*q.v.*), of which sale is a particular instance. Incapacity is either absolute or relative, the latter being a bar only in the individual case, *e.g.*, the incapacity of a person in a fiduciary position (see TRUST). The capacity of parties tends to become more extended as law advances; thus in England the Roman Catholic, the alien, and the married woman have all been relieved within a comparatively recent period from certain disabilities in sale and purchase which formerly attached to them.

In England, for historical reasons (see REAL ESTATE), there is a considerable difference in the law as it affects real and personal estate. The main principles of law are perhaps the same, but the sale of real estate is a matter of greater expense and intricacy than the sale of personal estate, and depends to a large extent upon legislation inapplicable to the latter. It appears, therefore, better to treat the two kinds of sale separately.

Real Estate.—At common law it was not necessary that there should be written evidence of a contract of sale. The publicity of the feoffment obviated the necessity of writing, which was not essential to the validity of a feoffment until the Statute of Frauds (see FEOFFMENT). The earliest statute making a written instrument essential to a sale appears to be the Statute of Enrolments (27 Hen. VIII. c. 16). The bargain and sale operating under the Statute of Uses, and enrolled under the Statute of Enrolments in the High Court of Justice or with the custos rotulorum of the county, is no longer in use; a bargain and sale at common law is a mode of conveyance sometimes used by executors exercising a power of sale. Such a bargain and sale must be by deed since 8 and 9 Vict. c. 106, but need not be enrolled. There was no comprehensive legislative enactment dealing with all cases of sale of real estate until section 4 of the Statute of Frauds. Since that date a contract for the sale of real estate must be in writing (see FRAUD, where the provisions of the Act are set out). Sales by auction are within the statute, the auctioneer being the agent of both parties (see AUCTION). In an ordinary case of the sale of real estate the contract is formally drawn up on the basis of particulars and conditions of sale, which ought fairly to represent the actual state of the property. The statute, however, is satisfied by informal agreements, such as letters, if they contain the means of determining the property, the parties, and the price. The price must be a sum of money. If it is another estate, the contract is one of exchange; if no consideration passes, it is a gift. The price may be left to be determined by a third person, as by arbitration. For the way in which payment of the price may be made, see PAYMENT. The formation of a binding contract of sale is the most important stage in the transfer of real estate. From the moment at which the parties are bound by the contract the sale is made; the purchaser has the equitable estate in the subject-matter of the contract (see EQUITY), the vendor holding in trust for him, subject to the payment of the purchase money, for which the vendor[1] has a lien. The price becomes personal estate of the vendor and the land real estate of the purchaser. The latter has the right to accidental benefits and the burden of accidental losses accruing before completion of the purchase. The rights defined by the contract descend to the representatives of a deceased vendor or purchaser. In most cases the personal representative of a deceased vendor may convey the property under 44 and 45 Vict. c. 41, s. 4. After the contract it becomes the duty of the vendor to deliver an abstract of title, to satisfy the purchaser's reasonable requisitions as to any question arising on the title of the purchaser, and to pay a deposit, usually ten per cent. of the price fixed, within a certain time, the remainder being paid on completion,—that is, the execution of the conveyance and payment of the balance of the price. He also prepares the conveyance, which since 8 and 9 Vict. c. 106 must be by deed. The costs of execution of the conveyance are paid by the vendor. Any of these duties may be varied by special agreement. The sale is not in ordinary cases avoided because the purchaser is in default in payment of the purchase money on the day appointed. The purchaser does not forfeit his rights if he be ready to complete within a reasonable time after the day fixed for completion and to pay interest on the sum overdue. This rule is an old doctrine of equity, and is generally expressed by saying that time is not of the essence of the contract. As a general rule, any real estate is capable of sale, unless it is altogether *extra commercium*, as a church or public building. There are, however, a few exceptions introduced by the legislature, such as estates tail not barred, estates which by Act of Parliament are inalienable (see REAL ESTATE), and crown lands, of which all grants for more than thirty-one years are in general void by 1 Anne st. 1, c. 7. Sales of pretended titles to land are void by 32 Hen. VIII. c. 9. The sale of land to be held in mortmain would be void as contrary to the policy of the Mortmain Acts (see CHARITIES, CORPORATION). The rights and liabilities of vendors and purchasers have been considerably affected by recent legislation, the principal Acts dealing with the subject being the Ven-

[1] "Vendor" and "purchaser" are the words always used to denote the parties to a contract of sale of real estate. Where the sale is of personal estate, "buyer" and "seller" may be used as well.

dor and Purchaser Act, 1874, and the Conveyancing Act, 1881. A period of forty years has been substituted for the period of sixty years previously necessary as the root of title,—that is to say, in most cases an abstract showing title for forty years is sufficient. In an abstract of title to leaseholds, the title is to commence with the lease or underlease, in an abstract of title to enfranchised lands, under a contract to sell the freehold, with the deed of enfranchisement. Recitals twenty years old are evidence, except so far as they can be proved to be inaccurate, and recitals of documents dated prior to the commencement of the abstract are to be taken as correct, and their production is not to be required. The expenses of evidence required in support of the abstract and not in the vendor's possession are thrown upon the purchaser. The Conveyancing Act, 1881, further protects the purchaser by implying in a conveyance by a beneficial owner on sale for valuable consideration covenants for right to convey, quiet enjoyment, freedom from encumbrances, and further assurance. In a conveyance of leaseholds a covenant for the validity of the lease is implied. These covenants protect the purchaser much in the same way as the implied warranty in the sale of personalty. The Act also gives the mortgagee, where the mortgage is by deed, the power of sale generally inserted in mortgage deeds (see MORTGAGE).

The remedies of the vendor are an action for the price or for specific performance according to circumstances. There is also a remedy by mandamus against public companies refusing to complete. Specific performance is a remedy introduced by the Court of Chancery to enforce contracts for the sale or purchase of real estate, it being considered that in such cases the common law action for damages was an insufficient remedy. Strictly, it is only an exercise by the court of its jurisdiction over trustees, the vendor being after the contract, as has been said, a trustee for the purchaser. By the Judicature Act, 1873, actions of specific performance are specially assigned to the Chancery Division. A county court has jurisdiction where the purchase money does not exceed £500 [$2,430]. In spite of the Statute of Frauds, specific performance may in some cases be decreed where a parol contract has been followed by part performance and where the position of the parties has been materially altered on the faith of the contract. Actions for the price or for specific performance are subject to the purchaser's right to compensation for deficiency of quality or quantity or of the vendor's interest in the property. The question whether in a particular case the purchaser is entitled to rescind the contract or only to compensation is often a very difficult one. The remedies of the purchaser are an action for specific performance, for rescission of the contract, or for damages (in case of fraud), for a return of the deposit, or for expenses. On the principle of *caveat emptor*, the sale is not avoided by mere commendatory statements, statements of opinion, or non-disclosure of patent defects. Non-disclosure of latent defects or material misrepresentation of facts, on the faith of which the purchaser entered into the contract, will as a rule be a ground for rescission or for damages, and this irrespective of fraud, as a contract for the sale of land is a contract *uberrimæ fidei*. Where the sale goes off or the vendor without fraud fails to make a good title, the purchaser can only recover the deposit, if any, and any expenses to which he may have been put; he cannot recover damages for the loss of his bargain. Certain frauds by a vendor or his solicitor or agent in order to induce the purchaser to accept a title render the offender guilty of a misdemeanor, as well as liable to an action for damages (22 and 23 Vict. c. 35, s. 24). By the Vendor and Purchaser Act, 1874, either a vendor or a purchaser of real or leasehold estate in England may obtain on a summary application the decision of a judge of the Chancery Division on any question connected with the contract, not being a question affecting its existence or validity. (See Sugden, *Vendors and Purchasers;* Dart, *Vendors and Purchasers;* Fry, *Specific Performance.*)

Personal Estate.—At common law, as in the case of real estate, writing was not essential to the validity of a contract for sale. The common law is thus stated by Blackstone: "A contract of sale implies a bargain, or mutual understanding and agreement between the parties as to terms; and the law as to the transmutation of property under such contracts may be stated generally as follows. If the vendor says the price of the goods is £4 [$19.44] and the vendee says he will give £4, the bargain is struck; and, if the goods be thereon delivered or tendered, or any part of the price be paid down and accepted (if it be but a penny), the property in the goods is thereupon transmuted and vests immediately in the bargainee; so that in the event of their being subsequently damaged or destroyed he and not the vendor must stand to the loss. This supposes (it will be observed) the case of a sale for ready money; but, if it be a sale of goods to be delivered forthwith, but to be paid for afterwards, the property passes to the vendee immediately upon the striking of the bargain without either delivery on the one hand or payment on the other" (Stephen, *Commentaries*, vol. ii. bk. ii. pt. ii. ch. v.). Earnest may have been originally the same as the Roman *arrha;* it was never, however, part payment, as *arrha* might have been,—in fact, the Statute of Frauds specially distinguishes it from part payment. The giving of earnest has now fallen into disuse. The price need not be fixed; if not fixed, a reasonable price will be presumed. Though writing was in no case necessary at common law, it has become so under the provisions of various Acts of Parliament, prominent among which is the Statute of Frauds, ss. 4 and 17 (see CONTRACT, FRAUD). Section 17 of the Statute of Frauds was extended to executory contracts of sale by Lord Tenterden's Act, 9 Geo. IV. c. 14. The sale of horses in market overt must be entered in a book kept by the toll-keeper (2 and 3 Ph. and M. c. 7, 31 Eliz. c. 12), The sale of ships must by the Merchant Shipping Act, 1854, be made by bill of sale in a certain form. Contracts for the sale of shares in a joint-stock banking company are void unless the contract sets forth in writing the numbers of the shares on the register of the company or (where the shares are not distinguished by numbers) the names of the registered proprietors (29 and 30 Vict. c. 29). Bills of sale of goods must be in writing in a certain form and registered under the Bills of Sale Acts, 1878 and 1882.[1] As a general rule the property in goods passes by the contract of sale. This general rule is subject to the following important exceptions: (1) where the vendor is to do anything to the goods for the purpose of putting them into that state in which the purchaser is bound to accept them, the property does not pass until performance of the necessary acts; (2) the same is the case where the goods are to be weighed, tested, or measured; (3) where the purchaser is bound to do anything as a condition on which the passing of the property depends, the property does not pass until the condition is fulfilled, even though the goods may be actually in the possession of the buyer; (4) where an executory contract for the sale of goods is made, the property does not pass until appropriation of specific goods by the vendor in completion of the contract; (5) where the vendor reserves to himself the *jus disponendi* or future power of dealing with the goods, as by making a bill of lading deliverable to his order, the property does not pass until the *jus disponendi* is exercised in favor of the purchaser; (6) where there is fraud on the part of the vendor or purchaser, the sale is voidable, not void; it may be affirmed and enforced or rescinded. In sales of personalty, unlike sales of real estate, time is usually of the essence of the contract. A sale of goods may be

[1] Bills of sale have been included here solely on account of their name; they are in reality mortgages.

accompanied by an express warranty or collateral contract as to the title to or quality of the goods. No special form of words is necessary to create a warranty, nor need it be in writing. An implied warranty of title—that is, an affirmation that the vendor has a right to sell—exists certainly in executory contracts of sale. It most probably exists in executed contracts,[1] the exceptions to the rule having in recent times become by judicial decision more numerous than the cases falling under the old rule, that there was no such warranty. Warranty of quality exists either by statute or at common law. The Merchandise Marks Act, 1862, implies a warranty from the existence of trade-marks on chattels that the trade-mark is genuine, and from the existence of any statement respecting number, quantity, weight, place, or country that such statement is not in any material respect false. The rules as to warranty of quality at common law cannot be better stated than in the language of the clear and full judgment of the Court of Queen's Bench in Jones *v.* Just (*Law Reports*, 3 Queen's Bench, 197).

"First, where goods are *in esse* and may be inspected by the buyer, and there is no fraud on the part of the seller, the maxim *caveat emptor* applies, even though the defect which exists in them is latent and not discoverable on examination, at least where the seller is neither the grower nor the manufacturer. The buyer in such case has the opportunity of exercising his judgment upon the matter, and if the result of the inspection be unsatisfactory, or if he distrusts his own judgment, he may if he chooses require a warranty. In such a case it is not an implied term of the contract of sale that the goods are of any particular quality or are merchantable. So in the case of the sale in a market of meat which the buyer had inspected, but which was in fact diseased and unfit for food, although that fact was not apparent on examination and the seller was not aware of it, it was held that there was no implied warranty that it was fit for food, and that the maxim *caveat emptor* applied. Secondly, where there is a sale of a definite existing chattel specifically described, the actual condition of which is capable of being ascertained by either party, there is no implied warranty. Thirdly, where a known described and defined article is ordered of a manufacturer, although it is stated to be required by the purchaser for a particular purpose, still if the known described and defined thing be actually supplied there is no warranty that it shall answer for the particular purpose intended by the buyer. Fourthly, where a manufacturer or dealer contracts to supply an article which he manufactures or produces, or in which he deals, to be applied to a particular purpose, so that the buyer necessarily trusts to the judgment or skill of the manufacturer or dealer, there is in that case an implied warranty that it shall be reasonably fit for the purpose to which it is to be applied. In such a case the buyer trusts to the manufacturer or dealer, and relies upon his judgment and not upon his own. Fifthly, where a manufacturer undertakes to supply goods manufactured by himself or in which he deals, but which the vendee has not had the opportunity of inspecting, it is an implied term in the contract that he shall supply a merchantable article. And this doctrine has been held to apply to the sale of an existing barge by the dealer which was afloat but not completely rigged and furnished; there, inasmuch as the buyer had only seen it when built and not during the course of the building, he was considered as having relied on the judgment and skill of the builder that the barge was reasonably fit for use."

The case of sale by sample is peculiar to personalty. In such a sale the vendor warrants the quality of the bulk to be equal to that of the sample. There are certain kinds of sale which are governed by special legislation, chiefly on the grounds of public policy. A sale contrary to the provisions of any of the Acts is generally void in the same way as though it were illegal at common law, on the principle of the maxim *Ex turpi causa non oritur actio*. The sale of certain public offices is forbidden by 5 and 6 Edw. VI. c. 16, 49 Geo. III. c. 126, and other Acts dealing with special offices. A sale by a tradesman in the way of his ordinary business upon Sunday is illegal under 29 Car. II. c. 7. The same is the case with the sale of intoxicating liquors during prohibited hours, whether on Sundays or week days (31 and 38 Vict. c. 49, s. 6). No action can be brought to recover any debt alleged to be due in respect of the sale of any ale, etc., consumed on the premises where sold (30 and 31 Vict. c. 142). The sale of game in the close season or by an unlicensed person is forbidden by 1 and 2 Will. IV. c. 32. The sale of spirits to a person apparently under the age of sixteen is made penal by 35 and 36 Vict. c. 94, s. 7. These cases are only given as examples. There are numerous other enactments dealing with, *inter alia*, sales of anchors and chain cables, adulterated food and drugs, explosives, and poisons. Every sale by weight or measure must be according to one of the imperial weights or measures ascertained by the Weights and Measures Act, 1878; if not so made, the sale is void (41 and 42 Vict. c. 49, s. 19).

The remedies of the vendor are of two kinds, judicial against the purchaser, extra-judicial against the goods. Judicial remedies are either by action for non-acceptance where the property has not passed or by action for the price where it has passed. The extra-judicial are (1) a lien for the price, so that, in the absence of agreement to the contrary or assent to a sub-sale, the vendor need not deliver the goods until the price is paid; (2) the right of stoppage *in transitu*. This right is universally acknowledged by the commercial law of civilized nations. It arises on the insolvency of the purchaser before the goods have reached his possession, and is defeasible only by transfer, whether by way of sale or pledge, of the bill of lading or other document of title to a *bona fide* indorsee for value. The protection afforded at common law to the *bona fide* transferee has been extended by the Bills of Lading Act, 1855, and by the Factors Act, 1877. There is no general right of resale by the vendor on default of the purchaser. The remedies of the buyer are an action for damages for non-delivery, for conversion, for breach of warranty, for misrepresentation, etc., according to circumstances. He has also a remedy analogous to specific performance under the Mercantile Law Amendment Act, 1856. The act gives power to the court or a judge, in an action for breach of contract to deliver specific goods, to order execution to issue for the delivery of the goods without giving the defendant the option of retaining them upon paying the damages assessed. The buyer has further a right to reject goods where they are different in kind or quality from those which he had a right to expect. He is entitled to keep them for a sufficient time to give them a fair trial. It should be noticed that the effect of misrepresentation in the sale of real and personal property is not the same. As a rule innocent misrepresentation of facts does not give a right to rescind the sale, since a representation is, like an express warranty, not an integral part of the contract. A representation may, however, if so intended by the parties, become a condition a breach of which will avoid the sale. See Story's, Blackburn's, and Benjamin's treatises on the sale of personal property, especially Benjamin's, which is now the recognized text-book on the subject.

It may be useful to recapitulate shortly the main points of difference between Roman and English law. They have all been noticed in the preceding part of this article. (1) *Arrha* was not the same as earnest. (2) Written contracts were not necessary in Roman law under any circumstances. (3) There was no warranty of title in Roman law: the transfer was of *vacua possessio*, not of ownership; in England there is a warranty of title (unless the parties otherwise intend) on sales of personalty, but not on sales of real property, though the covenants for title practically amount to a warranty. (4) There was a warranty of quality extending to undisclosed defects in Roman law beyond anything recognized by English law. (5) By Roman law the property did not pass until *traditio*; even then it was only prop-

[1] An executed contract passes title, an executory gives a right. A purchase for ready money in a shop is an executed contract, an order for a certain chattel to be made is an executory contract. The consideration for such a contract is the express or implied promise to pay for the chattel on completion.

erty in a modified sense; it was rather *vacua possessio* secured by *duplæ stipulatio;* by English law the property in specific ascertained goods vests by the contract in the buyer. (6) A sale by a person who was not the owner was not good in Roman law; it is good in certain cases in English law (see below).

There are certain kinds of sale which it is proposed to consider separately on account of the exceptional circumstances in which they stand.

Compulsory Sale.—As a general rule sale is a matter of contract between the parties, and no one can be forced to sell against his will. But in this as in other matters, the right of the state comes in. Under the powers of the Lands Clauses and other Acts the state, exercising its right of eminent domain, may force an owner to sell for the purpose of public improvements,—such as railways. The power of compulsory sale is less common where the interests of the state are not involved; an example occurs in the Partition Act, 1868, under which the court may order a sale instead of a division, even though some of the parties interested dissent.

Judicial Sale.—Under this head may be grouped all those sales which are made under the authority and by the direction of a court of justice. In regard to real property the most important example is the sale by order of the Chancery Division. Such a sale may be ordered either under the original jurisdiction of the court or under the provisions of certain Acts of Parliament, such as the Lunacy Regulation Act, 1853, the Partition Act, 1868, the Settled Estates Act, 1877, or the Settled Land Act, 1882 (see SETTLEMENT). The Conveyancing Act, 1881, provides for freeing any land from encumbrances on sale by the court, on payment into court of a sum to meet the encumbrance. The Act also makes the order for sale conclusive in favor of a purchaser in almost every case. The abstract of title in a sale by the court is submitted to one of the conveyancing counsel of the Chancery Division, and the particulars and conditions are settled in judges' chambers. The sale is generally by public auction, the auctioneer being appointed by the judge. The regulations for the conduct of sales by the court will be found in the Rules of the Supreme Court, 1883, Ord. li. r. 1–13.

The Bankruptcy Act, 1883, gives power to a trustee acting under the authority of a court of bankruptcy to sell all or any part of the property of a bankrupt by public auction or private contract. Similar rights are given by the Scotch Bankruptcy Act, 1856. Judicial sales of the property of a debtor in Scotland are regulated by 19 and 20 Vict. c. 92. The term "judicial sale" does not seem to be used as a technical term in English as it is in Scotch law. In admiralty actions a vessel may be sold under a commission of appraisement and sale issued by the court. The practice is now regulated by Ord. li. r. 14–16. Similar powers may be exercised in an action of sett in Scotland. A common instance of a judicial sale is the sale by a sheriff of an execution debtor's goods under a writ of *fieri facias* or *venditioni exponas.* Where the execution is for a sum above £20 [$97.20] the sale is, unless the court otherwise orders, to be by public auction. Where the sheriff has seized and a claim by interpleader is set up, the court may order a sale of the whole or part of the goods (Rules of the Supreme Court, 1883, Ord. lvii. r. 12). The same rules (Ord. l. r. 2) give a valuable power to the court or a judge of ordering a sale of any goods of a perishable nature, or such as for any reason it may be desirable to have sold at once.

Sale by Persons not Owners.—English law in general agrees with the rule in Dig. l. 17, 54, "Nemo plus juris ad alium transferre potest quam ipse haberet," and a purchaser takes his purchase subject to informalities in the title. To this rule there are several exceptions, in which title may be given by persons who are limited owners or not owners at all. An example of sale by a limited owner is a sale by a tenant for life under the powers given by the Settled Land Act, 1882. Under the same head would fall sales by persons having a qualified right of sale under particular circumstances, such as a sheriff, the master of a ship in a foreign port, or a pawnee in default of payment (see PLEDGE). Sales by persons not owners at all must as a rule, in order to be valid, be made to purchasers ignorant of the defect of title on the part of the vendor. In the case of real estate a *bona fide* purchaser for valuable consideration without notice, actual or implied, of any adverse title is protected. This is on the principle that equity assists the person in possession of the legal estate. In the case of personal property title may be passed by a person not owner under the Factors Acts and in the case of stolen goods. The effect of the Factors Acts is to enable title to be given by the vendor or vendee or any person on his behalf while he is in possession of the documents of title (see FACTORS). The law as to the sale of stolen goods will be found under THEFT.

Preëmption.—This is a right of purchasing some particular property given to some particular person in priority to the public. It is conferred either by agreement between parties or by law. Thus by the Lands Clauses Act, 1845, before the promoters of an undertaking dispose of superfluous lands not required for the purposes of the undertaking they must (with certain exceptions) first offer to sell the same to the person then entitled to the lands from which the same were originally severed. In the United States preëmption is very important in its connection with the homestead law (see HOMESTEAD). In international law the right is exercisable by a belligerent nation over property not strictly contraband, but which would still be of advantage to the enemy. The goods are not seized and condemned, but purchased by the capturing nation at a reasonable compensation. The right of preëmption is given to the admiralty by 27 and 28 Vict. c. 25, s. 38 (see CONTRABAND). The old crown prerogative of purveyance and preëmption was a right of buying up provisions and other necessaries for the royal household at a valuation even without the consent of the owner, and also of impressing horses and carriages for the king's service on the public roads upon paying a settled price to the proprietor. The right was relinquished by the Act abolishing the feudal tenures (12 Car. II. c. 24).

Scotland.—The law of Scotland follows the Roman law more closely than does English law. Thus in Scotch as in Roman law the contract of sale is called a consensual contract; the sale is not complete until delivery, and market overt does not afford any protection. Writing is essential to the sale of heritable property, not by any statute, as in England, but by the ancient unwritten law. *Rei interventus,* may, however, in some cases, like part performance in England, supply the place of writings. The vendor is bound on completion to supply a sufficient progress of titles. In addition to the protection afforded to the purchaser by the progress of titles the statutory form of warrandice in 31 and 32 Vict. c. 101, s. 8, implies, unless specially qualified, absolute warrandice as regards the lands and writs and evidents, and warrandice from fact and deed as regards the rents,—that is to say, that a good title to the land has been conveyed, and that the grantor has not done and will not do anything contrary to the writ as regards the rents (see Watson, *Law Dict.*, s.v. "Warrandice"). In the case of movables writing is not necessary for a good contract of sale, except where the sale is of a ship, or the parties agree to reduce the terms to writing. The Mercantile Law Amendment (Scotland) Act, 1856 (19 and 20 Vict. c. 60), has made important changes in the law of Scotland. "The statute was passed for the purpose of assimilating the law of Scotland to that of England" (Lord Watson, in M'Bain *v.* Wallace, *Law Reports,* 6 Appeal Cases, 588). By section 1 goods after sale but before delivery are not attachable by the creditors of the seller. By section 2 the sub-purchaser may demand that delivery be made to him instead of to the original purchaser, without prejudice to the right of retention of the seller. By section 3 the seller of goods may attach the goods while in his own possession at any time prior to the date when the sale of such goods shall have been intimated to him. By section 5 the English principle of *caveat emptor* is introduced: "where goods shall be sold the seller, if at the time of the sale he was without knowledge that the same were of defective or of bad quality, shall not be held to have warranted their quality or sufficiency, but the goods, with all faults, shall be at the risk of the purchaser, unless the seller shall have given an express warranty of the quality or sufficiency of such goods, or unless the goods have been expressly sold for a specified and particular purpose, in which case the seller shall be considered without such warranty, to warrant that the same are fit for such purpose." The right of retention corresponds closely to the right of lien in England, but rests upon the simpler ground of undivested property (see Watson, *Law Dict.*, s.v. "Sale"). Criminal liability for fraud seems to be carried further in Scotland than in England (see FRAUD).

United States.—The law as to the sale of real estate agrees generally with English law. It is considerably simplified by the system of REGISTRATION (*q.v.*). The covenant of warranty, unknown in England, is the principal covenant for title in the United States. It corresponds generally to the English covenant for quiet enjoyment. The right of judicial sale of buildings under a mechanic's lien for labor and materials is given by the law of many States. The sale of public lands is regulated by Act of Congress (*Revised Statutes,* 2353–2379). In the law of sale of personal property American law is also based upon English law. The principal differences are that the law of market overt (see THEFT) is not recognized by the United States, and that an unpaid

vendor is the agent of the vendee to resell on non-payment, and is entitled to recover the difference between the contract price and the price of resale. The law of Louisiana (*Civil Code*, § 3194) gives the unpaid vendor a still greater right in his preferential claim for the price against the creditors of the purchaser, if the property still remains in the latter's possession. Warranty of title is not carried as far as in England. United States decisions draw a distinction between goods in the possession and goods not in the possession of the vendor at the time of sale. There is no warranty of title of the latter. The Statute of Frauds has been construed in some respects differently from the English decisions. The differences will be found in Mr. Benjamin's work. As to unlawful sales, it has been held that a sale in a State where the sale is lawful is valid in a State where it is unlawful by statute, even though the goods are in the latter State. (J. W†.)

SALEIYER (in Macassarese *Silâyara*, in Buginese *Silâja*), also called *Tana-dowang* ("Land of Shrimps"), is a Dutch island separated from the south coast of Celebes (East Indies) by a strait 8 miles wide, which in the west monsoon is used by vessels bound for the Moluccas, the Philippines, and China. With a length of 46 miles and general breadth of 9, the area is estimated at 315 square miles. Along the east side of the island is a belt of volcanic rock; the west side is of limestone or coralline formation. The highest point seems to be Haru on the east coast, but estimates of its altitude vary from 1000 to 3000 feet. There are no navigable rivers, and many of the streams dry up in the west monsoon. Besides most of the ordinary tropical fruits, the cultivated plants comprise Indian corn, barley, potatoes, tobacco, coffee, and indigo, and among the trees are cocoanut and areng palms, *kanari*, ebony, and teak (the last considered the property of the Dutch Government). Horses, buffaloes, goats, and sheep are kept, and pigs and deer exist in a wild state. The population of Saleiyer and dependencies, mainly a mixed race of Mancassars, Buginese, and natives of Luvu and Buton, was in 1869 55,147, and in 1880 66,276. They use the Mancassar language, are for the most part nominally Mahommedans (though many heathen customs survive), and support themselves by agriculture, fishing, seafaring, trade, the preparation of salt (on the south coast), and the weaving of clothing materials. Field work is largely performed by a servile class. Raw and prepared cotton, tobacco, trepang, tortoise-shell, cocoanuts and cocoanut oil, and salt are the principal articles of export.

The island is divided into nine regencies: Tanette, Batammata (Bataugmata; including the former regency of Onto), Buki, Mare-Mare, Bonêya—all five in the north—Bontobaugung, Balla-bulo, Layolo, and Barambarang—in the south. Panggiliyang or Benteng on the west coast, often called also Saleiyer, is the capital of the island. It stands in 6° 3′ 3″ S. lat. and 120° 31′ 48″ E. long., and possesses the best harbor on the whole coast, being protected by Pulo Pasi or Hog Island (also Sariwa or Pulo Babi). To the Saleiyer group belong a variety of small islands, for the most part, uninhabited—Tana Jampêya (the largest of all with a good anchorage at Maringi Bay), Gowang, Malimbu, etc. Previous to the Dutch occupation the Saleiyers were subject to the king of Ternate.

SALEM, a British district of India, in Madras presidency, lying between 11° 1′ and 12° 57′ N. lat. and 77° 32′ and 79° 5′ E. long. It embraces an area of 7653 square miles, and is bounded on the N. by Mysore and North Arcot, on the S. by Coimbatore and Trichinopoly, on the E. by Trichinopoly and South and North Arcot, and on the W. by Coimbatore and Mysore. Except towards the south, the district is very hilly, with large plains lying between the several ranges. Salem is described as consisting of three distinct tracts of country, known as the Tálaghát, the Báramahál, and the Bálághát. The Tálaghát is situated below the Eastern Ghats on the level of the Carnatic generally; the Báramahál includes the whole Salem face of the Ghats and a wide tract of country at their base; and the Bálághát is situated above the Ghats on the tableland of Mysore. The western part of the district is very mountainous, some of the ranges attaining an elevation of between 5000 and 6000 feet. Amongst the chief ranges are the Shevaroys, the Kalráyans, the Melagiris, the Kollimalais, the Pachamalais, and the Yelagiris. The chief rivers are the Cauvery with its numerous tributaries, and the Pennar and Palar; the last, however, only flows through a few miles of the Tirupatúr *táluk*, situated in the north-western corner of the district. The forests are of considerable value and their area is roughly estimated at 2251 square miles. The geological structure of the district is mostly gneissic, with a few irruptive rocks in the form of trap dykes and granite veins. Magnetic iron ore is common in the hill regions, and corundum and chromate of iron are also obtainable. The qualities of the soil differ very much; in the country immediately surrounding the town of Salem a thin layer of calcareous and red loam generally prevails, through which quartz rocks appear on the surface in many places. The climate, owing to the great difference of elevation, varies considerably; on the hills it is cool and bracing, and for a great part of the year very salubrious; the average rainfall is about 38 inches. Salem has about 1400 miles of road, and the length of railway line within the district is 134 miles.

In 1881 the population was 1,599,595 (males 778,483, females 821,112); Hindus numbered 1,531,855, Mohammedans 51,092, and Christians 16,567. Besides Salem (see below), the capital, the district contains three other towns with a population exceeding 10,000 each, viz., Daringambadi (15,426), Tirupatúr (14,278), and Shendamangalam (12,575). Of the total area of the district only 1,283,190 acres were under cultivation in 1883–84; but of these 137,403 acres were twice cropped. The staple crops are rice and ragi; other important crops are pulses and seeds. The chief industry is weaving, which is carried on in almost every large town and village. Carpets of great beauty and superior workmanship are made in the Salem jail. Good iron and steel are made, but only on a small scale. The gross revenue of the district in 1883–84 was £260,364 [$1,265,369.04], the land-tax contributing £211,062 [$1,025,761.32] of the amount. Though Salem has no connected history, there are few parts of Southern India that contain more spots of interest for English students. As at present composed it was acquired by the treaty of peace with Tipu Sultan in 1792 and the partition treaty of Mysore in 1799. By the former the Tálaghát and Báramahál were ceded, and by the latter the Bálághát, or what is now the Osúr *táluk*.

SALEM, chief town of the above district, situated in 11° 39′ 10″ N. lat. and 78° 11′ 47″ E. long., is a busy trading place, with a considerable weaving industry. It is tolerably well built and is prettily situated on the river Tirumanimuttar, 900 feet above sea-level, in a long valley inclosed by the Shevaroy hills, which are 6 miles distant. The population of the town in 1881 was 50,667 (males 24,584, females 26,083).

SALEM, a city of the United States, capital of Essex county, Massachusetts, is built on a peninsula between two inlets of the sea (North river and South river), in 42° 31′ 18″ N. lat. and 70° 53′ 53″ W. long., 16 miles north by east of Boston, on the Eastern Railroad. In the latter part of the 18th and the early part of the 19th century Salem was the seat of a flourishing foreign commerce, especially with the East Indies; but, its comparatively shallow harbor failing to accommodate the larger vessels of modern times, it has been supplanted by Boston and has to content itself with a good share of the coasting trade. Its industrial activity has, on the other hand, increased, and it now possesses steam cotton-mills, jute-factories, extensive tanneries, and various minor manufactories. The main interest, however, of Salem consists in its historical and literary associations and the institutions by which they are represented. Best known of these institutions is the Peabody Academy, founded in 1867 with funds provided by the well-known philanthropist. The academy at once purchased and refitted the East India Marine Hall, originally built in 1824 by the East India Marine Society (1799), which consisted of captains and supercargoes who had doubled either Cape Horn or the

Cape of Good Hope; and the building now contains under the trusteeship of the academy the collections of the old East India Museum and those of the Essex Institute, illustrating the zoology, natural history, and archæology of the county. The ethnographical collections, such as that dealing with Corea, are especially valuable. The *American Naturalist* has been the organ of the academy since 1867. The Peabody Institute, not to be confounded with the academy, is in the village of Peabody (S. Danvers), about 2 miles distant from Salem and about midway between the house in which the philanthropist was born and the grave, in Harmony Grove cemetery, in which he was buried. The institute contains various personal relics of the founder, such as the famous portrait of Queen Victoria. Plummer Hall, a fine building in Essex Street, erected out of funds left to the Salem Athenæum by Miss Plummer, contains the libraries of the Athenæum, the Essex Institute, and the South Essex Medical Society, making an aggregate of 50,000 volumes. Behind this hall is the frame of the oldest church edifice in New England, erected in 1634 for Roger Williams. Other buildings of note in Salem are a State normal school, the city hall, the court-house, St. Peter's Episcopal church, the custom-house, in which Nathaniel Hawthorne once acted as clerk, and several of the private houses (such as "Dr. Grimshawe's house," the dwelling really occupied by Dr. Peabody, Mrs. Hawthorne's father) which, while not exactly prototypes, have lent much of their verisimilitude to the localities of Hawthorne's fiction. The house in which the novelist was born is 21 Union Street. Salem had 24,117 inhabitants in 1870, 26,063 in 1875, and 27,563 in 1880.

Naumkeag (Eel Land) was the Indian name of the district in which Salem stands, and is still used familiarly by the inhabitants. The first house was built by Roger Conants from Cape Ann in 1626, and two years later a settlement was formed by John Endicott and called Salem, "from the peace they had and hoped in it." In 1630 Governor John Winthrop introduced a large body of colonists from England, including the brave and beautiful Arbella Johnson, daughter of the earl of Lincoln, who died shortly afterwards. In 1661 the Quakers were persecuted at Salem, and in 1692 the town was the scene of Cotton Mather's terrible proceedings against witchcraft: nineteen persons were hanged on Gallows Hill and Giles Cory was pressed to death. It was in Salem that in 1774 the house of representatives of Massachusetts resolved themselves into a sovereign political power. The town obtained a city charter in 1836. Few cities of the United States have given more eminent men to the world—Timothy Pickering, secretary of state (1795-1800), General Israel Putnam, F. T. Ward of China celebrity, John Rogers the sculptor, Bowditch the astronomer and mathematician, Maria S. Cummins the novelist, W. H. Prescott the historian, and Nathaniel Hawthorne.

SALEM, a city of the United States, the county seat of Salem county, New Jersey, on a small stream of the same name, by which it has steam communication with Philadelphia (on the Delaware), 44 miles distant to the north-northeast by rail. While Salem depends mainly on the agricultural prosperity of the surrounding district, it also contains foundries and machine-shops, fruit-canning establishments, glassware factories, oil-cloth factories, etc. The population was 3052 in 1850, 4555 in 1870, and 5056 in 1880.

A colony settled on the site of Salem in 1641 was replaced by a Swedish fort, and this passed through the Dutch to the English. One of the Quakers who in 1673 bought Lord Berkeley's half of New Jersey gave the place its present name and restored the settlement, which in 1682 was declared a port of entry. In 1778 the town was plundered by Colonel Mawhood.

SALEM, a city of the United States, the capital of Oregon, in Marion county, on the east bank of Willamette river, 53 miles south of Portland by the Oregon and California Railroad. It lies in a fertile prairie district, adorned with copses, and possesses a good source of water-power in Mill Creek. The capitol, a rather imposing edifice with a tower 180 feet high, erected in 1875-76, occupies a fine site above the city; other public buildings are the Willamette University (Methodist), which grants degrees in medicine, science, and general literature, the opera-house, the Roman Catholic school for girls, the State penitentiary, and State schools for the deaf and dumb and the blind. Lumber, woollen goods, flour, leather, brass castings, furniture, linseed oil, and building materials are the chief articles of manufacture and trade. The population was 2538 in 1881. Settled in 1834, incorporated in 1853, Salem became the State capital in 1860.

SALEP (Arab. *sahleb*, Gr. ὄρχις), a drug extensively used in the East as a nervine restorative and fattener, and also much prescribed in paralytic affections, probably owed its original popularity to the belief in the so-called "doctrine of signatures." In Europe it is chiefly used as a demulcent drink, but is also supposed to possess nutrient properties; it may be employed with advantage in inflammatory conditions of the mucous membrane, as in bronchitis, diarrhœa, cystitis, and other urinary disorders. It consists of the tuberous roots of various species of *Orchis* and *Eulophia*, which are decorticated, washed, heated until horny in appearance, and then carefully dried. The most important constituent of salep is a kind of mucilage which it yields to cold water to the extent of 48 per cent. This mucilage in its chemical reactions is more nearly allied to cellulose than to gum, since when dry it is readily soluble in ammoniacal solution of copper; when boiled with nitric acid it yields oxalic but not mucic acid. Salep also contains sugar and albumen, and when fresh traces of a volatile oil; dried at 100° C. it yields 2 per cent. of ash, chiefly the phosphates and chlorides of potassium and calcium.

Salep was formerly imported into Europe from the Levant, but in 1760 the French chemist Geoffroy discovered its true nature and showed how it might be prepared from the species of *Orchis* indigenous to France. That used in Germany is obtained from plants growing wild in the Taunus Mountains, the Westerwald, the Rhön, the Odenwald, and Franconia. Grecian salep is chiefly collected in Macedonia. In Asia Minor the tubers are collected near Melassa and Mughla, and about 330 tons are annually exported from Smyrna. The salep of the Bombay market, which is imported principally from Persia, Cabul, and northern India, occurs in three forms, palmate, large ovoid, and small ovoid tubers on strings, all more or less horny and translucent. Salep is also produced on the Nilgiri (Neilgherry) Hills and in Ceylon. Besides the above-mentioned forms, elongated cylindrical tubers, usually in pairs and undecorticated, are occasionally met with. The palmate tubers are the most highly esteemed, being valued at ten rupees per pound. This variety is known in the Bombay market as Persian salep. It is probably derived chiefly from *O. latifolia*, L., although *O. maculata* L., *O. saccifera*, Brongn., and *O. conopsea*, L., also afford palmate tubers. The species known to yield ovate salep are *O. mascula*, *O. Morio*, *O. pyramidalis*, *O. ustulata*, *O. militaris*, *O. coriophora*, L., and *O. longicruris*, Link. All these species are natives of the greater part of central and southern Europe, Turkey, the Caucasus, and Asia Minor, *O. latifolia* extending to western India and Tibet and *O. conopsea* to the Amur, in the extreme east of Asia. Salep is not easily reduced to powder, being both hard and tough, and is therefore usually ground between millstones. This difficulty is said to be lessened if the salep is first soaked in cold water until soft and then rapidly dried. As the powder does not mix readily with water, the authors of *Pharmacographia* (2d ed. p. 656), recommend that it should be first mixed with 1½ parts of rectified spirits of wine (brandy or other strong spirit would answer equally well), 40 parts of cold water being then added quickly and the mixture boiled. In these proportions salep affords a thick jelly.

SALERNO, a city of Italy and the chief town of a province of its own name (formerly Principato Citeriore), is beautifully situated on the west coast 34 miles southeast of Naples, and presents a fine appearance with the ruins of its old Norman castle on an eminence 905 feet above the sea and its background of graceful limestone hills. The town walls were destroyed in the beginning of the 19th century; the seaward portion has given place to the Corso Garibaldi, the principal

promenade. Among the conspicuous buildings are the theatre, the prefecture, and the cathedral of St. Matthew (whose bones were brought from Pæstum to Salerno in 954), begun in 1076 by Robert Guiscard and consecrated in 1084 by Gregory VII. In front is a beautiful quadrangular court (112 by 102 feet), surrounded by arcades formed of twenty-eight ancient pillars mostly of granite; and the middle entrance into the church is closed by a remarkable bronze door of 11th or 12th century Byzantine work. The nave and two aisles end in apses. Two magnificent marble ambos, the larger dating from 1175, several specimens of ancient mosaic, and the tombs of Gregory VII. and Queen Margaret of Durazzo deserve to be mentioned. In the crypt is a bronze statute of St. Matthew. The lofty aqueduct, one of whose arches is now used by the railway, is a building of 1320; the present water-supply is provided by a canal formed in 1865. A fine port constructed by Giovanni da Procida in 1260 was destroyed when Naples became the capital of the kingdom, and remained blocked with sand till after the unification of Italy. A series of works, especially those decreed in 1880, have provided an inner harbor of 40 acres (depth 12 to 22 feet), an outer harbor (22 to 25 feet), and wharves to the extent of 4468 feet. In 1884 180 vessels (29,078 tons) entered and 173 (28,069) cleared. Silk and cotton spinning are the principal industries. The population was 19,905 in 1870 and 22,328 (commune, 31,245) in 1881.

A Roman colony was founded at Salerno (Salernum) in 194 B.C. to keep the Picentines in check, but the city makes no figure in history till after the Lombard conquest. Dismantled by order of Charlemagne, it became in the 9th century the capital of an independent principality, the rival of that of Benevento, and was surrounded by strong fortifications. The Lombard princes, who had frequently defended their city against the Saracens, succumbed before Robert Guiscard, who took the castle after an eight months' siege and made Salerno the capital of his new territory. The removal of the court to Palermo and the sack of the city by the emperor Henry VI. in 1194 put a stop to its development. The position which the medical school of the Civitas Hippocratica (as it called itself on its seals) held in mediæval times has been described under MEDICINE, vol. xv. p. 816. Salerno university, founded in 1150, and long one of the great seats of learning in Italy, was closed in 1817.

SALES, FRANÇOIS DE (1567-1622), see vol. ix. p. 612.

SALFORD. See MANCHESTER, vol. xv. p. 467 *sq.*

SALICIN, the bitter principle of willow bark, was discovered by Leroux in 1831. It exists in most species of *Salix* and *Populus*, and has been obtained to the extent of 3 or 4 per cent. from the bark of *S. helix* and *S. pentandra*. According to Herberger, the bark of the young branches affords salicin in larger proportion than that of the trunk and contains less of the other ingredients which interfere with its extraction. Salicin is prepared from a decoction of the bark by first precipitating the tannin by milk of lime, then evaporating the filtrate to a soft extract, and dissolving out the salicin by alcohol. As met with in commerce it is usually in the form of glossy white scales or needles. It is neutral to test paper, inodorous, unaltered by exposure to the air, and has a persistently bitter taste. It is soluble in about 30 parts of alcohol or water at the ordinary temperature, and in 0.7 of boiling water or in 2 parts of boiling alcohol, and more freely in alkaline liquids. It is also soluble in acetic acid without alteration, but is insoluble in chloroform and benzol. From phloridzin it is distinguished by its ammoniacal solution not becoming colored when exposed to the air. Cold sulphuric acid dissolves salicin, forming a bright red solution. When salicin is heated with sulphuric acid and potassium bichromate, salicylic aldehyde ($C_7H_6O_2$) is formed, which possesses the odor of meadow-sweet flowers (*Spiræa Ulmaria*, L.).

Salicin is chiefly used in medicine as an antipyretic in acute rheumatism, for which it is given in doses of 5 to 30 grains. Its action is less powerful than that of SALICYLIC ACID (*q.v.*), and its depressing effect on the circulation is less marked. It is also given for headache and for ague.

Salicin is a glucoside, having the composition $C_{13}H_{18}O_7$, and is not precipitated by the alkaloidal reagents. It has been prepared artificially from helicin, synthesized from sodium, salicyl-aldehyde, and aceto-chlorhydrose, being the first glucoside that has been artificially prepared (*Journ. Chem. Soc.*, 1884, p. 439). According to Binz, it may be split up by digestion with emulsin or saliva into salicylic alcohol (saligenol, $C_7H_8O_2$) and glucose; heating it gently with dilute sulphuric acid produces a similar effect. Salicylic alcohol is converted by oxidizing agents into salicylic acid. This acid is formed when salicin is taken internally, since salicin is eliminated from the system partly in the form of salicylic and salicyluric acids, and partly as saligenin.

SALIC LAW, AND OTHER BARBARIAN LAWS. The (1) *Lex Salica* is one of those Teutonic laws of the early Middle Ages which are known as *leges barbarorum*, among which we also reckon the (2) *Lex Ripuariorum* or *Ribuariorum*, (3) *Ewa* (*Lex*) *Francorum Chamavorum*, (4) *Lex Alamannorum*, (5) *Lex Bajuvariorum*, (6) *Lex Frisionum*, (7) *Lex Angliorum et Werinorum*, h.c., *Thuringorum*, (8) *Lex Saxonum*, (9) *Leges Anglo-Saxonum*, (10) *Lex Burgundionum*, (10a) *Lex Romana Burgundionum*, (11) *Lex Wisigothorum*, (11a) *Breviarium Alarici*, (11b) *Edictum Theodorici*, (12) *Leges Langobardorum*, and to a certain extent (13) *Leges Wallicæ*. All these laws may in general be described as codes of procedure and of rights, which regulated for some indefinite period the internal affairs of the several Teutonic tribes whose names they bear.

(1) The *Salic Law* originated with the Salian Franks, often simply called Salians, the chief tribe of that conglomeration of Teutonic peoples known as FRANKS (*q.v.*). The latter first appear in history about 240 (Vopisc., *Vit. Aurel.*, c. 7), after which date we find them carrying on an almost uninterrupted struggle with the Roman empire, till 486, when they finally established a kingdom of their own in provinces which had previously been considered Roman. The Salian Franks first appear under their specific name in

Map of Salic and other Barbarian Countries.

358, when they had penetrated westwards as far as Toxandria (Texandria now Tessenderloo, in Limburg, the region to the south and west of the lower Meuse), where they were subdued by the emperor Julian (Ammian., xvii. 8). As regards their previous history nothing is known with certainty, though it seems probable that the Franks who occupied the Batavian island *c.* 290, and were there conquered in 292 by Constantius Chlorus (*Paneg. incerti auth.*, c. 4), and thence transplanted into Gaul, were the Salian Franks. We find, moreover, such unmistakable evidence of a connection between the Sigambri and the Salii[1] that the latter are by some regarded as the descendants of the Sigambri whom Tiberius removed in 8 B.C. from their home on the right bank of the Rhine; and it is argued that he did not transform them into the Gugerni, nor place them on the Merwede, a stream and locality near Dordrecht and Zwijndrecht, but transplanted them into the region now called the Veluwe, between the Utrecht Vecht and the Eastern Yssel, where the Romans probably made of them what the Batavi had been for years past—their allies—perhaps on the same condition as the latter, who merely furnished the Romans with men and arms. This accounts for the Sigambrian cohort in the Thracian war in 26 A.D. Some think, however, that the Salians were a separate tribe of the Franks who merely coalesced with the Sigambri (comp. Watterich, *Die Germanen des Rheins;* Waitz, *Verfass.*, ii. 24). In 431 the Frankish (Salic) king Chlodio (Chlojo, Chlogio), said to have been a son (or the father) of Merovech, the founder of the Merovingian dynasty (Greg. Tur., ii. 9), took Cambrai and advanced his dominion as far as the Somme (Greg., *ib.;* Sid. Apoll., v. 211 *sq.*), though still acknowledging Roman supremacy. Childerich reigned from 457 to 481, and resided at Tournai, where his grave was discovered in 1653. His son Clovis (Chlovis, Chlodovech) in 486 extended his empire to the Seine (Greg. Tur., ii. 43, 27). For an account of him, see vol. ix. pp. 636–7.

We have very few means of ascertaining when the Salic Law[2] was compiled, and how long it remained in force. Our knowledge of the code is derived—(i.) from ten texts, preserved in a comparatively large number of manuscripts, chiefly written in the 8th and 9th centuries; (ii.) from allusions to a Salic Law in various charters and other documents. But the Latin texts do not contain the original Salic Law. This is clear (*a*) from the allusions we find in them to a "Lex Salica," and "Antiqua Lex," which can hardly be anything but references to another and earlier Lex Salica; (*b*) from a certain peculiarity and awkwardness in the construction of the Latin, which, though it is so-called Merovingian, and therefore very corrupt, would have been different if the texts were original compilations; (*c*) from a number of words, found in nearly every paragraph of certain groups of the MSS., and now known as "Malberg glosses," which are evidently the remains of a vernacular Salic Law, and appear to have been retained in the Latin versions, in some cases because the translators seemed doubtful as to whether their Latin terms correctly rendered the meaning of the original, in other cases because these words had become legal terms, and indicated a certain fine. We do not know whether the original Frankish law-book was ever reduced to writing, or merely retained in, and handed down to posterity from, the memory of some persons charged with the preservation of the law. All that we know of such an original is contained in a couple of prologues (apparently later than the texts themselves) found in certain MSS. of the existing Latin versions. One of them states that four men "in villis quæ ultra Renum sunt per tres mallos (judicial assemblies) convenientes, omnes causarum origines sollicite discutiendo tractantes, judicium decreverunt," which must refer to a period before 358, as in that year the Salian Franks had already crossed the Rhine and occupied the Batavian island and Toxandria. Another prologue says that the Salic Law was compiled (*dictare*) while the Franks were still heathens (therefore before 496), and afterwards emended by Clovis, Childebert, and Chlotar. Nor can it be stated with certainty when the Latin translations which we now possess were made, but it must have been after Clovis had extended his power as far as the Loire (486-507), as in chapter 47 the boundaries of the Frankish empire are stated to be the Carbonaria Silva (in southern Belgium between Tournai and Liége) and the Loire.[3]

There exist five Latin recensions, more or less different. (i.) The earliest of the code (handed down in four MSS. with little difference, and very likely compiled shortly after Clovis extended his empire to the Loire) consists of sixty-five chapters (with the Malberg glosses). In the course of the 6th century a considerable number of chapters appear to have been added (under the title of "edicts" or "decrees"), some of which are ascribed to Clovis, and the remainder to his successors before the end of the century. One of them (chap. 78) may with some certainty be ascribed to Hilperic (*c.* 574). Some others seem to have originated with Childebert I. and Chlotar I. (whose joint reign lasted from 511 to 558), and are known collectively as "Pactus Childeberti et Chlotharii." From internal evidence we may infer that this first version dates from a time when Christianity had not yet become general among the Franks. (ii.) Two MSS. contain a second recension, having the same sixty-five chapters (with the Malberg glosses) as the first, but with numerous interpolations and additions, which point to a later period. Especially may this be said of the paragraph (in chap. 13) which pronounces fines on marriages between near relatives, and which is presumed to have been embodied in the Lex Salica from an edict of Childebert II. issued in 596. In chapter 55 paragraphs six and seven speak of a "basilica," of a "basilica sanctificata," and of a "basilica ubi requiescunt reliquiæ," but it is more than doubtful whether we have here any evidences of Christianity, though a later recension (the fourth) altered "basilica" into "ecclesia," the "reliquiæ" into "reliquiæ sanctorum," and thereby gave a decidedly Christian aspect to the clause. (iii.) A third recension is contained in a group of nine MSS. (divided into two classes), three of which have the same text (with the Malberg glosses) as the MSS. of the first and second recensions, divided, however, systematically into ninety-nine chapters, while the other six MSS. have the same ninety-nine chapters, with very little difference, but without the Malberg glosses. This text seems to have been arranged in Pippin's or Charlemagne's reign (*c.* 765-779). The clause on marriages between near relatives mentioned above is not found in this recension. On the other hand, we find in chapter 55 (=77) fines pronounced on the murder of a presbyter and deacon (no bishop yet mentioned), while the six MSS. of the second class do not contain chapter 99 ("De Chrenecruda"), but merely say that the symbolism described in that chapter had been observed in heathen times, and was to be no longer in force. (iv.) The

[1] "Detonsus Vachalim [the river Waal] bibat Sicamber" (Sid. Apoll., *Carm.*, xiii. 31). "Ut Salius jam rura colat flexosque Sicambri In falcem curvent gladios" (Claudian, *De Laude Stilic.*, i. 222). According to the *Gesta Franc.*, c. 1, the Franks at one time inhabited the town of Sicambria. The earliest Frankish kings, who were undoubtedly kings of the Salian Franks, are often called Sigambri, and always with the object of honoring them. St. Remigius, when he baptized Clovis, exhorted him, "Mitis depone colla Sicamber" (Greg. Tur., ii. 31). Venantius Fortunatus (vi. 4) says to King Charibert, "Cum sis progenitus clara de gente Sygamber." For further evidence, comp. Waitz, *Verfass.*, ii. 22 *sq.*

[2] The origin of the name Salicus, Salius, is uncertain. It is not improbable that it was derived from the river Yssel, called in the Middle Ages Isloa, Hisloa, Isla, Isela, Isalia. The region about Deventer, in the east of Holland, is still called Salland, though it is nowhere expressly said that the Salians ever lived there.

[3] Some explain *Ligeris* to be the river Leye, a branch of the Scheldt, in which case the compilation would fall between *c.* 453 and 486.

fourth version (handed down in a great number of MSS., and embodying in seventy chapters substantially the whole of the previous versions) is usually called *Lex Salica Emendata*, as the text bears traces of having been emended (by Charlemagne), which operation seems to have consisted in eliminating the Malberg glosses from the text, correcting the Latin, omitting a certain number of paragraphs, and inserting some new ones. In chapter 55 the bishop is mentioned with the presbyter and the deacon. (v.) Finally, we have a fifth text, which seems an amalgamation of the previous recensions, more especially of the second, third, and fourth, but here and there with considerable differences. It was published in 1557, at Basel, by Bas. Joh. Herold (*Originum ac Germanicarum Antiquitatum Libri*); but no trace of the Fulda and other MSS. which the editor says that he used has hitherto been found.

First recension.	*Second recension.*	*Third recension.*	*Fourth recension.*	*Fifth recension.*
De terra vero nulla in muliere [portio aut] hereditas non pertinebit, sed ad virilem sexum qui fratres fuerint tota terra pertineat.	De terra vero Salica in muliere nulla pertinet portio, sed qui fratres fuerint, et ad virile sexu tota terra pertineat.	De terra vero Salica nulla in mulierc hereditatis transeat porcio, sed ad virilis sexus tota terra[2] proprietatis suæ possedeant.	De terra vero Salica nulla portio hereditatis mulieri veniat sed ad virilem sexum tota terræ hereditas perveniat.	De terra vero Salica, in mulierem nulla portio hæreditatis transit, sed hoc virilis sexus acquirit, hoc est, filii in ipsa hæreditate succedunt. Sed ubi inter nepotes ant pro nepotes post longum tempus de alode terræ contentio suscitatur, non per stirpes sed per capita dividantur.

The Salic code consists of enactments regarding procedure in lawsuits (chaps. 1, 18, 26, 37, 46–53, 56, 57, 60), judicial fines and penalties for various kinds of theft and kidnapping (2–8, 10–12, 21–23, 27, 28, 33–35, 38–40, 55, 61), for offences, injuries, etc., to persons, animals, and property (9, 15–17, 19, 20, 24, 25, 29–32, 36, 41–43, 64, 65); it regulates the "wergeld" (a word found only in the text published by Herold; all the other texts have *leodis*, *leudis* = people, associate of the people) of all classes of persons living under the Salic law (41–43, 54, 63), the share of the kindred in the composition for homicide (58–62), the devolution of property and inheritance (59), migration from one village to another (45), etc.

The Salic Law speaks of—(*a*) freeborn persons (*ingenuus Francus*, *Salicus Francus*), with a wergeld of 200 solidi,[1] which was tripled when such a person served in the army, and the latter amount again tripled when the person killed was an officer of the king; (*b*) serfs (*leti* or *liti*), who enjoyed personal freedom though belonging to some master, and (*c*) *pueri regis* (probably serfs in the service of the king), both with a wergeld of 100 solidi; (*d*) the Roman population, not yet placed on the same footing with the Francus (*possessores* with a wergeld of 100 solidi; *tributarii*, perhaps = *coloni*, with a wergeld of 62½ solidi; (*e*) slaves (*servi*), with a wergeld of 30 solidi; and a variety of other persons belonging to one or other of these classes (*puer crinitus*, class *a*; *porcarius*, *faber ferrarius*, *aurifex*, etc., class *e*). An aristocracy is not mentioned. The people lived together in villages (chap. 45); they exercised agriculture and reared cattle (2–5, 27, etc.); they hunted and fished (6, 33); vineyards and gardens were known to them (27, 6, etc.); and gold work and iron work are mentioned (10). The chief of the state was a king; his officers included the *grafio*, who was chief of a *pagus* (shire); *sacebaro*, chief of a hundred (both with a wergeld of 600 solidi; the latter could also be a *puer regis*, in which case he had a wergeld of 300 solidi); *thunginus* or *centenarius*, chief of a hundred, but probably elected by the people from among themselves, as his wergeld seems to have been the ordinary one. The judicial assembly was called *mallus*, the place where it assembled *malloberg*, the party in a suit *gamallus*, the councillor of the assembly *rachineburgus*, an officer who had to advise upon the sentence to be pronounced, and to value the property in question.

The famous clause in the Salic Law by which, it is commonly said, women are precluded from succession to the throne, and which alone has become known in course of time as *the* Salic Law, is the fifth paragraph of chapter 59 (with the rubric "De Alodis") in which the succession to private property is regulated. The chapter opens with four (five) paragraphs in which it is enacted that—(1) if a man died without male issue, his mother (so in first recension; the second to fifth have "pater aut mater") would succeed to the inheritance (in hereditatem succedat); (2) failing her (the father and mother), his brother (brothers) or sister (sisters); (3) failing these, the sister of the mother; (4) when there was no sister of the mother, the sisters (sister) of the father; and (5), failing these, the nearest relative. After this the fifth paragraph reads as follows:

It seems clear that the first four paragraphs of the chapter, which admit women to a share in the inheritance, refer to *private*, *movable* property, and that, by the fifth paragraph, the inheritance of *land* was exclusively confined to males. We know that this exclusion of women from landed property was hardly a rule anywhere in the Frankish empire, and certainly not in the 6th century, but it obtained more or less afterwards, especially during the feudal period, when all the owners of landed property (*i.e.*, the tenants of fiefs) were liable to military service. We do not know when this exclusion of women from landed property began first to be applied and extended to an exclusion from the succession of thrones, as we do not read of such a notion until the middle of the 14th century during the controversy between Edward III. and Philip of Valois, when it was alleged to be derived from the Salic Law. It will be observed that the word *Salica* is not found in the oldest existing recension, but appears first in the second text, which some would ascribe to the end of the 6th century. Nor is the word found in the corresponding paragraph (56,4) of the Lex Ripuaria, which was based on the Salic Law. This addition (retained in all the other recensions, also in the so-called Lex Emendata) was no doubt made for some purpose, but we do not know whether it was made by a scribe, nor what particular notion it was intended to convey, nor whether it was this special word which gave rise to the idea of women being precluded from the succession of thrones.

The various texts of the Lex Salica, arranged in parallel columns, with a commentary on the Malberg glosses, were published in 1880, under the title *Lex Salica: the Ten Texts with the Glosses, and the Lex Emendata*, ed. J. H. Hessels, with notes on the Frankish words in the Lex Salica by H. Kern, 4to, London, 1880; comp. also Geo. Waitz, *Das alte Recht der salischen Franken*, 8vo, Kiel, 1846; Rud. Sohm, *Die fränk. Reichs- und Gerichts-Verfassung*, 8vo, Weimar, 1871; Pardessus, *Loi Salique*, 4to, Paris, 1843.

Having treated of the Salic Law somewhat minutely, we need only say a few words about each of the other *leges barbarorum*, as they all present somewhat similar features, and hardly differ except in the time of their compilation, the amount of fines, the number and nature of the crimes, the number, rank, duties, and titles of the officers, etc.

(2) The *Ripuarian Law*, or Law of the Ripuarian Franks (*Lex Ripuaria* or *Riboaria*, *L. Ripuariorum* or *Ribuariorum*, *L. Ripuariensis* or *Ribuariensis*), or inhabitants of the river-banks, was in force among the East or Rhenish Franks in the Provincia Ribuaria, also called Ducatus or Pagus Ribuarius (see vol. ix. p. 636), of which Cologne was the chief town. It has much in common with the Salic Law, in fact, chapters 32–64 are, with the exception of some necessary

[1] [The *Solidus* or *Aureus* of the Roman Empire was a coin worth about $3.79; it afterwards depreciated in value nearly one-half.—Am. Ed.]

[2] Text B reads: "proprietas perveniat."

modifications and additions, merely a repetition of the corresponding chapters of the Salic Law, and even follow the same arrangement, so that this part of the code is hardly anything but the Salic Law revised by order of the kings of Austrasia. Professor Sohm (whose edition, published in 1883 in *Mon. Germ. Hist.*, Legg., vol. v., part 2, is based on nearly forty MSS., written between the 8th and the 11th century) divides the eighty-nine chapters of this code into four distinct portions, ascribing the first portion (chaps. 1–31), which contains enactments not met with in the Salic Law, to the first part of the 6th century, the second (chaps. 32–64) to the second part of the same century (*c.* 575), the third (chaps. 65–79) to the 7th century, and the fourth (chaps. 80–89) to the beginning of the 8th century. This result practically agrees with the statements found in a prologue in certain MSS. (which contain some of the barbarian codes), where it is said that the "Leges Francorum (= Lex Ripuariorum), Alamannorum, et Bajuvariorum" were compiled at Châlous-sur-Marne at the dictation of Thierry I. (511–534), by wise men learned in the law of his kingdom, and that the codes were afterwards revised and amended by Childebert I., Chlotar I., and Dagobert. Charlemagne promulgated some additional chapters to the Ripuarian Law in 803 (*Mon. Germ. Hist.*, Legg., i. 117). We may here observe that the Salic and Ripuarian Laws were to some extent introduced into England by the Norman Conquest, as appears from the laws of Henry I., where we find enactments "secundum Legem Salicam" and "secundum Legem Ripuariam"; comp. Leg. Hen. I., capp. 87, §§ 9, 10, 11 (word for word = L. Sal., tit. 43), 89, 90 § 4 (= L. Rip., 70), and 83 § 5 (= L. Sal., tit. 55 § 4).

(3) With the Ripuarian Law the *Lex Francorum Chamavorum* is intimately connected. The two MSS. in which it is preserved call it "Notitia vel commemoratio de illa ewa (law) quæ se ad Amorem habet." Amor is the district called Hamarlant, Hamalaut, Hammelant, Hamuland, in the 9th century. This name was derived from the Chamavi, a German state mentioned by Tacitus (*Ann.*, xiii. 55; *Germ.*, c. 33, 34), which afterwards constituted a part of the Frankish empire. In the 9th century Hamalant was a part of the Pagus Ribuariorum. The whole code consists of only forty-eight short paragraphs, which are apparently nothing but statements made in answer to the "missi dominici" whom Charlemagne despatched to the various nations of his empire to inquire into their condition and to codify their respective laws. It may therefore be ascribed to the beginning of the 9th century (802 or 803). Professor Sohm has published it as an appendix to the Lex Ripuaria (*Mon. Germ. Hist.*, Legg., vol. v. part 2, p. 269).

(4) The *Lex Alamannorum* was (according to the prologue mentioned above) first compiled by the East-Frankish king Thierry (511–534), and afterwards improved and renewed by Childebert I. (511–558), Chlotar I. (558), and Dagobert I. (622–638). Although not much reliance can be placed on this statement, the researches of Professor Merkel, who edited the code from forty-eight MSS. (*Mon. Germ. Hist.*, Legg., vol. iii.), show that some kind of code called Pactus (of which he published three fragments) was compiled for the Alamanni in the reign of Chlotar I. (537–561). Under Chlotar II. (613–622) a more complete code, consisting of seventy-five chapters, was compiled, which was revised under Dagobert (628) and augmented with chapters 76–97; it was again altered and augmented under the Alamannic duke Landfrid (d. 730), whose work Merkel calls *Lex Alamannorum Lantfridana*, and finally augmented in the Carolingian period (hence called *Lex Alamannorum Karolina sive reformata*), perhaps early in the 9th century. The code consists of 97 (in some MSS. 98, 99, 105, and 107) chapters.

(5) The *Lex Bajuvariorum*, or *Pactus Bawarorum*, had the same origin as the Lex Alamannorum, if we accept the somewhat unreliable statement of the prologue spoken of above. It seems probable that some kind of code was compiled for the Bavarians during the reigns of Clovis's sons. Those paragraphs which treat of ecclesiastical affairs and the position of the Bavarian dukes towards the Frankish kings (tit. ii. chap. xx. § 3) have clearly been inserted in Dagobert's time, if not later. There is a great similarity between certain provisions of the Bavarian and the Alamannic codes, and also some paragraphs of the former have been derived from the earliest recension of the Lex Wisigothorum. Some additions were made by Duke Thassilo II. (763–775), some by Charlemagne (803), some by King Louis (*c.* 906), and, finally, some by Duke Henry II. (end of 10th century). The emperor Henry III. is alleged to have granted the law of the Bavarians to the Hungarians in 1044. It consists of twenty-one chapters, each containing several paragraphs. Professor Merkel distinguishes three different recensions of the code and various additions, which he edited in 1863 from thirty-five MSS. for the *Mon. Germ. Hist.*, Legg., iii. p. 183 *sq.*

(6) For the *Lex Frisionum*, see vol. ix. p. 693.

(7) The *Lex Angliorum et Werinorum, hoc est, Thuringorum*, consists of seventeen chapters. Early editions of this code contained some legal decisions identical with those of Judge Wlemarus in the appendix to the Lex Frisionum (L. Angl. Jud.Wlem., 1, 2, 6, 7=L. Fris., 22, §§ 54, 55, 86; Addit., i. 18), from which circumstance it was inferred that the compilation, or at least the revision, of both codes took place at one and the same time (802–803). But Richthofen, who edited the work in *Mon. Germ. Hist.* (Legg., v. p. 103), and who rejects these legal decisions of Wlemarus as not belonging to this code at all, is of opinion (p. 115) that the code was not written even at the end of the 9th century. Opinions have differed also as to the region where the law originated. Some ascribe it to the Angli and Werini, who inhabited the Holstein and Schleswig regions; others attribute it to Thuringia proper; and in more recent times it has been ascribed to Thuringia on the left bank of the Rhine (=South Holland, Brabant, etc.). It was also argued that the code must have originated in a region where Frisian and Frankish elements had become mixed, both in language and in law, and where the Frankish preponderated. That the code originated in South Holland was inferred from its agreement in some respects with the Lex Chamavorum, which originated in the region of the lower Rhine and the Yssel. And the law may have come to be in force among the allied tribes on the Elbe in northern Thuringia, even though it originated in South Holland. If it originated in Thuringia, it must have been transplanted to the Holstein and Schleswig regions; and it was used by the Danes, as is clear from Canute bringing it over to England when he conquered the country in 1013.[1] But in England the code was simply called "Lex Weriuorum, h.e., Thuringorum," but no longer "Anglorum," as the Danes called the whole Anglo-Saxon population which they had conquered "Angli," and the law which they found in force "Lex Anglorum" (Legg. Edw. Conf., c. 30). Hence it has been concluded that what was called in England Lex Danorum is nothing but the Lex Weriuorum. When the Normans conquered England in 1066 they soon recognized that this Lex Danorum and the Law of the Norwegians (Lex Noricorum or Norwegensium), who had migrated to England in earlier times, were practically one and the same. Hence William I., declaring that the population which he had brought over with him from Normandy were also originally Norwegians, resolved to abrogate the Anglo-Saxon laws and to leave only that of the Danes in force (Legg. Edw. Conf., c. 30),—a plan which only the most persevering entreaties of the Anglo-Saxon barons could induce him to abandon. The latest edition of this code (1875) is by K. F. von Richthofen, who is decidedly against the South Holland origin of the law.

(8) The *Lex Saxonum* consists of nineteen chapters or sixty-six articles or paragraphs, and appears to be composed of three essential parts, the oldest of which (arts. 1–23) seems to have existed before the later additions known as the Capitulare Paderbornense (de partibus Saxoniæ) of 785 (or 777) and the Capitulare Saxonicum of 797 (in which a "Lex Saxonum" and "Ewa Saxonum" are referred to; comp. chaps. 33 and 7, 8, 10); the second part (arts. 24–60) must have been compiled after that date; and the third (arts. 61–66) was probably added in 798, when Charlemagne had removed a part of the Saxon nobility as hostages from their own country; while the whole was united into one code at the diet of Aix-la-Chapelle in 802–803 (Merkel, *Lex Saxonum*, Berlin, 1853). The enactments of this code are far more severe than those of any other of the barbarian laws, and it often inflicts capital punishment for crimes which the other laws punish with mere pecuniary fines, as, for instance, theft and incendiarism. This rigor Charlemagne softened by reserving to himself the right of asylum and pardon, but it was expressly retained and granted anew by Conrad II. (1024–1039). The code was edited in 1875 by Von Richthofen in *Mon. Germ. Hist.*, Legg., v. p. 1 *sq.*

(9) The *Leges Anglo-Saxonum* are for a great part written in Anglo-Saxon, and as such may be reckoned among the most ancient monuments of the Teutonic language. They appeared mostly in the form of constitutions promulgated by the various kings (somewhat like the Frankish capitularies), with the coöperation of an assembly of leading men ("sapientes," Beda, *H. E.*, ii. 5), and frequently also of the clergy (*concilium*, *synodus*). They may be divided into two classes,—secular and ecclesiastical laws. Sometimes they are mere judicial sentences (*dôm*) or treaties of peace (*friđ*). The earliest laws we have are those of Æthelbert, king of Kent (*c.* 561); then follow those of Hlođhaer (*c.* 678) and Eâdrîc (*c.* 685), Wihtraed (*c.* 691), Ine (after 688),

[1] Comp. *Canuti Constit. de Foresta*, c. 33, "Emendet secundum pretium hominis mediocris, quod secundum Legem Werinorum, *i.e.*, Thuringorum [= L. Angl. and Werin., i. 2] est 200 solidorum" [*c.* $380].

Ælfred (after 871), Eadward (after 901), Æthelstan (after 924), Eadmund (after 941), Edgar (after 959), Æthelred II. (after 978), the Danish Cannte (after 1017), William the Conqueror (after 1066). Then follow two collections of laws, the so-called "Leges Edwardi Confessoris" and "Leges Henrici I.," which, drawing from the Anglo-Saxon Law, represent the modifications which had been made in the earliest laws during the Norman period, and the introduction of new elements derived from the Salic and Ripuarian laws. Besides these there are a good many canons and other ecclesiastical ordinances enacted under the archbishops Theodore and Ecgbert and King Edgar, etc.; comp. ENGLAND, vol. viii. pp. 332-3, 340. There is an edition of these laws by B. Thorpe (fol., London, 1840), another by Dr. Reinh. Schmid (*Die Gesetze der Angel-Sachsen*, 2d ed., 8vo, Leipsic, 1858).

(10) The compilation of the *Lex Burgundionum* is usually ascribed to Gundobald (d. 516), whence it is also called *Lex Gundobada* (corrupted *Gombata*, Fr. *Loi Gombette*). It consists, according to its first prologue, of a collection of constitutions enacted partly by the earlier kings of Burgundy, partly by Gundobald, and revised by a general Burgundian diet. This agrees with the statements contained in its second prologue, which itself may be regarded as an independent constitution or edict to the counts and judges regarding the introduction of the law. In the rubric which it bears in the MSS. it is said that it was promulgated at Lyons on 29th March in the second year of Gundobald (some MSS. read Sigismund). As the year of Gundobald's accession is supposed to be 465, the promulgation must have taken place in 467, or, if we assume that the year is meant in which Gundobald became sole king of Burgundy (478), the date of the law would be 480, while it would be 517 if we adopt the reading "Sigismund" of some of the MSS. But as the law in its present state contains decrees both of Gundobald and of Sigismund we can only regard the whole as a compilation effected by the latter. In early editions the law was divided into eighty-nine chapters, with two additamenta, the first of which (consisting of twenty chapters) was ascribed to Sigismund, the second (of thirteen chapters) to his brother and successor, the last king of the Burgundians, Godomar. But Professor Bluhme (who published the law in 1863, in *Mon. Germ. Hist.*, Legg., iii. 497) places chap. i. (De causis itineribus et aliis servitutibus) and chap. xix. (De liberali causa) of the first additamentum as chaps. xvii. and xliv. in "Papianus"; chap. xx. as chap. cvi. (extravagant) and its remaining chapters as chapters lxxxix. to cv. The second additamentum is placed as chap. cvii., the old chap. lxxxix. as chap. cviii., and a new chapter cix. (a decree of Sigismund "De collectis" of 516) added. It was Gundobald's intention that his law should decide all cases between Burgundians and between them and Romans; in all other cases the latter would only use Roman law (comp. second preface), of which the Lex Burgundionum contains many traces, and even the Burgundians were allowed to use Roman law (comp. L. Burg., titt. 43, 60, 55 § 2). The Latinity of the Burgundian Law is purer than that of all the preceding barbarian codes, and we find in it a distinct tendency to treat Romans with greater leniency and to make them equal to the Burgundians in the eye of the law. Through Gundobald's political relations with Alaric II., the Lex Burgundiouum influenced the West-Gothic legislation, of which traces are found in the Lex Wisigothorum and the interpretatio to Alaric's Breviarium. Charlemagne promulgated in 813 a Capitulare Aquisgranum (*Mon.*, Legg., i. 817) regarding the Lex Burgundionum, though the text was not altered. Agobart, bishop of Lyons, complained to Louis the Pious respecting certain abuses caused by the Burgundian Law (Bouquet, vi. 356), but no remedy was effected. On the other hand, towards the end of the 9th century the law had gradually fallen into disuse like all the other barbarian laws, though it is said that the emperor Conrad II. revived and confirmed it. See, besides Professor Bluhme's edition, Hubé, *Hist. de la formation de la loi Bourguignonne*, Paris, 1867.

(10a) In the second preface to the Lex Burgundionum (published in 502) the Roman subjects of the Burgundian king were promised a codification of their own laws. This work appears to have been promptly executed and was published under the title *Lex Romana Burgundionum*, perhaps before the compilation of the Breviarium Alarici (506). This collection is also known as *Papianus*, of which name (found already in MSS. of the 9th century) no satisfactory explanation has hitherto been offered, some, perhaps wrongly, supposing that it is a corruption of the name of Papinianus, the Roman jurist. It was published by Professor Bluhme as an appendix to the Lex Burgundionum (*Mon. Germ. Hist.*, Legg., iii. p. 579).

*(11) As regards the *Lex Wisigothorum* (also called *Forum Judicum*, *Judicum Liber*, *Forum Judiciale*, etc.), we know with certainty from Isidore of Seville (*Hist. Goth. Hisp.*, 504) that Euric (466-483) was the first Gothic king who gave written laws to the West Goths. It would therefore be erroneous to ascribe (with Mariana, *Hist. de España*, v. 6) their first written laws to Euric's son, Alaric II., though it seems probable that the latter, by adding his own laws to those of his father, was really the first author of a West-Gothic codification. Isidore refers to the collection of laws (as it had been preserved up to the end of the 5th and the beginning of the 6th century) as the Laws of Enric, though we must assume that the statutes of the kings who succeeded Enric had already been added to his collection. Isidore also tells us (*Hist. Goth. Hisp.*, 606-624) that Leovigild (d. 586) revised Enric's Laws. As Isidore was bishop of Seville from 599 to 636, and may therefore be said to have been a contemporary of Leovigild, his testimony may be accepted as conclusive, though a much later but untrustworthy tradition would have it that the revision was executed by Leovigild's son, Reccared I. (the first Catholic king of the Goths), who died in 601, whereby the whole population of Spain was equalized in point of law. According to Spanish traditions of the 12th century, the West-Gothic collection of laws was again revised, under Sisenand, by the fourth council of Toledo (633), a revision on which Isidore seems to have exercised some influence. It is uncertain, however, whether the code was then systematically arranged and divided into twelve books, as we now have it, or whether this was done under Chindaswinth (d. 652) or under his son Receswinth (d. 672). The several books of the code are divided (in imitation of the codes of Theodosius and Justinianus) into tituli, and those again into chapters or constitutions. From Leovigild down to Egica (d. 701) and his son and coregent Witiza (d. *c.* 701, the last king of the Goths before the invasion of the Moors) every constitution bears the name of the king who promulgated it, while those dating from before Leovigild have the word "antiqua" prefixed to them instead of the name of a king. This designation is said to have been commenced by Erwig (680-687), who thereby wished to prevent the clergy from claiming the code as their work. Of the texts which existed before the fourth council of Toledo only one small fragment has come down to us, in a palimpsest preserved in the Paris National Library (No. 1278). Some regard this as the remainder of the supposed recension of Reccared I.; others regard it as a fragment of the Laws of Euric, though it could in no case be the Laws of Euric themselves, but at most their codification by Alaric II. The fragment was known to the Benedictines (*Nouv. Traité de Diplom.*, i. 483, iii. 52, 152, note 1), and was published in 1847 by Professor Bluhme (*Die Westgoth. Antiqua oder das Gesetzbuch Reccared's I.*, Halle). The text is undoubtedly older than those enactments which we find designated as "antiqua," so that it could hardly be placed later than the commencement of the 6th century, *i.e.*, shortly after the compilation of the Breviarium Alarici (506). Hence the text called "antiqua" may be regarded as a modification of that of the Paris palimpsest, and was probably not made before the end of the 6th or the beginning of the 7th century. Roman law, which is so conspicuous in the later text, may already be traced in that of the palimpsest (taken from the Breviarium Alarici), and also in the "antiqua" constitutions, in which we find even traces of Justinian's law. The Lex Wisigothorum (the first code in which Roman law and Teutonic law were systematically combined) was no doubt regarded, after Leovigild and Reccared I., as a code for the Goths as well as for the Romans, without abolishing the Breviarium among the Romans. But King Chindaswinth ordained that the Lex Wisigothorum should be the sole code for both nations, prohibiting at the same time the use of the Roman law, thereby materially promoting the amalgamation of the two nations. It remained in force in Spain throughout the Middle Ages, and was translated into Spanish (Castilian) under Ferdinand III. (1229-1234, or 1241) under the title *Fuero Juzgo*, or *Fuero de Cordova*.

Editions: (1) *Fuero Judzgo en Latin e Castellano cotejado con los mas antiguos y preciosos Codices por la Real Academia Española*, Madrid, 1815, fol.; (2) in *Portugaliæ Monumenta Historica*, vol. i., Lisbon, 1856, fol.

(11a) Here also we may mention a *Lex Romana* compiled for the Roman population, just as in Burgundy. It is also known as *Liber Legum*, *Liber Legum Romanorum*, and as *Lex Theodosii* or *Corpus Theodosianum*. It received the latter name because the *Codex Theodosianus* served as its basis. It includes also excerpts from *novellæ* of Theodosius, Valentinian, Marcian, Majorian, Severus, and from the *Institutiones* of Gains, the *Sententiæ* of Paulus, the *Codices Gregorianus* and *Hermogenianus*, etc. In a MS. of the 10th century it is called *Breviarium*, and the title *Breviarium Alarici* or *Alaricianum* has become general since the 16th century.

The compilers of the Breviarium are not known, but it was published in the twenty-second year of Alaric II., *i. e.*, on 5th February, 506, at Aire (Atures) in Gascony. It was also used in other western provinces of the Roman empire, and was imitated, excerpted, and altered in other places. One recension, probably dating from the 9th century, is known (from the place where the MS. was found) as the *Lex Romana Utinensis*. The best edition is that of G. Haenel, *Lex Romana Wisigothorum*, Berlin, 1847.

(11b) We have also a code for the Eastern Goths compiled by command of Theodoric after 506, but before 526, and known as *Edictum Theodorici*. It consists of 155 chapters (with a few additions), which are in reality an epitome of Roman law. It was published in 1875, in *Mon. Germ. Hist.*, Legg., v. p. 145 *sq.*, ed. by Professor Bluhme.

(12) *Leges Langobardorum*.—The first trace of Lombardic law is an edict of Rothar, consisting of 388 chapters, and promulgated at a diet held at Pavia on 22d November, 643. This was followed by laws of Grimoald (668), nine chapters; Liutprand (713-735), six books; Ratchis (746), nine chapters; Aistulphus (*c.* 755), fourteen chapters. Additions were also made by Charlemagne and his successors down to Lothair II. In the manuscripts the texts are arranged, some in a chronological, some in a systematical order. The latter arrangement is already found in a MS. of the 9th century. The systematic collection, which was used chiefly in Bologna at lectures and for quotations and was known as *Lombarda* (*Liber Langobardæ s. Lombardæ*), appears to have been made in the 11th century. The text as it exists at present is very corrupt, as a number of glosses (some of great antiquity) and formulæ, added in the first instance by those who had to use the code to explain certain enactments of the law, afterwards found their way into the text. Towards the end of the 12th and down to the beginning of the 16th century various glosses and commentaries on the Lombardæ made their appearance. The first commentaries were those of Ariprand and of Albertus (second half of 12th century). The later commentators (Carolus de Tocco, *c.* 1200; Andreas of Barulo, *c.* 1230; Blasius de Morcone of Naples, before 1338; Boherius and Johannes Nenna of Bari, *c.* 1540) refer frequently to Roman law. Of the Edictum Rotharis a Greek translation was made, of which only fragments have been preserved (comp. C. E. Zachariä, *Fragmenta versionis Græcæ Legum Rotharis, Langob. regis*, ex. cod. Paris. Græc., No. 1348, Heidelberg, 1835).

Edition: (1) C. Baudus a Vesme, *Edicta regum Langobardorum*, Turin, 1855, reprinted by J. F. Neigebaur, Munich, 1855, 1856; (2) *Mon. Germ. Hist.*, Legg., iv. (1868), by Friedr. Bluhme and Alfr. Boretius; (3) Fr. Bluhme, *Edictus ceteræque Langobardorum leges*, Hanover, 1870; comp. Merkel, *Geschichte des Lombardenrechts*, Berlin, 1850.

(13) The *Leges Walliæ* do not belong to the Teutonic family of codes; but it is not out of place to mention them here. There is, comparatively speaking, no great distance of time between the *leges barbarorum* and the Laws of Wales, while the contents of the latter show a similar, nay, almost the same, idea of law as the former; and, apart from the fact that Wales became permanently connected at the end of the 13th century with a Teutonic people, the Anglo-Saxons, it has been noticed that in Wales, Roman and Germanic, but no traces of a specific Welsh, law are found. King Howel Dda (*i. e.*, the Good), who died in 948, is the originator of the Welsh code.[1] In the preface it is stated that Howel, "seeing the laws and customs of the country violated with impunity, summoned the archbishop Menevia, other bishops and the chief of the clergy, the nobles of Wales, and six persons (four laymen and two clerks) from each comot, to meet at a place called Y Ty Gwyn ar Dav, or the white house on the river Tav, repaired thither in person, selected from the whole assembly twelve of the most experienced persons, added to their number a clerk or doctor of laws, named Bllgywryd, and to these thirteen confided the task of examining, retaining, expounding, and abrogating. Their compilation was, when completed, read to the assembly, and, after having been confirmed, proclaimed. Howel caused three copies of them to be written, one of which was to accompany the court for daily use, another was deposited in the court at Aberfraw, and a third at Dinevwr. The bishops denounced sentence of excommunication against all transgressors, and soon after Howel himself went to Rome attended by the archbishop of St. David's, the bishops of Bangor and St. Asaph, and thirteen other personages. The laws were recited before the pope and confirmed by his authority, upon which Howel and his companions returned home." All this could not have been effected before Howel had subjected Wales to his own rule, therefore not before 943. We have three different recensions of the code, one for Venedotia or North Wales, another for Dimetia or South Wales, a third for Gwent or Northeast Wales. We do not know how far these recensions were uniform in the beginning; but a variance must have occurred shortly after, for the manuscripts in which the codes are preserved differ greatly from each other. The code was originally compiled in Welsh, but we have no older MSS. than the 12th century, and even in the earliest ones (especially those of the Venedotia recension) contain many interpolations. The Latin translations of the code would seem to be very old, though even here we have no earlier MSS. (belonging to the Dimetia recension) than the 13th century. The Latin text is much shorter than the Welsh, but we do not know whether this abridgment was made on purpose, or whether the translation is an imitation of an earlier text. The texts present only a few traces of Roman law, which, however, are evidently additions of a later period. The whole body of Welsh laws was published in one volume by An. Owen, under the direction of the commissioners on the public records (fol., London, 1841).

[1] There is no historical foundation for the legendary laws of a prince Dymal (or Dyvnwal) Moel Mud, nor for the Laws of Marsia, which are said to belong to a period before the Roman invasion, even so early as 400 years before Christ. An English translation by the side of the Welsh text of the so-called triads of Dyvnwal Moel Mud is given by Owen, *The Ancient Laws of Wales*, London, 1841, p. 630.

For further information on the barbarian codes, see Heinr. Zoepfl, *Deutsche Rechtsgeschichte*, 8vo, Brunswick, 1860, vol. i. p. 8 *sq.*, whose clear and able treatment of the subject has been taken as the basis of paragraphs 4-13 above; comp. also Stobbe, *Geschichte der deutschen Rechtsquellen*, 8vo, Brunswick, 1860. (J. H. H.)

SALICYLIC ACID, an organic acid found in nature, in the free state, in the flowers of the meadow-sweet (*Spiræa Ulmaria*, L.) and, combined with methylic ether, in the leaves of the wintergreen (*Gaultheria procumbens*, L.) and *Andromeda Leschenaultii*, in the bark of the sweet birch (*Betula lenta*, L.), and in several species of *Viola*. It was discovered in 1838 by Piria, who prepared it artificially by the decomposition of SALICIN (*q. v.*). It is remarkable as being the first organic compound occurring in nature which has been prepared artificially on the large scale as a commercial article. During the last few years it has been extensively used in medicine as a remedy for acute rheumatism, either alone or in the form of its sodium salt. Possessing powerful antiseptic properties and being poisonous only in large doses (the medicinal dose being from 5 to 30 grains), it is capable of manifold uses in the arts and manufactures. In the proportion of from 1 to 10 per cent. it prevents the development of bacteria in fluids containing them, and if added to the extent of 1 part in 60 it will destroy their life. It also kills *Torula*, and prevents the souring of beer and milk. It hinders the chemical changes brought about by the action of vegetable ferments or enzymes such as amygdalin and sinnigrin, and consequently can prevent the formation of essential oil of almonds or oil of mustard, etc. Plants watered with its solution speedily die. The addition of a little of the acid to glue renders it more tenacious; skins to be used for making leather do not undergo decomposition if steeped in a dilute solution; butter containing a small quantity of it may be kept sweet for months even in the hottest weather. It also prevents the mouldiness of preserved fruits and has been found useful in the manufacture of vinegar. Unless the perfectly pure acid be employed the addition of salicylic acid to articles of food must be considered dangerous, some persons being peculiarly susceptible to its action.

Salicylic acid is met with in commerce in two forms, "natural" and "artificial." The former occurs as handsome prismatic crystals resembling those of strychnin, but considerably larger, usually about half an inch in length; the latter is met with as light minute crystals bearing some resemblance to sulphate of quinine, but smaller. The natural acid is prepared by decomposing the volatile oil of wintergreen or of the sweet birch by a strong solution of potassium hydrate, and treating the resulting potassium salicylate with hydrochloric acid, which liberates the salicylic acid. The artificial acid is prepared according to Robbe's patent process by passing carbonic anhydride through sodium phenoxide (carbolate) heated in a retort, with certain precautions respecting temperature to prevent the formation of para-hydroxybenzoic acid. It is subsequently

purified and recrystallized. An improvement has recently been made on this process by substituting sodium phenol for sodium phenoxide, the whole of the phenol being in this case converted into salicylic acid. Formerly this acid was met with in commerce contaminated with phenol, rosolic, and para-oxybenzoic acids, but is now prepared in a perfectly pure condition. The presence of the first-named impurity may be detected by its odor and by the melting-point being lower than when pure, the second by the pink tinge it communicates to the acid, and the third by its comparative insolubility in boiling chloroform, by the greater solubility of its calcium salt, and by its giving a yellow precipitate with ferric chloride. Salicylic acid when pure should be free from odor and should dissolve completely in alcohol, and its solution, when spontaneously evaporated without contact with air, should yield crystals having colorless points. It has a specific gravity of 1.45 and fuses at 155° C. (311° Fahr.); above that temperature it is converted into phenol and carbonic anhydride. Its chemical formula is $C_6H_4(OH)CO_2H$. It is soluble in 760 parts of cold water, in 4 of rectified spirits of wine, and in 200 of glycerin, also in olive and castor oils, in melted fats and vaseline. Alkaline salts of citric, acetic, and phosphoric acids render it more soluble in water, possibly from the base combining with it. An aqueous solution of salicylic acid gives a deep violet color with ferric salts. The methyl, ethyl, and amyl ethers of the acid are used in perfumery, and the calcium salt if kept for some time and then distilled with water yields a liquid which has a strong odor of roses (Dingler, *Polytechn. Journ.*, ccxvii. p. 136).

When administered internally salicylic acid rapidly lowers the bodily temperature and reduces the pulse rate, blood pressure, and rapidity of respiration, causing death when given in excessive doses by paralysis of the respiratory organs. It is excreted in the urine partly as salicylic and partly as salicyluric acid, communicating to it a brown color by reflected and a green one by transmitted light. When taken for some time it produces deafness, giddiness, headache, and noises in the ears, like quinine. Taken internally in medicinal doses it possesses the same properties as salicin and sodium salicylate (see below), but is much less used in medicine. Applied externally, it has a marked action on thickened epidermis, and is hence used for the cure of corns and warts, to relieve pain and destroy fetor in ulcerated cancer, and also in certain skin diseases in which an antiseptic is useful, as in psoriasis, eczema, intertrigo, lupus, and ringworm. Taken as snuff it relieves hay fever.

Salicylate of sodium ($NaC_7H_5O_3$) is more frequently used in medicine than salicylic acid because less irritating to the mucous membranes. It is prepared by neutralizing a solution of sodium carbonate with salicylic acid. It occurs in commerce as small white crystalline plates with a slight pearly lustre, having a sweetish saline taste and mildly alkaline reaction. It is soluble in 1.5 parts of water and 6 of alcohol at 15° C. (59° Fahr.), but much more so in boiling water and alcohol. It is chiefly employed medicinally as a remedy for acute rheumatism, in which it lowers the temperature and allays pain. It is also useful in headache and in phlegmasia alba; its cholagogic action and its power of rendering the bile more fluid indicate its usefulness in the treatment of gall stones. It has been found of service in Menière's disease. Alcohol or other stimulants are often given with it to prevent the depressing influence on the heart's action which is caused by large doses. Ammonia is, however, unfit for this purpose (Martindale, *Extra Pharmacopœia*, 3d ed., p. 57). Like salicylic acid, it produces when given in full doses subjective auditory phenomena, but these symptoms are relieved by the use of ergot and hydrobromic acid. In a few persons it causes most disagreeable visions whenever the eyes are shut, and in others it has even produced delirium. In its action on bacteria it is about one-third less powerful than salicylic acid.

SALIERI, Antonio (1750–1825), dramatic composer, was born at Legnano, Italy, August 19, 1750. In 1766 he was taken to Vienna by a former "Kapellmeister" named Gassmann, who introduced him to the emperor Joseph, and fairly prepared the way for his subsequent success. His first opera, *Le Donne Letterate*, was produced at the Burg-Theater in 1770. On Gassmann's death in 1774, he received the appointment of Kapellmeister and composer to the court; and on the death of Bonno in 1788 he was advanced to the dignity of "Hofkapellmeister." He held his offices with honor for fifty years, though he made frequent visits to Italy and Paris, and composed for many important European theatres. His *chef d'œuvre* was *Tarare* (afterwards called *Axur, Re d'Ormus*), a work which was preferred by the public of Vienna to Mozart's *Don Giovanni*, though it is, in reality, quite unworthy of comparison with that marvellous inspiration. It was first produced at Vienna June 8, 1787, and strangely enough, considering the poverty of its style, it was revived at Leipsic in 1846, though only for a single representation. His last opera was *Die Neger*, produced in 1804. After this he devoted himself to the composition of church music, for which he had a very decided talent. Salieri lived on friendly terms with Haydn, but was a bitter enemy to Mozart, whose death he was suspected of having produced by poison; but no particle of evidence was ever forthcoming to give color to the odious accusation. He retired from office, on his full salary, in 1824, and died at Vienna May 7, 1825. None of Salieri's works have survived the change of fashion. He gave lessons in composition both to Cherubini and Beethoven; the latter dedicated to him his Three Sonatas for Pianoforte and Violin, *Op.* 12.

SALII. See Mars.

SALISBURY, or New Sarum, a city and municipal and parliamentary borough, the county town of Wiltshire, England, is situated in a valley at the confluence of the Upper Avon, the Wily, the Bourne, and the Nadder, on the Great Western and South Western Railways, 80 miles west-southwest of London. The city at the beginning was regularly laid out by Bishop Poore and still retains substantially its original plan. In the centre is the market-place, a large and handsome square, from which the streets branch off at right angles, forming a series of quadrangles facing a thoroughfare on each side, and enclosing in the interior a space for courts and gardens. The streams flowed uncovered through the streets till the visitation of cholera in 1849 led to their being arched over. The cathedral of St. Mary was originally founded on the hill fortress of Old Sarum by Bishop Herman, when he removed the see from Sherborne between 1075 and 1078. The severe drought in 1834 caused the old foundations to be discovered. Its total length was 270 feet; the nave was 150 feet by 72, the transept 150 feet by 70; and the choir was 60 feet in length. In 1218 Bishop Poore procured a papal bull for the removal of the cathedral to New Sarum. For this various reasons have been given,—the despotism of the governor, the exposure to high winds which drowned the voice of the officiating priest, the narrow space for houses, and the difficulty of procuring water. Until the Reformation service still continued to be performed in the old church. A wooden chapel of St. Mary was commenced at New Sarum in the Eastertide of 1219, and the foundations of the new cathedral were laid by Bishop Poore, 28th April, 1220. It was dedicated at Michaelmas 1258, the whole cost having amounted to 40,000 marks, or £26,666 [$129,596.76]. The cloisters, of great beauty, and the late Early English chapter-house were added by Bishop Walter de la Wyle (1263–74). The tower from near the ridge was built in the Decorated style by Bishop Wyville about 1331, and the spire was added between 1335 and 1375. It is the highest in England (404 feet), and is remarkable both for its beauty of proportion and the impression it conveys of lightness and slenderness. The chapel built by Bishop Beauchamp (1450–82), that built by Lord Hungerford in 1476, and the fine campanile were all ruthlessly demolished by the architect James Wyatt (1782–1791). The cathedral as a whole is a unique specimen of Early English, having the advantage of being practically complete, as it now stands within a remarkably short period. For lightness, simplicity, grace, and unity of design it is not surpassed in England. It is in the form of a Greek or double cross, and comprises a nave of ten bays with aisles and a lofty northern porch; two transepts, one of three and the other of two bays, while both have eastern aisles for chapels; a choir of

three bays with aisles; a presbytery of three bays with aisles; and a lady-chapel of two bays. The total length of the building is 449 feet, the length of the nave being 229 feet 6 inches, of the choir 151 feet, and of the lady-chapel 68 feet 6 inches, while the principal transept has a length of 203 feet 10 inches, and the eastern transept of 143 feet. The width of the nave is 34 feet 4 inches, and of the principal transept 50 feet 4 inches. The library, built by Bishop Jewel (1560–71), contains about 5000 volumes and several MSS. of great interest. In the close, occupying an area of half a square mile, and possessing a finely-shaded mall, are the episcopal palace, an irregular structure begun by Bishop Poore but of various dates, the deanery house, and other buildings. The three parish churches are St. Martin's, with square tower and spire, and possessing a Norman font and portions of Early English in the choir; St. Thomas's (of Canterbury), founded in 1240 as a chapel to the cathedral, and rebuilt in the 15th century, a handsome building in the Perpendicular style; and St. Edmund's, founded as the collegiate church of secular canons in 1268, but subsequently rebuilt in the Perpendicular style and lately restored at a cost of £6000 [$29,160]. The residence of the college of secular priests is now occupied by the modern ecclesiastical college of St. Edmund's, founded in 1873. St. John's chapel, founded by Bishop Bingham (1228–46), is now occupied by a dwelling-house. There is a beautiful chapel attached to the St. Nicholas hospital, founded in the reign of Richard II. The poultry cross, or high cross, an open hexagon with six arches and a central pillar, was erected by Lord Montacute before 1335. In the market-place is Marochetti's statue to Lord Herbert of Lea. The principal secular buildings are the court-house, the market-house, the Hamilton Hall, the county jail, and the theatre. Among the specimens of ancient domestic architecture still remaining may be mentioned the banqueting hall of J. Halle, wool merchant, built in 1470, and Audley House, belonging also to the 15th century, and repaired in 1881 as a diocesan church house. There are a large number of educational and other charities, including the bishop's grammar school, Queen Elizabeth's grammar school, Talman's girls' school, the St. Nicholas hospital, founded in the reign of Richard II., and Trinity hospital, founded by Agnes Bottenham in 1379. At one time the city possessed woollen and cutlery manufactures, but these have now declined; and, although the manufacture of hardware and of boots and shoes is still carried on, it is on its shops for the supply of the neighboring villages and its agricultural trade that it now principally depends. The population of the city and municipal borough (area 616 acres) in 1871 was 12,903, and that of the parliamentary borough (area 676 acres) 13,839; in 1881 the numbers were 14,792 and 15,680.

Salisbury and its neighborhood are remarkably rich in relics of antiquity. To say nothing of Old Sarum and the scanty ruins of the royal palace of Clarendon, Milford Hill and Fisherton are two of the richest fields in the country for palæolithic implements. In the Blackmore Museum Salisbury possesses one of the finest collections of prehistoric antiquities in England: its splendid gathering of objects from the mounds in the New World is probably unsurpassed. The fortress of Old Sarum (*Searobyrig, i.e.*, Searborough, probably "the dry city"; Sarisberic in Domesday) is of very early date, and was undoubtedly held by the Belgæ before it became an important fortress of the Romans (*Sorbiodunum*). It occupied a conical mound rising abruptly from the valley, and its fossæ and ramparts, which still remain, are about a mile in circumference. Various Roman roads branched out from it in different directions. Near it Cynric won a great victory over the Britons in 552. It was burned and sacked by Swend in 1003. In the great plain beneath William the Conqueror in 1070 reviewed his army after his victories; and it was here that he took the oath of fealty from all English landholders on the completion of Domesday in 1086. Old Sarum continued to have the privilege of returning two members to parliament until 1832, although latterly not a single house remained within its limits. New Sarum grew up round the new cathedral founded in the 13th century. In 1227 it received from Henry III. a charter conferring on it the same freedom and liberties as Winchester. The Duke of Buckingham was executed at Salisbury in 1484. During the Civil War it was held alternately by both parties. Salisbury first sent members to parliament in 1295, and various parliaments have been held there. The Redistribution Act of 1885 deprived it of one of its two representatives.

See *Description of Salisbury Cathedral*, 1719 and 1787; Rawlin, *Salisbury*, 1718; M. E. Walcott, *Memorials of Salisbury*, 1865; W. Henry Jones, *Fasti Ecclesiæ Sarisberiensis*, 1879; W. Henry Jones, *Diocesan History of Salisbury*, 1880.

SALISBURY, Robert, Earl of. See Cecil.

SALIVA, SALIVARY GLANDS. See Nutrition.

SALLEE. See Rabát.

SALLUST (86–34 B.C.). Sallust is the generally accepted modern form of the name of the Roman historian Caius Sallustius Crispus. 86 B.C. was the year of his birth, and the old Sabine town of Amiternum at the foot of the Apennines was his birthplace. He came of a good plebeian family, and entered public life at a comparatively early age, obtaining first the quæstorship, and then being elected tribune of the people in 52 B.C., that year of political turbulence in which Clodius was killed by Milo. Sallust was opposed to Milo and to Pompey's party and to the old aristocracy of Rome. From the first he was a decided partisan of Cæsar's, and to Cæsar he owed such political advancement as he attained. Unless he was the victim of violent party misrepresentation, he seems to have been morally worthless. In 50 B.C. the censors exercised their power of removing him from the senate on the ground of gross immorality. A few years afterwards, however, no doubt through Cæsar's influence, he was restored to his position, and in 46, in which year Cæsar was for the third time consul, he was prætor, and was with Cæsar in his African campaign, which ended in the decisive victory of Thapsus over the remains of the Pompeian party and in the suicide of Cato. Sallust remained for a time in Africa as governor of the province of Numidia, which, it would seem, Cæsar gave him as a reward for good service. It was said that he enriched himself at the expense of the provincials, but the charge, as far as we know, was never substantiated, though it was rendered highly probable by the fact that he returned to Rome the following year a very rich man, able to purchase and lay out in great splendor those famous gardens on the Quirinal known as the "horti Sallustiani," which became subsequently an imperial residence. He now retired from public life and devoted his leisure to letters, for which he had always had a taste, and certainly considerable ability. The fruits of his industry have come down to us in the shape of a history of the famous Catiline conspiracy, of an account of the war with Jugurtha, and of some fragments of a larger work—"histories," as the Romans called them, "memoirs," as we should style them. His history of the Catiline conspiracy was his first published work; it is the history of the memorable year 63, when Cicero as consul baffled and confounded Catiline by making all men believe that he was an arch-conspirator against the liberties of his country, who, under specious pretexts of relieving poverty and distress, was really aiming at making himself a tyrant and a despot. Sallust adopts the view which was no doubt the usually accepted one, and he writes accordingly as a political partisan, without giving us a clear insight into the causes and circumstances which gave Catiline a considerable following, and led many to think that his schemes were more respectable than those of a mere wild revolutionist. He does not explain to us at all adequately what Catiline's plans and views were, but simply paints the man as the deliberate foe of all law, order, and morality. Catiline, it must be remembered, had been of Sulla's party, to which Sallust was opposed. There may be truth in Mommsen's suggestion

that he was particularly anxious to clear his patron Cæsar of all complicity in the conspiracy. Anyhow, the subject was quite one to his taste, as it gave him the opportunity of showing off his rhetoric at the expense of the old Roman aristocracy, whose degeneracy he delighted to paint in the blackest colors. His history, again, of the war with Jugurtha, though a valuable and interesting monograph, is not a satisfactory performance. We may assume that he had collected materials and put together notes for it during his governorship of Numidia. Here too we find him dwelling on the feebleness of the senate and of the aristocracy, and dropping too often into a tiresome moralizing and philosophizing vein, his besetting weakness, but altogether failing us in those really important details of geography and even chronology which we naturally look for in the historians of military operations and campaigns. In all this Sallust is no better than Livy. Of his *Histories*, said to have been in five books, and to have commenced with the year 78 B.C. (the year of Sulla's death), and to have concluded with the year 66, we have but fragments, which are, however, enough to show the political partisan, who took a keen pleasure in describing the reaction which followed on the dictator's death against his policy and legislation. It is unfortunate that the work has not come down to us entire, as it must have thrown much light on a very eventful period, embracing the war against Sertorius, the campaigns of Lucullus against Mithradates of Pontus, and the victories of the great Pompey in the East. A few fragments of his works were published for the first time from a manuscript in the Vatican early in the present century. We have also two letters (*Duae epistolae de Republica ordinanda*) addressed to Cæsar, letters of political counsel and advice, which have been commonly attributed to Sallust, but as to the authenticity of which we must suspend our judgment.

The verdict of antiquity was on the whole favorable to Sallust as an historian and as a man of letters. In certain quarters he was decried; his brevity was said to be obscurity, and his fondness for old words and phrases, in which he is said to have imitated his contemporary Cato, was ridiculed as an affectation. Tacitus, however, speaks highly of him (*Ann.*, iii. 30); and, to do him justice, we must remember that he struck out for himself almost a new line in literature, as up to his time nothing of much value had been done for Roman history, and his predecessors had been little better than chroniclers and annalists of the "dry-as-dust" type. Sallust aimed at being something like a Roman Thucydides, and, though he falls far short of the great Greek historian, and drifts now and again into mere rhetoric and pedantry, we may at least congratulate ourselves on the possession of his *Catiline* and *Jugurtha*, and we must feel that fortune has been unkind in depriving us of his larger work, his *Histories*.

SALMASIUS, Claudius (1588–1653), in the vernacular Saumaise, the most distinguished classical scholar of his day, was born at Semur-en-Auxois in Burgundy, April 15, 1588. His father, a counsellor of the parlement of Dijon, gave him an excellent education, and sent him at the age of sixteen to Paris, where his promise excited the especial interest of Casaubon. After hardly overcoming his father's opposition, he proceeded in 1606 to the university of Heidelberg, nominally to be initiated into jurisprudence under Godefroy, but in fact entirely devoted to classical studies. The atmosphere of the place probably had its influence in inducing him to embrace Protestantism, the religion of his mother; and his first publication was an edition of a work by Nilus Cabasilas, archbishop of Thessalonica, against the primacy of the pope, with a similar tract by Barlaam. The Latin translation of these works, although apparently assigned to Salmasius on the title page, is not by him. In 1609 he edited Florus, with notes compiled in ten days. In the following year he returned to France, and nominally pursued the study of jurisprudence to qualify himself for the succession to his father's post, which he eventually lost on account of his religion. Nothing important proceeded from his pen until 1620, when he published Casaubon's notes on the *Augustan History*, with copious additions of his own, equally remarkable for learning and acumen. In 1623 he married Anna Mercier, a Protestant lady of a distinguished family; and in 1629 he produced his *magnum opus* as a critic, his commentary on Solinus's *Polyhistor*, or rather on Pliny, to whom Solinus is indebted for most of his materials. Greatly as this work may have been overrated by his contemporaries, it is still a monument of stupendous learning and conscientious industry. Salmasius learned Arabic to qualify himself for the botanical part of his task, and was so unwilling to go to press without having consulted a rare treatise by Didymus that the third part of his commentary, *De Herbis et Plantis*, did not appear in his lifetime. He was now ostensibly as well as actually devoted to philology, and foreign universities vied with each other in endeavoring to secure his services. After declining overtures from Oxford, Padua, and Bologna, he closed in 1631 with a proposal from Leyden, offering an entirely honorary professorship, with a stipend of two thousand (afterwards raised to three thousand) livres a year, merely to live in Holland and refute the *Annals* of Baronius. This latter stipulation he never fulfilled. Shortly after his removal to Holland, he composed, at the request of Prince Frederick of Nassau, his treatise on the military system of the Romans, which was not published until 1657. Other works followed, mostly philological, but including a denunciation of wigs and hair-powder, and a vindication of moderate and lawful interest for money, which drew down upon him many expostulations from lawyers and theologians. It prevailed, however, with the Dutch Church to admit money-lenders to the sacrament. His treatise *De Primatu Papæ* (1645), accompanying a republication of the tract of Nilus Cabasilas, excited a warm controversy in France, but the Government declined to suppress it. Notwithstanding his Protestantism and the opposition of the papal nuncio, he had already been made a royal counsellor and a knight of St. Michael, and great offers had been made to induce him to return, which, suspecting that he was to be charged with the composition of a panegyric on Richelieu, he honorably declined.

In November, 1649, appeared the work by which Salmasius is best remembered, his *Defensio Regia pro Carolo I.* His advice had already been sought on English and Scotch affairs, and, inclining to Presbyterianism or a modified Episcopacy, he had written against the Independents. It does not appear by whose influence he was induced to undertake the *Defensio Regia*, but Charles II., low as his exchequer was, defrayed the expense of printing, and presented the author with £100 [$486]. The first edition was anonymous, but the author was universally known. A French translation which speedily appeared under the name of Le Gros was the work of Salmasius himself. This celebrated work, in our day principally famous for the reply it provoked from Milton, even in its own added little to the reputation of the author. Salmasius injured his character for consistency by defending absolute monarchy, and knew too little of English history and politics to argue his cause with effect. He deals chiefly in generalities, and most inappropriate illustrations from Biblical and classical history. Not caring sufficiently for his theme to rise to the heights of moral indignation, he is as inferior to Milton in earnestness as in eloquence and the power of invective. Milton had, no doubt, a great advantage in encountering a personality, at whose head vituperation could be launched, while Salmasius is fighting abstractions and indicting a people. But the reply to Milton, which he left unfinished at his death, and which was published by his son in 1660, is insipid as well as abusive. Until the appearance of Milton's rejoinder in March, 1651, the effect of Salmasius's work was no doubt consider-

able; and it probably helped to procure him the flattering invitation from Queen Christina which induced him to visit Sweden in 1650. Christina loaded him with gifts and distinctions, but upon the appearance of Milton's book was unable to conceal her conviction that he had been worsted by his antagonist. Milton, addressing Christina herself, ascribes Salmasius's withdrawal from Sweden in 1651 to mortification at this affront, but this appears to be negatived by the warmth of Christina's subsequent letters and her pressing invitation to return. The claims of the university of Leyden and dread of a second Swedish winter seem fully adequate motives. Nor is there any foundation for the belief that Milton's invectives hastened his death, which took place on September 3, 1653, from an injudicious use of the Spa waters. He was at the time engaged upon his reply to Milton; this he does not seem to have reckoned among the MSS. which, feeling that he had expressed himself with undue asperity, he directed his wife to burn after his decease. He left several sons, but his posterity did not attain the third generation.

Nothing, to modern ideas, can seem more singular than the literary dictatorship exercised by a mere classical scholar, who shone principally as a commentator, and whose independent works, though highly respectable, evince no especial powers of mind. Salmasius was far enough from being a Grotius, a Leibnitz, or even a Casaubon. As a commentator and verbal critic, however, he is entitled to very high rank. His notes on the *Augustan History* and Solinus display not only massive erudition but massive good sense as well; his perception of the meaning of his author is commonly very acute, and his corrections of the text are frequently highly felicitous. His manly independence was shown in many circumstances of his life, and the general bias of his mind was liberal and sensible. He was accused of sourness and sullenness of temper; but the charge, if it had any foundation, is extenuated by the wretched condition of his health. His biographer Clément enumerates seven classes of disorders which pursued him throughout his life, and which render his industry and productiveness the more extraordinary. Papillon catalogues eighty books published by Salmasius himself, or from his MSS., or to which he contributed notes; eighteen manuscripts which he himself saw in the library of M. de la Mare; forty-three more mentioned by others; ninety-three works with MS. notes by Salmasius, which should now be in the National Library of France; and fifty-nine books projected or contemplated.

The life of Salmasius was written at great length by Philibert de la Mare, counsellor of the parlement of Dijon, who inherited his MSS. from his son. Papillon says that this biography left nothing to desire, but it has the capital fault of never having been printed. It was, however, used by Papillon himself, whose account of Salmasius in his *Bibliothèque des Auteurs de Bourgogne* (Dijon, 1745) is by far the best extant. There is an *éloge* by Clément prefixed to his edition of Salmasius's *Letters* (1656), and another by Morisot, inserted in his own *Letters*. Clément's notice contains many interesting facts, but it is marred by an extravagant admiration for its subject, perhaps excusable if he really believed that his hero was born in 1596, and edited Florus at thirteen. It is remarkable, however, that Clément passes over the *Defensio Regia* almost without notice, whether from feeling that it was unworthy of Salmasius, or because discussion of the subject was discouraged in Holland during the existence of the English Commonwealth. (R. G.)

SALMON. It will be convenient to consider this in connection with the other members of the great family of fishes to which it belongs. See SALMONIDÆ.

SALMONIDÆ. The distinguishing features of this family of fishes are described in technical language in the article ICHTHYOLOGY (vol. xii. p. 732), and it is unnecessary to repeat the definition. The most conspicuous of the external characteristics is the presence of two dorsal fins, of which the anterior is well developed and supported by the usual jointed bones known as fin-rays, while the posterior is thick and fleshy, rounded in outline, and destitute of rays. The posterior fin is thus a rudimentary organ, and it is commonly called the adipose fin. There are two other families of fishes which resemble the *Salmonidæ* in the arrangement of the dorsal fins—the *Percopsidæ* and *Haplochitonidæ;* but the former consists of only one species, found in the United States, and the latter is confined to the southern hemisphere. Amongst British fishes a Salmonoid can be always recognized by its dorsal fins.[1]

The *Salmonidæ* retain the open communication of the air-bladder with the intestine, and the original posterior position of the pelvic fins,—features which characterize the division of *Teleostei* known as *Physostomi*. In the great assemblage of bony fishes known as *Physoclisti*, these features are lost in the adult condition. It is known that in all cases the air-bladder develops in the young fish as an outgrowth or diverticulum from the intestine; and it is obvious from a survey of Vertebrates in general that the posterior limbs belong originally to the neighborhood of the anus. It follows therefore that in these features the *Salmonidæ*, and all the *Physostomi*, are more similar to the early ancestors of the bony fishes than are those species in which the air-bladder is closed and the pelvic fins have an anterior position.

In the *Salmonidæ* the characteristic Teleostean pseudobranchia is present. This organ is the diminished remnant of the series of gill-lamellæ belonging to the posterior face of the hyoid arch, as the pseudobranchia in Elasmobranchs is the rudiment of the series of gill-lamellæ belonging to the posterior face of the mandibular arch.[2] The bones known as maxillæ form portion of the boundary of the upper jaw in *Salmonidæ;* in many fishes they are excluded from the jaw margin by the backward prolongation of the premaxillæ. There are no scales on the head in this family, and there are no fleshy filaments or "barbels" in the neighborhood of the mouth as there are in many bony fishes—for example, the Cod, in which a single short barbel is attached beneath the lower jaw. The pyloric appendages, cæcal diverticula of the intestinal tube immediately behind the stomach, are nearly always present in considerable numbers. In the female Salmon the oviduct, the tube connecting the ovary with the exterior, is wanting; the eggs when ripe escape from the surface of the ovary into the abdominal cavity and pass thence to the exterior through a pair of apertures in the body-wall situated one on each side of the anus; these apertures are the abdominal pores. In the male salmon there is a duct to the testis, and the semen is extruded through it in the usual way. Fertilization takes place outside the body, the spermatozoa and eggs uniting in the water.

Distribution.—*Salmonidæ* are found both in the sea and in fresh water. Most of the marine species inhabit the deeper parts of the ocean. Many of the freshwater forms pass a portion of their lives in the littoral parts of the sea, ascending rivers when adult every year in order to deposit their spawn; that is to say, many species are anadromous. Some are confined entirely to fresh water. The *Salmonidæ* are, with the exception of one species indigenous to New Zealand, peculiar to the temperate and arctic regions of the northern hemisphere.[3] Fossils belonging to the family are found in strata of Mesozoic age. *Osmerus* occurs in the green sand of Ibbenbüren, and the schists of Glarus and Licata. *Mallotus villosus*, indistinguishable from the living Capelin, occurs abundantly in clay in Greenland, the geological age of the bed being unknown. *Osmeroides acrognathus* and *Aulolepis* are fossil genera occurring in the chalk near Lewes in Sussex, and were probably deep-sea Salmonoids. The introduction of certain species into new areas by human agency, which has been effected recently, and is still going on, will be described in another section.

[1] It is interesting to observe that a peculiarity of the dorsal fins is often a family character among the bony fishes. Thus the species of the Cod family (*Gadidæ*) have usually three separate dorsal fins similar in shape and size. The *Blenniidæ* are characterized by the presence of a continuous dorsal fin extending almost the whole length of the back. The *Clupeidæ* or Herrings all have a single triangular dorsal fin in the middle of the back.

[2] This at least is the view till recently accepted by most morphologists; its correctness is questioned by Anton Dohrn.

[3] [But the Bathylagus was found by the "Challenger" in Antarctic waters. See p. 232.—AM. ED.]

Synopsis of Genera.

The following five genera include British species:

1. **Salmo,** Artedi (Salmon and Trout). Scales small. Cleft of mouth wide; maxilla exteuding backward to below or behind the eye. Dentition well developed; conical teeth on the jaw bones, on the vomer and palatines, and ou the tongue; none on the pterygoid bones. Anal fin short, with fourteen or fewer rays. Pyloric appendages numerous. Ova large. Dark transverse bands, known as "parr marks," present on the sides of the body in the young stages of life.

2. **Osmerus,** Cuv. (Smelts). Scales of moderate size. Cleft of the mouth wide; maxilla long, extending to or nearly to the hind margin of the orbit. Dentition well developed; teeth on the maxilla and premaxilla smaller than those on the mandible; transverse series of teeth on the vomer, several of which are large and fang-like; a series of conical teeth aloug the palatine and pterygoid bones; strong fang-like teeth on the frout of the tongue, several lougitudinal series of smaller oues on its posterior part. Pyloric appendages short and few iu number. Ova small.

3. **Coregonus.** Scales of moderate size. Cleft of mouth small; maxilla rather short, not extending back beyond the orbit. Teeth minute, or absent altogether. Anterior dorsal fin with few rays. Pyloric appendages numerous. Ova small.

4. **Thymallus,** Cuv. (Graylings). Similar to *Coregonus*, but haviug a long anterior dorsal with many rays. Small teeth on jaws, vomer, and palatine bones.

5. **Argentina,** Cuv. Scales rather large. Cleft of mouth small; maxilla not extending to below the orbit. Teeth wanting on jaws; minute teeth ou the head of the vomer and fore part of the palatines; series of small curved teeth on each side of the tongue. Dorsal fiu short, in advance of the pelvic. Pyloric appendages few or in moderate numbers. Ova small. The most conspicuous peculiarity of this genus is the flattening of the sides to plane surfaces bordered by keeled ridges, so that the transverse section of the fish is hexagonal.

The following eleven genera include no British species:

6. **Oncorhynchus,** Suckley (*Ann. Lyc. Nat. Hist.*, 1861). Similar to *Salmo*, except that the anal fiu has more than fourteen rays.[1]

7. **Brachymystax,** Güuther. Intermediate between *Salmo* and *Coregonus*.

8. **Luciotrutta,** Günther. Migratory trout from North America.

9. **Plecoglossus,** Schlegel. Body covered with very small scales. Cleft of mouth wide; maxilla long. Dentition feeble; premaxilla with few small conical teeth. Ends of mandibles separate at the chin, the mucous membrane between them forming folds and pouches. Tongue very small, with minute teeth.

10. **Retropinna,** Gill. Similar to *Osmerus*.

11 and 12. **Hypomesus,** Gill, aud **Thaleichthys,** Girard, are allied genera.

13. **Mallotus,** Cuv. (Capelin). Scales minute, somewhat larger along the lateral line and along each side of the belly. In mature males those scales become elongate, lanceolate with projecting points. Cleft of mouth wide; maxilla very thin, lamelliform, extending to below middle of eye. Dentition very feeble; teeth in single series. Pyloric appendages very short, few. Ova small.

14. **Salanx,** Cuv. Body elongate, compressed, naked, or with small, exceedingly fine, deciduous scales. Head elongate and much depressed, terminating in a long, flat, pointed snout. Cleft of mouth wide. Jaws and palatine bones with conical teeth, some of those on premaxilla and mandibles being enlarged; no teeth on vomer; tongue with single series of curved teeth. Anterior dorsal fin far behind ventral, in front of anal; adipose small. Pseudobranchiæ well developed; air-bladder none. Alimentary canal quite straight; pyloric appendages none. Ova small.

15. **Microstoma,** Cuv. Body elongate, cylindrical, covered with large thin silvery scales. Cleft of mouth very small; premaxilla very small; maxillæ very short and broad. Eye very large. Narrow series of very small teeth in the lower jaw and across the head of the vomer; no other teeth. Dorsal fin short, inserted behind the ventrals, but before the aual; adipose fin present in most young specimens, frequently absent in old ones. Pseudobranchiæ well developed; air-bladder large. Pyloric appendages absent; mucous membrane of stomach with numerous large papillæ. The genus is allied to *Argentina*.

16. **Bathylagus,** a genus of deep sea Salmonoids discovered by the "Challenger" in the Atlantic and Antarctic Oceans at depths of 1950 and 2040 fathoms.

[1] This is the generic distinction adopted by Dr. Günther. Suckley's original diagnosis was the prolongation of both jaws in the males.

Species.

1. Genus **Salmo.** The difficulty of defining and distinguishing the species of this genus is considerable, and much diversity of opinion on the subject exists among ichthyologists. Many of the species are extremely variable, so that some individuals of one resemble the more aberrant individuals of another; the species are seldom separated by conspicuous differences. The individuals of a given species vary considerably with age and sex, and also with habitat and external conditions. Many of the species are capable of breeding together and producing fertile offspring. The characters which are most constant, and on whose differences the distinction of species chiefly rests, are as follows: (1) the form of the præoperculum (the horizontal breadth of this bone at its lower portiou is always small in the young, but in the adult it is greater in some species than in others; (2) width and strength of maxillary iu adult); (3) size of teeth; (4) arrangement and permanence of vomerine teeth; (5) form of caudal fin; (6) pectoral fins; (7) size of scales; (8) number of vertebræ; (9) number of pyloric appendages.

In all the species of *Salmo* there are teeth in the vomer. In the Salmons proper and in the Trouts there are, in the young, teeth both on the head and body of that bone, but in some species on the body only; some of the teeth on the body are deciduous, and are in most of the species shed at an early age. In the Charrs there are teeth on the head of the vomer but none on the body of the bone at any period of life, and none of the vomerine teeth are deciduous. The species of true Trout are confined to fresh water, and are not migratory. In accordance with these peculiarities some zoologists have divided the genus *Salmo* into three subgenera,—*Salmo* sensu restricto, *Fario*, and *Salvelinus*. But modern authorities retain only two subdivisions,—the subgenera *Salmo*, including migratory Salmon and non-migratory Trout, and *Salvelinus*, the Charrs.

A. Subgenus Salmo.—A vast number of species of *Salmo* have been described; in the *Brit. Mus. Cat.* Dr. Günther distinguishes fifty-two, of which seven are confined to the British Islands and four are found both in the British Islands and other parts of the world. Mr. Day on the other hand considers that all the indigenous Salmon and Trout of the British Islands belong to two species, *Salmo salar* and *Salmo trutta*,—*Salmo levenensis* and *Salmo fario* being varieties of the latter; the rest of the described British species he considers as local varieties or sub-varieties of these.

(1) *Salmo salar*, L. (the Salmon). B. 11–12; D. 14; A. 11; P. 14; V. 9; L. lat. 120; L. transverse $\frac{22\text{-}26}{19\text{-}22}$; Vert. 59–60; Cæc. pyl. 53–77.[2] Attains to a length of 4 to 5 feet; female mature at a length of about 15 inches. Præoperculum with a distinct lower limb and with the angle rounded. Head of vomer subpentagonal, as long as broad, toothless; the body of the bone with single series of small teeth which are gradually lost from behind forwards so that older examples only have from one to four left. Hiud part of body elongate and covered with relatively large scales. Young with about eleven dusky transverse bars on the sides; half-grown and old specimens silvery, with small black spots in small number; spawning males with numerous large black and red spots, some of the red spots confluent into more or less extensive patches, especially on the belly. An anadromous species, inhabiting temperate Europe southwards to 43° N. lat.; not found in Mediterranean; in Asia and America southwards to 41° N. lat.

No varieties of *Salmo salar* are recognized in Europe, but in North America there occurs one Salmonoid which is considered by different authorities either as a variety or a sub-species, viz., *Salmo salar*, var. *sebago*, L. lat. 115. Body and dorsal and caudal fins with subquadrangular or subcircular black spots. Is non-migratory and occurs in some of the lakes of Maine and New York in the United States; these lakes have no communication with the sea. This form is called variously the Landlocked Salmon or the Schoodic Salmon.

The true *Salmo salar* on the American shore of the Atlantic is sometimes called the Penobscot Salmon.

(2) *Salmo trutta*, Fleming; *Salmo eriox*, Parnell (*Fishes of Firth of Forth*) (Sea-Trout, Salmon-Trout, Bull-Trout). B. 11; D. 13; A. 11; P. 15; V. 9; L. lat. 120; L. transverse $\frac{24\text{-}26}{36\text{-}34}$; Vert. 59–60; Cæc. pyl. 49–61. Attains to a length of about 3 feet; female mature at a length of 10 to 12 inches. Head of vomer triangular, as broad as long, toothless; body

[2] In the formula usually preceding the diagnosis or description of a species of fish, B = number of branchiostegal rays; D = number of rays in dorsal fin; P = ditto in pectoral fin; A = ditto in anal fin; V = ditto in ventral fin; L. lat. = number of scales along the lateral line; L. transverse = number of scales in the oblique transverse row of the widest part of the body, the numbers above and below the line in the fraction being those of the scales above and below the lateral line respectively.

of the bone with a longitudinal ridge armed with a single series of teeth, which are deciduous; generally only the two or three anterior ones found in examples of more than 20 inches in length. Silvery, sometimes immaculate, usually with more or less numerous X-shaped spots; spots on the head and dorsal fin round and readily disappearing. Young (parr) with nine or ten dusky cross bars; grilse with top of dorsal and pectoral and with hind margin of caudal black. A migratory species, occurring in the rivers falling into the Baltic and German Ocean: numerous in Scotland, less frequent in English and Irish rivers.

(3) *Salmo cambricus*, Donov. (*Brit. Fishes*) (the Sewen of Couch, Salmon Peal). B. 10–11; D. 14; A. 11–12; P. 16; V. 9; L. lat. 120–125; L. transverse $\frac{27}{28\text{-}40}$; Vert. 59; Cæc. pyl. 39–47. Attaining to a length of 3 feet; female mature at a length of from 12 to 13 inches. Præoperculum with a distinct lower limb, with the angle rounded and with the hind margin convex or undulated, subvertical. Head of vomer triangular, broader than long, toothless in adult examples, armed with a few teeth across its hinder margin in young ones; body of the bone with a sharp longitudinal ridge, in the sides of which the teeth are inserted, forming a single series, and alternately pointing to right and left. In pure-bred specimens these teeth are lost in the grilse state, so that only the two or three anterior remain in specimens more than 12 or 13 inches long. Fins of moderate length; caudal fin forked in parr stage, slightly emarginate in grilse, truncate in mature specimens. This species loses the parr marks very early, when only 5 to 6 inches long; it is then bright silvery. Greenish on the back, with a few small round black spots on the head and sides. This coloration remains nearly unaltered during the further growth of the fish, but the spots become more irregular, indistinctly X-shaped. An andromous species, occurring in rivers of Norway, Denmark, Wales, and Ireland. Mr. Day (*Fishes of Great Britain*) considers this form as merely a variety of *Salmo trutta*.

(4) *Salmo fario*, L. (Trout). Dr. Günther distinguishes two varieties:

(*a*) *Salmo fario gaimardi; Salmo gaimardi*, Cuv. and Val.; *Salmo trutta*, Gaimard (*Voy. Isl. and Groenl.*, Atl. Poiss., pl. 15, fig. A). D. 13–14; A. 11–12; P. 14; V. 9; L. lat. 120; L. transverse $\frac{27}{30}$; Cæc. pyl. 33–46; Vert. 59–60. Largest specimen observed, 15 inches; female mature at a length of 7 or 8 inches. Head of vomer triangular, small, broader than long; vomerine teeth in a double series sometimes disposed in a zigzag line, persistent throughout life. Sides with numerous round or X-shaped black spots; upper surface and sides of the head and the dorsal, adipose, and caudal fins usually with crowded round black spots; dorsal, anal, and ventral with a black and white outer edge. Found in Iceland, North Britain, Ireland, Scandinavia.

(*b*) *Salmo fario ausonii*; *Salmo ausonii*, Cuv. and Val. (the common River Trout). Formula as in *a*, but Vert. 57–58. Attains to a length of 30 inches; female mature at a length of 8 inches. A non-migratory species, inhabiting numerous fresh waters of Central Europe, Sweden, and England, and rivers of the Maritime Alps.

The following forms are peculiar to the British Islands:

(5) *Salmo levenensis*, Walker (*Wern. Mem.*, i. p. 541) (Loch Leven Trout). D. 13; A. 11; P. 14; V. 9; L. lat. 118; L. transverse $\frac{23}{26}$; Cæc. pyl. 68–80; Vert. 59. Maximum length 21 inches. Teeth moderately strong; the head of the vomer triangular with a transverse series of two or three teeth across its base; the teeth of the body of the vomer form a single series and are persistent throughout life. Upper parts brownish or greenish olive; sides of the head with round black spots; sides of the body with X-shaped, sometimes rounded, brown spots. Dorsal and adipose fins with numerous small brown spots. A non-migratory species, inhabiting Loch Leven and other lakes of southern Scotland and Northern England. This species is considered by Mr. Day as a variety of *S. trutta*.

(6) *S. brachypoma*, Günther; *S. eriox*, Parnell (*Fish, Firth of Forth*). D. 13; A. 10–11; P. 14; V. 9; L. lat. 118–128; L. transverse $\frac{27}{30}$; Cæc. pyl. 45–47; Vert. 59. Præoporculum with scarcely a trace of lower limb. Teeth rather strong; those of the vomer in double series, but in zigzag lien, Most of them are lost in specimens 17 inches long, only a few of the anterior remaining. Sides of the body with X-shaped or ocellated black spots, some red spots along and below the lateral line; dorsal fin with round black spots. Dorsal, anal, and ventral fins with a white and black outer margin in young examples. A migratory species, from the rivers Forth, Tweed, and Ouse. According to Mr. Day, it is identical with the White Salmon of Pennant and *Salmo albus* of Cuv. and Val., all of them being considered by Day as a variety, *S. albus*, of *Salmo trutta*.

(7) *S. gallirensis*, Günther. An anadromous species from Galway, distinguished by the acutely pointed but not elongate snout, broad convex head, small eye, feeble teeth, feeble maxillary and mandible, and by extremely thin and short pyloric appendages, which are not longer than one inch nor thicker than a pigeon's quill. According to Day a variety of *S. fario*.

(8) *S. ferox*, Jard. and Selby (*Edinb. New Philos. Journal*, 1835, xviii.). A non-migratory species inhabiting the large lochs of the north of Scotland and several lakes of the north of England, Wales, and Ireland. Præoperculum crescent-shaped, the hinder and lower margins passing into each other without forming an angle. According to Day a variety of *S. fario*.

(9) *S. orcadensis*, Günther, from Loch Stennis in Orkney.

(10). *S. stomachicus*, Günther (the Gillaroo). From lakes of Ireland. Thick stomach. Feeds on shells (*Limnæus, Ancylus*).

(11) *S. nigripinnis*, Günther. Non-migratory species inhabiting mountain-pools of Wales, also Lough Melvin, Ireland.

Day mentions also the following varieties of *S. fario:*

S. cornubiensis, Walb., Artedi;

Swaledale trout, from Swaledale, Yorkshire; and

Crassapuill trout, from Loch Crassapuill, Sutherlandshire.

Many species of *Salmo* exist which are confined to limited areas in the continent of Europe. An account of these is given in the *Brit. Mus. Catalogue*, which also contains references to the literature. One of these, *S. macrostigma*, Duméril, is a non-migratory form occurring in Algeria, and is the southernmost species of the Old World. Three non-migratory species exist in the rivers belonging to the basin of the Adriatic. In the Alpine lakes of central Enrope five species are known, which resemble in habits the forms found in British lakes, ascending the streams which feed the lakes, in order to spawn. Two of these species inhabit the Lake of Constance, one the Lake of Geneva. *Fario argenteus*, Cuv. and Val., found in the Atlantic rivers of France, is considered by Dr. Günther a distinct species, by Mr. Day as a synonym of *S. trutta*. One migratory species is known from the Eidfjord river in Norway; two land-locked species from Lake Wener in Sweden.

The species of *Salmo* belonging to the Pacific coast of North America have been described by Richards in *Faun. Bor. Amer.*, by Suckley in *Nat. Hist. Washington Territory*, and by Girard in *Proc. Acad. Nat. Sc. Philad.* Only one species need be mentioned here, and that on account of the importance it has acquired in connection with the work of the United States Fish Commission:

Salmo irideus, Gibbons (*Proc. Cal. Ac. Nat. Sc.*, 1855, p. 36); *Salar iridea*, Girard (*Proc. Acad. Nat. Sc. Philad.*, 1856, p. 220 and *U. S. Pac. R. R. Explor.—Fish*, p. 321, pl. 73, f. 5, and pl. 74) (the Californian, Mountain, or Rainbow Trout). B. 10; D. 14; A. 14; L. lat. 140. Caudal deeply emarginate. Body and dorsal and caudal fins with numerous small black spots. A non-migratory species in rivers of Upper California.

For the same reason as in the preceding case, the following species of the eastern slope of the North American continent is introduced.

Salmo namaycush, Penn (*Arct. Zool.*, ii. p. 139), Cuv. and Val. (xxi. p. 348) (Lake Trout). B. 11–12; D. 13–14; A. 12; V. 9; L. lat. 220. Præoperculum very short, without lower limb; head very large. Teeth strong; those on the vomer persistent throughout life, and in single series. Inhabits all the great lakes of the northern part of North America.

B. Subgenus SALVELINUS:

Salmo alpinus, L. (the Charr, Yarrell, *Brit. Fishes*, 3d ed.). D. 13; A. 12; P. 13; V. 10; L. lat. 195–200; Vert. 59–62; Cæc. pyl. 36–42. Body slightly compressed and elongate. Length of head equal to height of body in mature specimens and two-ninths or one-fifth of total length; maxillary extends but little beyond the orbit in the fully adult fish. Eye one-half, or less than one-half, of the width of the interorbital space. Teeth of moderate size. Inhabits lakes of Scandinavia, Scotland (Helier Lake, Hoy Island, Orkneys; Sutherlandshire; Loch Roy, Inverness-shire) and probably Iceland.

S. killinensis, Günther (*Proc. Zool. Soc.*, 1865, p. 699). D. 14–15; A. 13; P. 13; V. 9; L. lat. 180; Vert. 62; Cæc. pyl. 44–52. Head, upper parts, and fins brownish-black; lower parts with an orange-colored tinge in the male; sides with very small, light, inconspicuous spots. Anterior margins of the lower fins white or light-orange colored. Loch Killin, Inverness-shire. Considered by Mr. Day as a variety of *S. alpinus*.

S. willughbii, Günther (*Proc. Zool. Soc.*, 1862, p. 46, pl. 5), Charr, Willughby (*Hist., Pisc.*, p. 196), Penn (*Brit. Zool.*), and Yarrell (*Brit. Fish.*, 3d ed.) (the Charr of Windermere). D. 12–13; A. 12; P. 13–14; V. 9–10; L. lat. 165; Vert. 59–62; Cæc. pyl. 32–44. Sides with red dots; belly red; pecto-

ral, ventral, and anal with white margins. Lake of Windermere; Loch Bruiach (Scotland). Considered by Mr. Day as a variety of *S. Alpinus*.

S. perisii, Günther (*Ann. and Mag. Nat. Hist.*, 1865, p. 75); Torgoch, Willughby (*Hist. Pisc.*) and Penn (*Brit. Zool.*) (the Torgoch or Red Charr). D. 13; A. 12; P. 12; V. 9; L. lat. 170; Vert. 61; Cæc. pyl. 36. Sides with numerous red dots; belly red in the mature fish; pectoral, ventral, and anal with white margins. Lakes of North Wales (Llanberris). considered by Mr. Day as a variety of *S. alpinus*.

S. grayi, Günther (*Proc. Zool. Soc.*, 1862, p. 51). D. 13; A. 12; P. 13–14; V. 9; L. lat. 125; Vert. 60; Cæc. pyl. 37. Sides with scattered light-orange-colored dots; belly uniform silvery whitish, or with a light-red shade; fins blackish. Lough Melvin, Ireland. Considered by Mr. Day as a variety of *S. alpinus*.

S. colii, Günther (*Proc. Zool. Soc.*, 1863) (Cole's Charr, Couch, *Fish. Brit. Isles*). D. 14; A. 12; P. 13; V. 9; L. lat. 160; Vert. 63; Cæc. pyl. 42. Bluish-black above; sides silvery with scattered light-salmon-colored dots; belly reddish; fins black, the anal and the paired fins with a reddish tinge, the anal and ventrals with a narrow whitish margin. A small species 7 to 8 inches long from Loughs Eske and Dan, Ireland. Considered by Mr. Day as a variety of *S. alpinus*.

The above are all the British species.

S. umbla, L. (*Syst. Nat.*), Cuv. and Val. D. 12; A. 12–13; P. 14; V. 9; L. lat. 200; Vert. 65; Cæc. pyl. 36. Commonly called in French *Ombre Chevalier*. Lower parts whitish or but slightly tinged with red. Lakes of Constance, Neuchâtel, and Geneva. Considered by Mr. Day as identical with *S. alpinus*. Other species have been described from lakes in Europe and Asia, but are imperfectly known; for an account of them see Günther's *Catalogue*.

The following American species of Charr is one of those cultivated by the American Fish Commission:

S. (Salvelinus) fontinalis, Mitch. (*Trans. Lit. and Phil. Soc.*, New York, i. p. 435), Cuv. and Val. (xxi. p. 266) (Brook Trout). B. 12; D. 12; A. 10; L. lat. 200; Cæc. pyl. 34. No median series of teeth along the hyoid bone. Præoperculum short in longitudinal direction, with the lower limb very indistinct. Rivers and lakes of British North America, and of the northern parts of the United States. Introduced in Britain.

2. Of the genus **Osmerus** only three species are described in the *Brit. Mus. Cat.*, one of which is British:

Osmerus eperlanus, Lacép., Linn. (the Smelt; Fr., *Éperlan;* Scotch, *Sparling* or *Spirling*). B. 8; D. 11; A. 13–16; P. 11; V. 8; L. lat. 60–62; L. transverse $\frac{7}{11}$; Cæc. pyl. 2–6; Vert. 60–62. Height of body much less than length of the head, which is a quarter or two-ninths of the total length to base of caudal fin. Snout produced. Vomerine teeth and anterior lingual teeth large, fang-like; posterior mandibular teeth larger than the anterior ones, which form a double series, the inner series containing stronger teeth than the outer one. Back transparent, greenish; sides silvery. Adult size 10 or 12 inches. Coasts and numerous fresh waters of northern and central Europe.

Osmerus viridescens, Lesueur, another species scarcely distinct from *O. eperlanus*, but with scales a little smaller, occurring on the Atlantic side of the United States.

Osmerus thaleichthys, Ayres, occurs abundantly in the Bay of San Francisco.

3. Of **Coregonus** forty-one species are described in the *Brit. Mus. Cat.* Four species are found in Britain.

C. oxyrhynchus, Kröyer, Linn., Cuv. and Val. (xxi). Called the *Houting* in Holland. B. 9; D. 14; A. 14–15; L. lat. 75–81; L. transverse $\frac{9}{12}$–$\frac{10}{12}$; Vert. 58. Snout produced, with the upper jaw protruding beyond the lower, and in adult specimens produced into a fleshy cone. Length of the lower limb of operculum 1⅓ to 1¾ times that of the upper. Pectoral as long as the head without snout. Found on coasts and in estuaries of Holland, Germany, Denmark, and Sweden. Captured recently (three specimens only) in Lincolnshire, near Chichester, and at the mouth of the Medway.

C. clupeoides, Lacépède; *C. pennantii*, Cuv. and Val. (the Gwyniad of Lake Bala, Schelly of Ullswater, Powan of Loch Lomond; sometimes called the Freshwater Herring). B. 9; D. 14–15; A. 13–16; L. lat. 73–90; L. transverse $\frac{9}{11}$; Cæc. pyl. 120; Vert. 38/20. Snout with upper jaw not produced. Pectoral larger than the head. Fins black or nearly so. Lakes of Great Britain.

C. vandesius, Richards (*Faun. Bor. Amer.*); *C. albula*, Cuv. and Val. (the Vendace). D. 11; A. 13; V. 11; L. lat. 68–71; L. transverse $\frac{8}{10}$; Vert. 56. Castle Loch, Lochmaben in Dumfrieshire.

C. pollan, Thompson (*Proc. Zool. Soc.*, 1835), Cuv. and Val. (the Pollan). D. 13–14; A. 12–13; V. 12; L. lat. 80–86; L. transverse $\frac{9}{11}$; Vert. 60–61. Two jaws of same length. Teeth if present very minute. Bluish along the back, silvery along the sides and beneath. Usual length of adults, 10 to 11 inches, maximum 13 inches. Ireland, in Loughs Neagh, Erne, Derg, Corrib, and the Shannon.

Thirty-seven species of *Coregonus* have been distinguished besides these four. Some are migratory; but the greater number are inhabitants of large lakes. The anadromous species are confined to the Arctic Sea, and the greater number belong to the coast and rivers of Siberia. Several distinct species occur in the lakes of Sweden; a few are found in the lakes of Switzerland and central Europe. *C. hiemalis* is peculiar to the Lake of Constance. Several species inhabit the great freshwater lakes connected with the river St. Lawrence of North America, and the lakes farther to the north. One of these is cultivated by the American Fish Commission:

Coregonus clupeiformis, Mitchell, Dekay (*New York Fauna, Fish*), Cuv. and Val., Agassiz (*Lake Superior*) (the Shad, Salmon, Freshwater Herring, Whitefish). D. 12; A. 14; L. lat. 76–77; L. transverse $\frac{8}{10}$. The snout is pointed, and there is an appendage to the ventral fin which is half as long as the fin itself. Length of adult 11 to 13 inches. Lakes Erie and Ontario.

4. Only one species of **Thymallus** occurs in the British Islands:

Thymallus vulgaris, Nilsson; *Thymallus vexillifer*, Cuv. and Val. (the Grayling; French, *L'Ombre*: Italian, *Temelo*). B. 7–8; D. 20–23: A. 13–16; P. 16; V. 10–11; L. lat. 75–85; L. transverse $\frac{8-9}{14-16}$; Cæc. pyl. 22; Vert. 39/22. Length of head two-ninths or one-fifth of total length to base of caudal; posterior dorsal rays somewhat produced in adult. Grows to 15 inches in length. A freshwater fish, common in many of the rivers of England, introduced into some of those of southern Scotland; absent from Ireland. It is widely distributed in central and northern Europe, occurring in Lapland, Sweden, Lake of Constance, the Isar, and the Danube. Adult size about 15 inches.

Thymallus æliani, Cuv. and Val. (θύμαλλος, Æl., xiv. 22), occurs in Lago Maggiore. One species has been described from Siberia, and two are known inhabiting Lake Michigan and the waters of British North America.[1]

5. Of **Argentina** four species are described in the *Brit. Mus. Cat.*, namely: *Argentina silus*, Nilsson, occurring off the northwest coast of Norway, *Argentina sphyræna* L., from the Mediterranean, *Argentina hebridica*, Nilsson, found on the coasts of Norway and Scotland, and *Argentina lioglossa*, Cuv. and Val. According to Mr. Day, two of these, *A. sphyræna* and *A. hebridica* are identical, the species ranging from the coast of Norway and east and west shores of Scotland to the Mediterranean. The following is the formula of *A. hebridica*, Nilsson, according to Günther: D. 9–11; A. 13 (12); P. 13–14: V. 11; L. lat. 52–53; Cæc. pyl. 14–20; Vert. 52. The scales with minute spines.

6. The species of **Oncorhynchus** are all anadromous, and are confined to American and Asiatic rivers flowing into the Pacific. *O. quinnat*, Richardson = *O. chouicha* occurs in the river Sacramento, and is cultivated by the American Fish Commission.

7, 8. For **Brachymystax** and **Luciotrutta**, see p. 232 above.

9. **Plecoglossus** comprises small aberrant freshwater species abundant in Japan and the island of Formosa.

10. **Retropinna** contains but one species, *R. richardsonii*, which is known as the New Zealand Smelt. It is common on the coasts of New Zealand, ascending estuaries. Like *Osmerus eperlanus*, it is landlocked in freshwater in some localities.

11, 12. The species of **Hypomesus** and **Thaleichthys** occur on the Pacific coast of North America. *Thaleichthys pacificus*, Girard, is caught in vast numbers in the neighborhood of Vancouver Island; it is extremely fat, and is used as a torch when dried, and also as food. It is called locally the Eulachan or Oulachan.

13. Of **Mallotus** only one species is described by Günther: *Mallotus villosus*, Cuv. and Val., Müll. (the Capelin; French, *Capelan*). B. 8–10; D. 13–14; A. 21–23; P. 18–20; V. 8; Cæc. pyl. 6; Vert. 68. Brownish on the back, silvery on the sides. Operculum silvery with minute brown dots. Shores of Arctic North America and of Kamchatka.

14. Of the genus **Salanx** two species are known: *Salanx chinensis*, Günther, Osbeck, which is common on the coast of China and called "Whitebait" at Macao, and *Salanx microdon*, Bleeker, from the rivers near Jeddo.

15. **Microstoma.**—*M. rotundatum*, Risso, is marine and occurs in the Mediterranean; it is not anadromous. It is the only species of the genus known, unless the *Microstomus grönlandicus*, described by Reinhardt, from the Sea of Greenland, really belongs to this genus.

16. For **Bathylagus**, see p. 232 above.

[1] [The grayling of Michigan is also found in the upper Yellowstone river.—AM. ED.]

Life History of the Salmon and Allied Species.

Up to a period not many years past, when our knowledge of the breeding and life history of the salmon and kindred species was based entirely on desultory observations of the fish in their natural conditions, there existed a great deal of uncertainty and diversity of opinion on the subject. Within the last twenty or thirty years the extensive practice of salmon-culture has removed nearly all obscurity from the phenomena, and the history of Salmonoids is now more accurately known than that of most other fishes.

The salmon proper, *Salmo salar*, breeds in the shallow running waters of the upper streams of the rivers it ascends. The female, when about to deposit her eggs, scoops out a trough in the gravel of the bed of the stream. This she effects by lying on her side and ploughing into the gravel by energetic motions of her body. She then deposits her eggs in the trough; while she is engaged in these operations she is attended by a male, who sheds milt over the eggs as the female extrudes them, fertilization being, as in the great majority of *Teleostei*, external. The parent fish then fill up the trough and heap up the gravel over the eggs until these are covered to a depth of some feet. The gravel heap thus formed is called a "redd." The period of the year at which spawning takes place in the British Isles, and in similar latitudes of the northern hemisphere, varies to a certain extent with the locality, and in a given locality may vary in different years; but, with rare exceptions, spawning is confined to the period between the beginning of September and the middle of January.

The eggs of *Salmo salar* are spherical and non-adhesive; they are heavier than water, and are moderately tough and elastic. The size varies slightly with the age of the parent fish, those from full-sized females being slightly larger than those from very young fish. According to rough calculations made at salmon-breeding establishments, there are 25,000 eggs to a gallon; the diameter is about a quarter of an inch. It is usually estimated that a female salmon produces about 900 eggs for each pound of her own weight; but this average is often exceeded.

The time between fertilization and hatching, or the escape of the young fish from the egg-membrane, varies considerably with the temperature to which the eggs are exposed. It has been found that at a constant temperature of 41° F. the period is 97 days; but the period may be as short as 70 days and as long as 150 days without injury to the health of the embryo. It follows therefore that in the natural conditions eggs deposited in the autumn are hatched in the early spring. The newly hatched fish or "alevin," is provided with a very large yolk-sac, and by the absorption of the yolk contained in this the young creature is nourished for some time; although its mouth is fully formed and open, it takes no food. The alevin stage lasts for about six weeks, and at the end of it the young fish is about 1¼ inches long. During the next period of its life the young salmon is called a "parr," and is distinguished by the possession of a number of dark transverse marks along the sides, known as "parr marks." These marks occur in the young stage of many species among the *Salmonidæ*. The parr doubles its length in about four months.

The great majority of parr remain in fresh water for two years after hatching, at the end of which time they are about 8 inches in length. The second spring after they are hatched they develop a coating of bright silvery scales which completely conceals the parr marks, and they pass into a stage in which they are known as "smolts." The smolt is similar to the adult salmon in all respects except size, and the young salmon, as soon as the smolt stage is reached, migrates down the rivers to the sea.

The above facts have been established within recent years by accurate observation and experiment. Not very long ago it was a disputed question whether the parr was the young salmon or a distinct species of fish. That the former view was correct was first experimentally proved by Mr. John Shaw, gamekeeper to the duke of Buccleuch, Drumlanrig, Dumfriesshire, who in 1833 isolated several parrs in a pond, and found that in April, 1834, they changed into smolts; an account of this experiment was published in the *Transactions* of the Royal Society of Edinburgh. The question is now of merely historical interest, for at the present time large numbers of parr are hatched at various fish-hatching establishments every season. By observation at these establishments, the knowledge of the history of the parr and the migration of the smolt which had been gained by the study of the fish in their natural conditions has been rendered more accurate and complete.[1] It has been conclusively ascertained that some parr become smolts and migrate to the sea in the spring following that in which they were hatched, while the great majority remain in the parr stage until the second spring, and a few do not attain to the smolt condition until the third year. The male parr when only 7 or 8 inches in length is often sexually mature, the milt being capable of fertilizing the ova of an adult female salmon.

The migration of smolts to the sea takes place in all rivers at about the same time of the year, viz., between March and June. Sometimes the smolts are observed descending in large shoals. Formerly angling for the descending smolts was a recognized sport, but their capture is now illegal. It is the opinion of the most competent authorities that the smolts increase with wonderful rapidity in size and weight when they reach the sea, and then return to the rivers after a few months, during the same year, as "grilse," which name is given to sexually mature salmon up to a little over 5 lb in weight. It is surprising that a smolt weighing only a few ounces should increase to 3 or 4 or even 6 lb in about three months. Nevertheless it has been proved by actual experiment that this is the fact. At Stormontfield, in May, 1855, 1300 smolts were marked by cutting off the adipose fin, and 22 of these were recaptured the same summer as grilse, weighing from 3 lb upwards. It might be supposed that some smolts do not return as grilse till the summer following the year of their descent, the time of their stay in the sea being variable as is the period spent by parr in the rivers. But all the evidence is against this supposition; grilse never commence ascending till late in summer; if they had been more than a year in the sea, some would probably ascend early in the season, as do the larger salmon. At the same time it must be borne in mind that a fish which remained in the sea a year after descending as a smolt might not be recognized as a grilse, having reached the size of a small salmon.

The grilse, after spawning in autumn, return again to the sea in the winter or following spring, and reascend the rivers as mature spawning salmon in the following year. Both salmon and grilse after spawning are called "kelts." The following recorded experiment illustrates the growth of grilse into salmon: a grilse-kelt of 2 lb was marked on March 31, 1858, and recaptured on August 2 of the same year as a salmon of 8 lb.

The ascent of rivers by adult salmon is not so regular as that of grilse, and the knowledge of the subject is not at the present time complete. Although salmon scarcely ever spawn before the month of September, they do not ascend in shoals just before that season; the time of ascent extends throughout the spring and summer. A salmon newly arrived in fresh water from the sea is called a clean salmon, on account of its bright, well-fed appearance; during their stay in the rivers the fish lose the brilliancy of their scales and deteriorate in condition. The time of year at which clean salmon ascend from the sea varies greatly in different rivers; and rivers are, in relation to this subject, usually denominated early or late. The Scottish rivers flowing into the German Ocean and Pentland Firth are almost all early, while those of the Atlantic slope are late. The Thurso in Caithness and the Naver in Sutherlandshire contain fresh-run salmon in December and January; the same is the case with the Tay. In Yorkshire salmon commence their ascent in July, August, or September if the season is wet, but if it is dry their migration is delayed till the autumn rains set in. In all rivers more salmon ascend immediately after a spate or flood than when the river is low, and more with the flood tide than during the ebb.

In their ascent salmon are able to pass obstructions, such as water-falls and weirs of considerable height, and the leaps they make in surmounting such impediments and the persistence of their efforts are very remarkable. In a great many rivers anadromous Salmonoids have been excluded from the upper reaches by artificial obstructions, such as dams and weirs, constructed for the purpose of utilizing the water of the stream, or to obtain water power, or simply to facilitate the capture of the fish. Other rivers have been rendered uninhabitable to salmon by pollutions. The state of the Thames within the boundaries of London has since the beginning of the present century excluded Salmonoids entirely from the river; but every season salmon and grilse are taken in or near the Thames estuary, and there is no doubt that if the water could again be rendered moderately clear, and if fish-ways were provided at the impassable weirs, the upper waters of the Thames would again be frequented by salmon and migratory trout.

The life history of *Salmo trutta* and *S. cambricus* is very similar to that of *Salmo salar*. The river trout, *S. fario*, makes a redd in the shallower parts of streams in the same manner as the salmon, the only difference being that the mound of gravel forming the redd is smaller, the egg lying

[1] The first important series of experiments on the growth and life history of the salmon was made at the salmon-hatchery of Stormontfield near Perth in 1862 and some previous years. The results are detailed in a work entitled *Stormontfield Experiments*. 1862.

from one to two feet below the surface. The breeding period of the trout varies in different rivers, within the limits of September and March.[1] The number of eggs produced by each female is about 800 for every pound of the parent's weight; about 40,000 of the eggs make a gallon, so that they are considerably smaller than those of *S. salar*. The trout of Loch Leven, *S. levenensis*, ascend the streams feeding the loch, in order to spawn, at the end of September and beginning of October. The habits of other species of lake trout are similar to those of *S. levenensis*.

The charrs differ from lake trout in the fact that they do not ascend streams in order to spawn, but form their redds in the gravelly shallows of the lakes they inhabit. The spawning period of the charr of the Cumberland lake district is from the beginning of November to the beginning of December. The eggs of the charr have been found to hatch in from 60 to 90 days, the great majority in 70 days, at an average temperature of 40° F. The American species, *S. fontinalis*, breeds at about the same time as *S. fario;* its eggs are only half the size of those of the latter.

The smelt, *O. eperlanus*, is a gregarious fish and exhibits regular migrations in most estuaries. It is common in the Solway, the Firth of Forth, the rivers of Norfolk, and the estuary of the Thames. In most places where it is found it remains in the fresh and brackish water from August until May, spawning about the month of April, and afterwards descending to the sea for the summer. At Alloa on the Forth smelts are taken in large numbers by seine nets in spring, before and during the spawning period. There is a regular fishery for them at the same season on the Solway Firth and in Norfolk. The food of the smelt consists chiefly of young fish, especially young herrings and crustaceans. The eggs are small, yellowish in color, and adhesive, not adhering by the surface merely as is the case with those of the herring, but each egg possessing a short thread the end of which becomes attached to planks, stones, or other solid objects in the water. According to Mr. Day the eggs are deposited near the high-water mark of spring-tides, so that they must be exposed to the air during the ebb. The smelt when in the sea is largely eaten by the picked dog-fish (*Acanthias vulgaris*). The species is absent from the southern coast of England and from Ireland, the smelt recorded as occurring on those coasts being probably the atherine (*Atherina*), often called the sand-smelt. *O. eperlanus* is abundant on the coast of Finland, and also is common there in freshwater lakes, in which it remains all the year round. It is also common on the Atlantic coast of France. It is of interest to note that the smelt in Britain and on other coasts, when not confined to fresh water, is, in its migration, intermediate between anadromous *Salmonidæ*, which ascend to near the sources of rivers, and such fish as the herring, which approach the shore to spawn but do not usually enter rivers. The smelt as a rule ascends estuaries only as far as the region of brackish water.

The various species of *Coregonus* resemble the charr in their habits, spawning in the autumn in the shallows of the lakes they inhabit; their ova are small, and, as mentioned in PISCICULTURE (*q.v.*), are non-adhesive and of almost the same specific gravity as fresh water, so that they are semi-buoyant.

The grayling, *Thymallus vulgaris*, is in Britain exclusively fluviatile; in Scandinavia it is found also in lakes. It is met with chiefly in clear streams with sandy gravels or loamy beds. It was introduced not many years ago into the Tweed by the marquis of Lothian, and thrives there. It is absent from the Thames, but is common in most of the rivers of England and Wales—*e.g.*, the rivers of Yorkshire, the Severn, and the Wye. It is absent from Ireland. It feeds on insects and their larvæ, crustaceans, and small mollusca. It breeds in April and May, depositing its ova on the surface of the gravel in the shallows, not in a redd. The ova are smaller than those of the trout, and vary in color from white to deep orange, and they hatch from the twelfth to the fourteenth day after extrusion. The fry grow to 4 or 5 inches in length by August, and by the following autumn to 9 or 10 inches.

Salmon Fishery Legislation.

In England and Wales the common law is that every person has an equal right to fish for salmon in the sea and in navigable tidal rivers, while the proprietors of the soil on the banks of rivers which are not navigable have the exclusive right of fishing in them. The erection of stake-nets or other fixed engines for the capture of salmon in estuaries or on the sea-coast is necessarily incompatible with the maintenance of the public right of fishing, and has therefore from very early times been regarded as illegitimate. There has consequently been a constant conflict between legislation and private interest over this point. By Magna Charta all fishing weirs were abolished except on the sea-coast, but the object of this seems to have been rather the protection of the freedom of navigation than the advantage of the salmon fisheries or the maintenance of a public right. In later times fixed engines were repeatedly declared illegal and their erection prohibited by statute. Finally in 1861 they were definitely abolished in all cases except where legal right to maintain them could be conclusively proved. The Salmon Fishery Act of 1861, of which the prohibition just referred to was one of the clauses, was based upon the report of a royal commission appointed in 1860 to inquire into the condition of the salmon fisheries, and it forms the basis of the regulations at present in force, all previous legislation being by it expressly abolished and superseded. It prohibited the capture of unclean and unseasonable salmon, made a uniform close season for England and Wales, ordained a weekly close season of forty-two hours, provided for the erection of fish-passes and regulated the use of fishing weirs on non-navigable rivers, vested the central authority of the salmon fisheries in the Home Office, and provided for the appointment of inspectors. In 1863 an Act was passed prohibiting the exportation of salmon during the close time. In 1865, as it was found useless to legislate without machinery to enforce the law, an Act was passed to constitute fishery districts under the control of local boards of conservators appointed by the magistrates in quarter-sessions. These boards were empowered to enforce a license duty on fishing implements used in public waters. One or two minor salmon fishery Acts were passed in succeeding years, but the next important piece of legislation on the subject was the Act of 1873, the two most important provisions of which are (1) that fishermen in public waters for every £50 [$243] of license duty which they pay elect a member of the local board of conservators, and (2) that each board of conservators may make by-laws for the regulation and improvement of the fisheries within its own district. The annual close time for salmon in England and Wales at present for nets commences Aug. 14–Sept. 30, and closes Feb. 2–April 1, varying in different districts within the limits given; for rods the close time is Sept. 30–Nov. 29 to Feb. 1–May 1. The law as regards close time for fixed engines was amended in 1879. The method of fishing followed in the English and Welsh estuaries is in consequence of the above course of legislation that of sweep-nets worked from shore by boats; a license duty has to be paid for each net, and stake-nets along the coast are very rare. An inspector of salmon fisheries appointed by the Home Office reports annually.

In Scotland the salmon fishery customs in one respect differ much from those of England: stake-nets are the common and universal means of salmon capture in estuaries, although sweep-nets are also employed. The reason of this is that originally all the salmon fishings belong to the crown or the grantees of the crown. The principal Acts regulating Scottish salmon fisheries are those of 1862 and 1868, but, as the previous statutes have never been repealed, the law on the subject is somewhat confused. Scotland has been divided into fishery districts managed by district boards. An annual close time of 168 days is enforced, lasting for nets from August 26 to September 14 until February 5 to February 25, and for rods from September 14 to November 20 until January 11 to February 25. The weekly close time lasts thirty-six hours, from Saturday night till Monday morning. The construction of cruives, mill-lades, dams, and water-wheels and the size of the meshes of nets are all regulated. In 1882 the management of the salmon fisheries was placed together with that of the sea fisheries under the control of the reconstituted Scottish Fishery Board, to which power was given to appoint an inspector of salmon fisheries; by this official an annual report of the condition of the fisheries is presented through the Fishery Board to the Home Office.

The principal Act relating to Irish fisheries is that of 1863. Special Fishery Commissioners are responsible for the carrying out of the legal regulations. The country is divided like England and Scotland into fishery districts under the jurisdiction of boards of conservators, by whom clerks and water bailiffs are appointed. A scale of licensing duties is enforced, and all new fixed engines—that is, any beyond those which legally existed in 1862—are illegal. The weekly close time in Ireland is of forty-eight hours' duration, from 6 A.M. Saturday to 6 A.M. Monday. The annual close time is for nets from July 16 to September 30 until January 1 to June 1, and for rods from September 14 to November 1 until January 1 to June 1. In Ireland as in England and Scotland an inspectorship of salmon

[1] The average period between fertilization and hatching, as ascertained at Howietoun, is at 44.1°—*Salmo fario*, 71 days; *S. levenensis*, 72; *S. fontinalis*, 73; *S. salar*, 77.

fisheries exists, and the holder of the office makes an annual report to the Home Office on the condition of the fisheries.

Introduction of Species to New Areas by Human Agency.

Within the past few years, since great activity has been exhibited in pisciculture generally, and especially in the culture of *Salmonidæ*, various experiments have been made in the transportation of eggs or young fry of valuable species from their native habitats to distant parts of the world. The American so-called brook trout, *S. fontinalis*, has been imported somewhat largely into Britain by various salmon fishery proprietors. It thrives well in various places in England, Scotland, and Wales where it has been set free—for example, in Norfolk rivers, near Guildford in Surrey, and in the stock ponds at Howictoun.

In *Nature*, July 16, 1885, an account was given of the introduction of the fry of the American landlocked salmon (*S. salar*, var. *sebago*) to the upper waters of the Thames. Eggs of *S. namaycush*, *S. sebago*, *S. fontinalis*, and *Coregonus albus* have been successfully forwarded from the hatcheries of the American Fish Commission to the Deutsche Fischerei-Verein in Berlin, and to the Société d'Acclimation at Paris.

The common trout of Britain, *S. fario*, was introduced with complete success into Tasmania nearly twenty years ago by Frank Buckland, and is now abundant in the Tasmanian streams, although it is reported to be much less valued as food there than at home. From Tasmania the eggs were transported to the rivers in Otago, New Zealand, where they also thrive and breed (see *Trans.* of Otago Institute, 1878). In 1866 Mr. Francis Day introduced the fry of the same species into the rivers of the table-land of the Nilgiris in the presidency of Madras. The experiment on this occasion failed, but two years later the establishment of the species in the district in question was successfully accomplished by Mr. M'Ivor, who imported the fry from Scotland.

Salmon Culture.

For the artificial culture of Salmonoids the reader is referred to the article PISCICULTURE. The following account of the salmon and trout hatcheries in Scotland is abridged from a paper read before the Scottish Fisheries Improvement Association in Edinburgh 26th November, 1884, by J. Barker Duncan, the honorary secretary to the Association.

The principal institution of its kind in Scotland at present is the Howietoun Fishery, belonging to Sir J. Gibson Maitland, who commenced it in 1873. Howietoun is about four miles from Stirling. The establishment contains thirty-two fish-ponds and a large hatching-house; there are also four ponds at Craigend, and one of 9 acres at Goldenhove, where fish are reared to their adult condition. The hatching-boxes are of wood, and the eggs are kept during development on glass grilles. The water supply is abundant, about a million gallons of spring water flowing through the ponds every twenty-four hours. The eggs hatched in greatest numbers are those of the Loch Leven trout, but *Salmo salar* and the common trout (*Salmo fario*) are also extensively reared. The American brook trout, *S. fontinalis*, is also cultivated. More than ten millions of ova are annually treated at this hatchery. In 1884 ninety thousand young fish were distributed to various parts of Great Britain and Ireland, and two consignments of trout and one of salmon ova were successfully sent to New Zealand.

The Solway Fishery, belonging to Mr. Joseph J. Armistead, was established in 1881, to supersede the Trentdale Fishery near Keswick, Cumberland. It is situated near the Solway in Kirkcudbrightshire. Various kinds of trout and charr, salmon and sea-trout, grayling and other freshwater fish are bred. The hatching house is fitted to hatch about a million ova. Small and large quantities of ova are supplied to applicants for purposes of stocking or for experiments in fish culture.

The Stormontfield Ponds were established in 1853 by proprietors of Tay fisheries. They are situated about 5 miles above Perth on the Tay and occupy about 2 acres of ground. The Stormontfield experiments above referred to were carried out at these ponds under the direction of Mr. Robert Buist. The establishment is now almost superseded by the Dupplin Hatchery, but is still used to some extent. The hatching boxes, 360 in number, are in the open air, and the eggs are placed on gravel at the bottom of the boxes; a larger percentage of loss occurs with this system than when glass grilles are used. Two of the ponds at Stormontfield are stocked with parr from the Dupplin Hatchery, about 20,000 being placed in them in 1884; the parr are fed with ground liver, and are liberated in the river and its tributaries when two years old.

The Dupplin Hatchery was instituted in 1882 by the Tay district board at Newmill, Dupplin Castle, on the river Earn, a tributary of the Tay. The hatching-house is supplied with spring water, and contains about 300,000 ova. The glass grille system is adopted here, and the fry are liberated in the Tay and its tributaries when about forty days old.

There is a hatchery for Loch Leven trout erected in 1883 by the Loch Leven Angling Association, situated about 800 yards from the loch, beside a small stream. In the season of 1884–85 about 220,000 eggs were laid down. The fry are turned into the feeders of the loch five or six weeks after hatching. Before the erection of this hatchery Loch Leven was several times stocked with fry from the Howietoun Fishery. The great effect of stocking on the produce of Loch Leven is shown by the following figures: in 1884 over 15,000 trout were taken in the loch during the season from April to September; during the preceding ten years the lake had been supplied with some thousands of fry in five several seasons; previous to 1874 no attempt at stocking had been made, and in that year the total catch was about 5000.

In May, 1884, the Linlithgow Palace Loch Hatchery was opened by its proprietor, Mr. A. G. Anderson, fish merchant, Edinburgh, who holds a lease of the loch for angling purposes from the crown. The hatchery is intended chiefly to stock the loch, and is capable of containing about 600,000 ova. Experiments on the cultivation of *Salmo salar*, var. *sebago*, from America, are also to be made here.

A private hatchery belonging to the marquis of Ailsa, capable of hatching about 250,000 ova, is situated at Culzean in Ayrshire. Salmon ova are obtained from the rivers Doon, Stinchar, and Minnock, and the fry turned again into those rivers when about six weeks old. Charr, *S. fontinalis*, and Loch Leven trout are also hatched to stock the hill lochs of the estate of Culzean. According to Mr. Young the number of salmon in the Doon has been considerably increased by the artificial stocking from this establishment.

Another private hatchery, with a capacity of 50,000, is maintained on the Lochbuy estate, Isle of Mull, for the purpose of stocking the rivers and lakes on the property.

The Aberdeen hatchery was established in Aberdeen by the district boards of the rivers Dee and Don. From 15,000 to 20,000 fry are hatched here every year and are conveyed 10 to 40 miles up the rivers Dee and Don and then liberated.

Various proprietors in Scotland have at various times erected small hatching-houses on the rivers of their estates for the purpose of stocking, but these have not been maintained. The above-mentioned are the only salmon-rearing establishments of any importance at present in operation in Scotland.

Salmon Disease.

During the last few years salmon in a great many rivers have been observed to be suffering from an epidemic cutaneous disease from which large numbers have died. So far as is known this disease in its epidemic form is quite a new phenomenon; there can be but little doubt that it must have occurred as a sporadic affection in former times, but it seems on the other hand probable that such mortality among salmon as has taken place in some recent seasons must have attracted attention if it occurred, even when accurate observation was rare. The disease was first noticed in 1877 in the Esk and the Nith, flowing into the Solway Firth, and since then it has destroyed very large numbers of salmon in almost every river in Britain. The disease consists in ulcerations of the skin, which begin at one or several spots on the head and body, and ultimately extend to the whole surface of the fish. The diseased parts of the skin are found when examined to be covered with a fungoid growth, with the mycelium of a fungus consisting of plaited hyphæ which extend into and ramify through the tissue of the derma and epidermis, causing the cells to die, until the superficial tissues decay and slough off, and inflammation and bleeding are produced in the deeper and surrounding parts. It is certain that the injury to the skin and flesh of the salmon is caused by the fungus. If a section of the edge of an affected spot be made, and examined microscopically, the cells are seen to be perfectly normal and healthy beyond the region to which the hyphæ extend, and the growing points of the hyphæ are seen to be penetrating between and distorting these uninjured cells. It is evident therefore that the morbid alteration of the tissues follows the attack of the hyphæ and does not precede it. The external superficial part of the mycelium covering a diseased spot of the skin bears the fructification of the fungus. This consists of zoosporangia, which are the enlarged blind terminal parts of certain of the hyphæ, that stand out perpendicular to the surface of the mycelium. Each zoosporangium contains a multitude of spherical spores. These spores are of the kind technically called zoospores, each on its escape from the sporangium moving about actively by means of two vibratile cilia. The zoosporangium emits the zoospores by an aperture at its end, and when it has emptied itself the hypha begins to grow again at the base of the empty membrane and sends up through the cavity of the old zoosporangium a new sprout which becomes a second spore capsule. This feature is characteristic of the genus *Saprolegnia*, belonging to the *Oosporeæ*, various kinds of which are well known to botanists; they usually occur in dead insects or other invertebrate animals in water: the dead bodies of the common house-fly when in a sufficiently moist place almost invariably produce a luxuriant crop of *Saprolegnia*. The commonest species of *Saprolegnia* is *S. ferax*, and the salmon fungus has usually received the same name, as though it were a proved fact that it was identical with that species. But the species of a *Saprolegnia* can only be ascertained from the characters of its oosporangia, which are quite different from the zoosporangia and are produced much more rarely, and whose contents, the oospores, are fertilized by the contents of sim-

ultaneously produced antheridia. Mr. Stirling has observed the oosporangia of salmon fungus (see his papers in *Proc. Roy. Soc. Ed.*, 1878 and 1879), but his description is not sufficient to put the identification of the species beyond a doubt. From Prof. Huxley's experiments it is evident that the salmon fungus may reproduce for very many generations without the appearance of oospores. The salmon fungus grows with great luxuriance on other animal substances. In a diseased salmon the fungus seems to be confined to the skin and not to give rise to bacteria-like bodies in the internal organs. What are the conditions which favor the infection of salmon in a river is a question to which at present no answer can be given. Until it is known under what conditions the *Saprolegnia* exists in a river before infecting the salmon, the conditions which favor or prevent salmon disease cannot be ascertained. The fungus may have its permanent nidus in decaying vegetable substances, but at present it has not been determined whether it is possible to cultivate the salmon *Saprolegnia* on vegetable matter; or the disease may be propagated sporadically among the fish, Salmonoids and others, which are permanent residents of the rivers; or its abundance may depend on the amount of dead animal matter that is available for its nutrition. There is probably always some *Saprolegnia* in every river; the secondary conditions which determine whether or not the fungus shall multiply on the anadromous salmon to such an extent as to cause an epidemic have yet to be ascertained.

Literature.—Albert Günther, *Catalogue of Fishes in Brit. Mus.*, London, 1866, vol. vi.; Id., *Introduction to Study of Fishes*, Edinburgh, 1880; Francis Day, *Fishes of Great Britain and Ireland*, London and Edinburgh, 1880 to 1884, vol. ii. The following papers of the Conferences of the International Fisheries Exhibition, London, 1883, also contain valuable information: "Fish Culture," by Francis Day; "Salmon Fisheries," by Charles S. Folger; "Culture of *Salmonidæ*," by Sir James Maitland; "Salmon and Salmon Fisheries," by David Milne Home. For a most complete and valuable memoir on the salmon disease see the paper by Prof. Huxley, *Quart. Jour. Mic. Sci.*, 1882. (J. T. C.)

SALOME, widow of Alexander Jannæus, and queen of Judæa from 79 to 69 B.C. (see ISRAEL, vol. xiii. p. 434). Another Salome is the daughter of Herodias mentioned in Matt. xiv. 6. Her father was Herod, son of Herod the Great and Mariamne, and she became successively wife of her father's brother the tetrarch Philip (son of Herod the Great by Cleopatra; see HEROD PHILIP), and of Aristobulus.

SALONICA, or SALONIKI (Ital. *Salonicco*, Turkish *Selanik*, Slav. *Solun*, the ancient *Thessalonica*), during the Roman empire the capital of the province of Macedonia, and still one of the most important cities of European Turkey, the chief town of an extensive vilayet which includes the sanjaks of Salonica, Serres, Drama, and Monastir, and has an aggregate population of 1,500,000. Salonica lies on the west side of the Chalcidic peninsula, at the head of the Gulf of Salonica (*Sinus Thermaicus*), on a fine bay whose southern edge is formed by the Calamerian heights, while its northern and western side is the broad alluvial plain produced by the discharge of the Vardar and the Inje-Karasu, the principal rivers of western Macedonia. Built partly on the low ground along the edge of the bay and partly on the hill to the north (a compact mass of mica schist), the city with its white houses enclosed by white walls runs up along natural ravines to the castle of the Seven Towers (Heptapyrgion), and is rendered picturesque by numerous domes and minarets and the foliage of elms, cypresses, and mulberry trees. The hill of the Heptapyrgion is dominated by a second and that by a third eminence towards the north. The commercial quarter of the town, lying naturally to the northwest, towards the great valleys by which the inland traffic is conveyed, is now pierced by broad and straight streets paved with lava; and the quay extends from the northwest of the city for four-fifths of a mile to the Kauli-Kule (Tower of Blood), or as it is now called Ak-Kule (White Tower). The old Via Egnatia traverses the city from what is now the Vardar Gate to the Calamerian Gate. The houses are for the most part insignificant wooden erections covered with lime or mud. Two Roman triumphal arches used to span the Via Egnatia. The arch near the Vardar Gate—a massive stone structure probably erected after the time of Vespasian—was destroyed about 1867 to furnish material for repairing the city walls; an imperfect inscription from it is now preserved in the British Museum.[1] The other arch, popularly called the arch of Constantine, but by Leake assigned to the reign of Theodosius, consisted of three archways built of brick and faced with marble. It is now in a very dilapidated state.[2] A third example of Roman architecture—the remains of a white marble portico supposed to have formed the entrance to the hippodrome—is known by the Judæo-Spanish designation of Las Incantadas, from the eight Caryatides in the upper part of the structure.[3] The conspicuous mosques of Salonica have nearly all an early Christian origin; the remarkable preservation of their mural decorations makes them very important for the history of Byzantine architecture. The principal are those dedicated to St. Sophia, St. George, and St. Demetrius.

St. Sophia (Aya Sofia), formerly the cathedral, and probably erected by Justinian's architect Anthemius, was converted into a mosque in 1589. It is cased with slabs of white marble. The whole length of the interior is 110 feet. The nave, forming a Greek cross, is surmounted by a hemispherical dome, the 600 square yards of which are covered with a rich mosaic representing the Ascension. St. Demetrius, which is probably older than the time of Justinian, consists of a long nave (divided into three bays by massive square piers) and two side aisles, each terminating eastward in an atrium the full height of the nave, in a style not known to occur in any other church. The columns of the aisles are half the height of those in the nave. The internal decoration is all produced by slabs of different-colored marbles. St. George's, conjecturally assigned by Messrs. Pullan and Texier to the reign of Constantine, is circular in plan, measuring internally 80 feet in diameter. The external wall is 18 feet thick, and at the angles of an inscribed octagon are chapels formed in the thickness of the wall, and roofed with wagon-headed vaults visible on the exterior; the eastern chapel, however, is enlarged and developed into a bema and apse projecting beyond the circle, and the western and southern chapels constitute the two entrances of the building. The dome, 72 yards in circumference, is covered throughout its entire surface of 800 square yards with what is the largest work in ancient mosaic that has come down to us, representing a series of fourteen saints standing in the act of adoration in front of temples and colonnades. The Eski Juma, or Old Mosque, is another interesting basilica, evidently later than Constantine, with side aisles and an apse without side chapels. The church of the Holy Apostles and that of St. Elias also deserve mention. Of the secular buildings, the Caravanserai, usually attributed to Amurath II., probably dates from Byzantine times.

The prosperity of Salonica has all along been largely that of a commercial city. During the Christian centuries before the Mohammedan conquest the patron saint of the city was also the saint of a great market or fair to which merchants came from all parts of the Mediterranean, and even from countries beyond the Alps. At the beginning of the present century a large export trade was carried on in woollen and cotton fabrics, white and red yarns, grain, wool, tobacco, yellow berries, silk fabrics, sponges, etc.; and silk gauze was manufactured in the city. Direct British trade with Salonica began after the Greek war of independence. Woven fabrics are at present imported from England, Austria, Germany, Switzerland, and Italy; sugar mainly from Austria; coffee from South America (partly direct); petroleum from America and Russia; soap from Greece and Crete; metal goods from England, France, and Austria; and coal from England. The exports comprise cereals (wheat, barley, oats, maize, rye), tobacco, wool, cotton, poppy-seed, opium, cocoons, prunes, and timber. In 1884 the industrial establishments were steam flour-mills, a cotton-spinning factory (employing 500 hands and sending its goods to Constantinople, Smyrna, and Beyrout), a distillery, several large soap-works, a nail factory, an iron-bedstead factory, and a number of brick and tile works.

In Salonica the several nationalities have schools of their own: the Greeks, for example, have a normal school, a gymnasium, and nine other schools (one for girls); and even the Bulgarians, though their numbers are comparatively small, have two normal schools. The Jewish community (about 50,000) is of Spanish origin, and still preserves its Judæo-Spanish written in Hebrew characters. Besides their own schools they have the advantage of a

[1] See *Trans. Roy. Soc. Lit.*, vol. viii., new series, 1878.
[2] See Newton's *Travels, etc., in the Levant*, vol. i. p. 122.
[3] See Stuart's *Athens*, vol. iii. pl. 45, for engraving.

large school supported by the Jewish Mission of the Established Church of Scotland (instituted about 1860). The total population of Salonica was estimated by Tozer about 1865 as 60,000. It has since increased probably to 90,000 or 100,000. The railway opened to Kiuprili (136¾ miles) in 1873 is now exteuded 75 miles to Mitrovitza.

History.—The older name of Thessalonica was Therma (in allusion to the hot springs of the neighborhood). It was a military and commercial station on a main line of communication between Rome and the East, and had reached its zenith before the seat of empire was transferred to Constantinople. It became a Roman *colonia* in the middle of the 3d century, and in the later defence of the ancient civilization against the barbarian inroads it played a considerable part. In 390 Thessalonica was the scene of the dreadful massacre perpetrated by command of Theodosius. Constantine repaired the port, and probably enriched the town with some of its buildings. During the inconoclastic reigns of terror it stood on the defensive, and succeeded in saving the artistic treasures of its churches; in the 9th century Joseph, one of its bishops, died in chains for his defence of image-worship. In the 7th century the Slavonic tribes strove to capture the city, but in vain even when it was thrown into confusion by a terrible earthquake which lasted several days. It was the attempt made to transfer the whole Bulgarian trade to Thessalonica that in the close of the 9th century caused the invasion of the empire by Simeon of Bulgaria. In 904 the Saracens from the Cyrenaica took the place by storm; the public buildings were grievously injured, and the inhabitants to the number of 22,000 were carried off and sold as slaves throughout the countries of the Mediterranean. In 1185 the Normans of Sicily, having landed at Dyrrhachium and marched across country, took Thessalonica after a ten days' siege, and perpetrated endless barbarities, of which Eustathius, then bishop of the see, has left us an account. In 1204 Baldwin, conqueror of Constantinople, conferred the kingdom of Thessalonica on Boniface, marquis of Montferrat; but eighteen years later Theodore, despot of Epirus, one of the natural enemies of the new kingdom, took the city and had himself there crowned by the patriarch of Macedonian Bulgaria. On the death of Demetrius (who had been supported in his endeavor to recover his father's throne by Pope Honorius III.) the empty title of king of Salonica was adopted by several claimants. In 1266 the house of Burgundy received a grant of the titular kingdom from Baldwin II. when he was titular emperor, and it was sold by Eudes IV. to Philip of Tarentum, titular emperor of Romania in 1320. The Venetians, to whom the city was transferred by one of the Palæologi, were in power when Sultan Amurath appeared, and on the 1st of May, 1430, in spite of the desperate resistance of the inhabitants, took the city, which had thrice previously been in the hands of the Turks. The body of St. Demetrius, the patron saint, who from the time of his death under Maximian in the 4th century had exercised a marvellous influence on the popular imagination, was hacked to pieces, though even the Mohammedans attributed virtue to the famous oil from which the saint obtained the title of Myroblete. In 1876 the French and German consuls at Thessalonica were massacred by the Turkish populace.

Besides Tafel's monograph, *Dessertatio de Thessalonica* (Berlin, 1839), see Holland's *Travels* (1815); Grisebach, *Rumelien und Brussa*, 1839; Bowen's *Mount Athos, Thessaly, and Epirus* (1852); Boeckh, *C. I. G.*, vol. ii.; Texier and Pullan, *Byzantine Architecture* (1864); Tozer, *Highlands of Turkey*, 1869.

SALOP. See SHROPSHIRE.

SALSETTE, a large island to the north of Bombay, with an area of 241 square miles. It lies between 19° 2′ 30″ and 19° 18′ 30″ N. lat. and between 72° 51′ 30″ and 73° 3′ E. long.; it is connected with Bombay Island by bridge and causeway. Salsette is a beautiful, picturesque, and well-wooded tract, its surface being well diversified by hills and mountains, some of considerable elevation, while it is rich in rice fields. In various parts of the island are romantic views, embellished by the ruins of Portuguese churches, convents and villas; its cave antiquities still form a subject of interest.

At the census of 1881 Salsette had a population of 108,149 (males 58,540, females 49,609); Hindus numbered 74,736 and Mohammedans 7036. The island was taken from the Portuguese by the Mahrattas in 1739, and from them the British captured it in 1774; it was formally annexed to the East India Company's dominions in 1782 by the treaty of Salbai.

SALT. Common salt, or simply salt, is the name given to the native and industrial forms of sodium chloride (NaCl). The consideration of this important substance naturally falls under two heads, relating respectively to sea salt or "bay" salt and "rock" salt or mineral salt. As actually found, however, the one is probably derived from the other, most rock salt deposits bearing evidence of having been formed by the evaporation of lakes or seas at former (often remote) geological periods. This is seen from their stratified nature, with their interposed beds of clay, which could only have been deposited from solution. The crystals of selenite (hydrated calcium sulphate), moreover, which they contain can only have been formed in water and can never since have been subjected to any considerable amount of heat, otherwise their water of crystallization would have been driven off. The beds also of potassium and magnesium salts found at Stassfurt and other places, interposed between or overlying the rock salt deposits, are in just the position in which one would naturally expect to find them if deposited from salt water. Finally, the marine shells often occurring abundantly in the surrounding rocks of contemporary periods also testify to the former existence of large neighboring masses of salt water.

Sea Salt.—Assuming a degree of concentration such that each gallon of sea water contains 0.2547 lb of salt, and allowing an average density of 2.24 for rock salt, it has been computed that the entire ocean if dried up would yield no less than 4,419,360 cubic miles of rock salt, or about fourteen and a half times the bulk of the entire continent of Europe above high-water mark, mountain masses and all. The proportion of sodium chloride in the water of the ocean, where it is mixed with small quantities of other salts, is on the average about 33.3 per 1000 parts, ranging from 29 per 1000 for the polar seas to 35.5 per 1000 or more at the equator. Enclosed seas, such as the Mediterranean, the Red Sea, the Black Sea, the Dead Sea, the Caspian, and others, are dependent of course for the proportion and quality of their saline matter on local circumstances. Forchhammer found the following quantities of solid matter in the water of various seas:

North Sea	32.80	grammes per litre.
Cattegat and Sound	15.12	"
Baltic	4.81	"
Mediterranean	37.50	"
Atlantic	34.30	"
Black Sea	15.89	"
Caribbean Sea	36.10	"

Of this sodium chloride constitutes about four-fifths. See SEA WATER.

At one time almost the whole of the salt in commerce was produced from the evaportion of sea water, and indeed salt so made still forms a staple commodity in many countries possessing a seaboard, especially those where the climate is dry and the summer of long duration. In Portugal a total of over 250,000 tons is annually made in the salt works of St. Ubes (Setubal), Alcacer do Sal, Oporto, Aneyro, and Figueras. Spain, with the salt works of the Bay of Cadiz, the Balearic Islands, etc., makes 300,000 tons. Italy has salt works in Sicily, Naples, Tuscany, and Sardinia, producing 165,000 tons. In France, between the "marais salants du midi" and those on the Atlantic, 250,000 to 300,000 tons are annually produced, besides those of Corsica. The "Salzgärten" of Austria produce collectively from 70,000 to 100,000 tons anuually at various places on the Adriatic (Sabioncello, Trieste, Pirano, Capo d'Istria, etc.). In England and Scotland the industry has of late years greatly fallen off under the competition of the rock-salt works of Cheshire, but some small manufactories still exist, at North Shields and elsewhere, where salt is made by dissolving rock-salt in sea water, and evaporating the solution to crystallization by artificial heat.

The process of the spontaneous evaporation of sea water has been very carefully studied by Usiglio on Mediterranean water at Cette. The density at first was 1.02. Primarily but a slight deposit is formed (none until the concentration arrives at specific gravity 1.0509), this deposit consisting for the most part of calcic carbonate and ferric oxide. This goes on till a density of 1.1315 is attained, when hydrated calcium sulphate begins to deposit, and continues till specific gravity 1.2646 is reached. At a density of 1.218 the volume of the sea water has become reduced to $\frac{83}{1000}$ths of what it was at first, and from this moment the deposit becomes augmented by sodium chloride, which goes down mixed with a little magnesium chloride and sulphate. At specific gravity 1.2461 a little sodium bromide has begun also to deposit. At specific gravity 1.311 the volume of the water is only $\frac{16}{1000}$ths of what it was at first, and it is thus composed:

Magnesium sulphate	11.45 per cent.
Magnesium chloride	19.53 "
Sodium chloride	15.98 "
Sodium bromide	2.04 "
Potassium chloride	3.30 "

Up to the time then that the water became concentrated to specific gravity 1.218 only 0.150 of deposit had formed, and that chiefly composed of lime and iron, but between specific gravity 1.218 and 1.313 there is deposited a mixture of

Calcium sulphate	0.0283 per cent.
Magnesium sulpbate	0.0624 "
Magnesium chloride	0.0153 "
Sodium chloride	2.7107 "
Sodium bromide	0.0222 "
	2.8389 "

And of this we see that about 95 per cent. is sodium chloride. Up to this point the separation of the salts has taken place in a fairly regular manner, but now the temperature begins to exert an influence, and some of the salts deposited in the cold of the night dissolve again partially in the heat of the day. By night the liquor gives nearly pure magnesium sulphate; in the day the same sulphate mixed with sodium and potassium chlorides is deposited. The mother-liquor now falls a little in density to a specific gravity of 1.3082 to 1.2965, and yields a very mixed deposit of magnesium bromide and chloride, potassium chloride, and magnesium sulphate, with the double magnesium and potassium sulphate, corresponding to the kainite of Stassfurt. There is also deposited a double magnesium and potassium chloride, similar to the carnallite of Stassfurt, and finally the mother-liquor, which has now again risen to specific gravity 1.3374, contains only pure magnesium chloride.

The application of these results to the production of salt from sea water is obvious. A large piece of land, varying from one or two to several acres, barely above high-water mark, is levelled, and if necessary puddled with clay so as to prevent the water from percolating and sinking away. In tidal seas a "jas" (as the storage reservoir is called) is constructed alongside, similarly rendered impervious, in which the water is stored and allowed to settle and concentrate to a certain extent. In non-tidal seas this storage basin is not required. The prepared land is partitioned off into large basins (*adernes* or *muants*) and others (called in France *aires, œuillets,* or *tables salantes*) which get smaller and more shallow in proportion as they are intended to receive the water as it becomes more and more concentrated, just sufficient fall being allowed from one set of basins to the other to cause the water to flow slowly through them. The flow is often assisted by pumping. The sea salt thus made is collected into small heaps on the paths around the basins or the floors of the basins themselves, and here it undergoes a first partial purification, the more deliquescent salts (especially the magnesium chloride) being allowed to drain away. From these heaps it is collected into larger ones, where it drains further, and becomes more purified. Here it is protected by thatch till required for sale.

The salt is collected from the surface by means of a sort of wooden scoop or scraper which the workman pushes before him, but in spite of every precaution some of the soil on which it is produced is inevitably taken up with it, communicating a red or gray tint. Sea salt is thence known in many of the French markets as *sel gris*, and frequently contains as much as 15 per cent. of impurity. Yet such is the ignorance and prejudice of many people that they will buy it in preference to the purer article from the evaporation of rock-salt brine, asserting its action to be milder and more even. Even if this were true they forget that mud ought to be cheaper than salt. The salt made on the coast of Brittany possesses the following composition:

Sodium chloride	87.97 per cent.
Magnesium chloride	1.58 "
Magnesium sulphate	0.50 "
Calcium sulphate	1.65 "
Insoluble	0.80 "
Water	7.50 "

Generally speaking this salt goes into commerce just as it is, but in some cases it is taken first to the refinery, where it either is simply washed and then stove-dried before being sent out or is dissolved in fresh water and then boiled down and crystallized like white salt from rock-salt brine. The salt of the "salines du midi" of the southeast of France is far purer than the above, however, its composition being as follows:

Sodium chloride	95.11 per cent.
Magnesium chloride	0.23 "
Magnesium sulphate	1.30 "
Calcium sulphate	0.91 "
Insoluble	0.10 "
Water	2.35 "

This is perhaps partly owing to the fact that of late years, by way of obviating the above-mentioned cause of impurity, a species of moss has been introduced there with some success from Portugal and forms a bed on which the salt is deposited. The mother-liquors from the crystallization of the common salt contain still a little sodium chloride and most of the bromine and iodine of the sea water, all the potassium salts, much magnesium sulphate, and a large quantity of magnesium chloride. They are often thrown away as useless, but lately, in the south of France, in the "salines du midi," they have been used for the production of certain chemicals by a system of ulterior treatment introduced by M. Merle and still continued by his successor M. Pechinet.

As soon as the water arrives at specific gravity 1.2407 and has deposited most of its salt, it is drawn off and stored in large tanks of 50,000 [1,765,800 cubic feet] or 60,000 [2,118,960 cubic feet] cubic metres capacity. From these it is withdrawn in successive portions, and artificially cooled to 0.4° Fahr. Under these circumstances, indeed at any temperature below 26° Fahr., a double decomposition takes place between the sodium chloride and the magnesium sulphate—crystallized sodium sulphate being thus separated. After being withdrawn and freed from the mother-liquor by a hydro-extractor, this sulphate, which contains two atoms of water, is then rendered anhydrous by heating in a reverberatory furnace. From the refrigerating vessel the water now passes to an ordinary evaporating pan, where the remaining salt is precipitated by boiling, collected, and purified by the hydro-extractor. Here the water attains a specific gravity 1.2680, and, being spread out in a thin layer

FIG. 1.—Plan of Austrian Salzgarten.

on a smooth level bed of cement or concrete, deposits on cooling all its potassium as the double chloride of potassium and magnesium, the same as the carnallite of Stassfurt.

Fig. 1 represents the usual form of an Austrian "Salzgarten" at Capo d'Istria. It is a parallelogram of 2 to 3 acres in extent surrounded by a dyke or sea-wall *a*. The sea water enters by the sluice *b*, and passes into the wide fosse *c*, where, clarifying by settlement, it passes by the openings *f* into a sextuple series of large basins divided by the separations *d*, first of all entering the largest ones *g*, *h*, *i*, and then passing by the canals *n* into the other basins *k*, *k*, *l*, *l*. The flow of the water from one set of basins to the other is regulated by the sluices *e*, *e*, *e*. As it passes from one set of basins to another it becomes more and more concentrated, till at last in the basins *m*, *m* the salt deposits. The mother-liquor or "bittern" is then run off into *p*, and thence into the sea. In France it is often stored as already stated for future treatment. In case of heavy rain, the already concentrated water is run into the covered cisterns *s*, *s*, which serve to hold it till the return of fine weather.

TABLE I.—*Percentage Analyses of Sea Salts from Well-known Localities.*

Locality	St. Ubes.						St. Martin.	Marais Salants de l'Ouest.	Island of Oléron.	Salines du Midi.	Cadiz.	S. Felice Trapani.	
Authority	Henry.	Berthier.		Karsten.			Henry.	Enquête sur les sels.	Henry.	Enquête sur les sels.	Watts.	Schrötter and Pohl.	
Sodium chloride	96.00	95.19	89.19	95.86	92.46	96.50	95.95	87.97	96.40	95.11	92.11	95.91	96.05
Magnesium chloride	0.30	...	...	0.24	0.55	0.32	0.35	1.58	0.20	0.23	...	0.46	0.50
Magnesium sulphate	0.45	1.69	6.20	0.35	0.66	0.25	0.60	0.50	0.45	1.30	0.99	0.40	0.51
Sodium sulphate	...	...	...	...	...	...	...	...	...	...	...	...	...
Calcium sulphate	2.35	0.56	0.81	1.30	2.28	0.88	1.90	1.65	1.95	0.91	0.33	0.49	0.45
Water	...	...	0.20	2.10	3.10	1.95	...	7.50	...	2.35	6.30	2.58	2.42
Insoluble matters	0.90	2.45	3.60	0.15	0.95	0.10	1.20	0.80	1.60	0.10	0.27	0.16	0.07
Loss	...	0.11	...	...	...	...	...	...	...	...	...	...	...

Rock Salt.—This appears to occur in almost every formation, except in the Primary rocks, strictly so called. The oldest deposit of which the age may be considered to have been anything like precisely determined may be said to be the great salt range of the Punjab, which is regarded as belonging to the Permian; and that lately discovered at Middlesborough in Yorkshire, immediately overlying the magnesian limestone, may be probably referred to the same period. In the northern counties of England there are frequent instances of brine springs rising from the Carboniferous and contiguous formations. The Cheshire and Worcestershire salt-beds are by some attributed to the Permian; more generally, however, they are referred to the Trias. Those of West New York and Goderich (Canada) are said to belong to the Salina period of the Upper Silurian. The deposits of the Vosges, Salzburg, and others of central Germany and Austria are considered to belong to the Trias; that of Bex in Switzerland to the Lias. Those of Wieliczka in Poland, Cardona in Spain, and some Algerian formations are admitted to be Cretaceous. Those of Bayonne, Dax, and Camarade, in the Pyrenees, are probably Tertiary, while the Dead Sea, Lake Elton in Astrakhan, the Bitter Lakes of the Isthmus of Suez, the Kara Boghaz on the shores of the Caspian, the Limans of Bessarabia south of Odessa, the Runn of Cutch, and certain formations of the Sea of Azoff, etc., are instances of salt formations now in actual progress. The frequent association of bitumen and petroleum with rock salt and brine is one of the most noticeable features in the geology of those substances, and seems to point to some unknown condition of the formation of the two first named. The Dax salt is close to the bitumen deposits of Bastenès and Gaujac. Borings made at Dax, as well as at Salies about 20 miles distant (where also salt exists), gave vent to an efflux of inflammable gas which continued for several weeks, and the water of several springs in that neighborhood is tainted with petroleum. Bitumen and petroleum occur near Volterra in Tuscany, where a large deposit of salt is being worked. In Walachia the two occur in the same formation. In the United States of America and in the south of Russia petroleum and brine are found in many places either actually associated or in near proximity; petroleum has recently been discovered not far from the salt deposits of Hanover, and one of the beds of rock salt at Nancy is strongly colored by bitumen, while almost all rock-salt has a more or less perceptible bituminous odor when struck or rubbed. In the province of Szechuen, China, are some remarkable salt springs, where the brine is accompanied by such an efflux of inflammable gas that the latter serves as fuel for its evaporation; and other springs accompanied by the same phenomenon exist in the same region. In fact, instances without end might be cited of the two occurring together, and it would appear that petroleum for some mysterious reason can only be formed in presence of salt.

The chief rock-salt districts of Europe may be classified as follows: (1) the Carpathians; (2) Austrian and Bavarian Alps; (3) West Germany; (4) Vosges; (5) Jura; (6) Swiss Alps; (7) Pyrenees and the Spanish or Celtiberian Mountains; (8) the British salt deposits; (9) isolated deposits and springs in Russia, Turkey, Italy, etc.

The Carpathian district may be subdivided into the Moldo-Walachian, Transylvanian, Galician, and Hungarian sections. They form probably the richest and most extensive of the European salt fields and by them alone the entire continent might be supplied for ages. The Transylvanian and Walachian mines are specially numerous and rich. Thousands of tons of salt, in the form of brine from the springs which are common throughout the country, are allowed to run to waste, no important factory existing in the country for its evaporation. The rock is in fact in itself so pure that simply ground it meets all requirements of public consumption. In Galicia the principal mines and those of most historical interest are at Wieliczka and Bochnia. The former, which is justly the most celebrated in the world, is situated 9 miles from Cracow and has been worked continuously for six hundred years. The mass of salt is calculated to be 500 miles long, 20 miles broad, and 1200 feet thick. It is on the northwest side of a ridge of hills, an offset of the Carpathians. The salt is stoped out in longitudinal and transverse galleries, and large vaulted chambers, supported by massive pillars. Explosives are not used in this or any of the other mines of the district. The salt is sold just as it comes from the mine, or else finely ground and packed in casks or sacks. The mine is divided into four levels, and is 284 yards deep and 1 mile 1279 yards long by 830 yards wide. All the grinding and packing is done within it. It is stated that the collective length of the galleries and chambers is no less than 30 English miles and the total yield 55,067 tons per annum. These mines employ from eight hundred to one thousand persons, many of whom live permanently under ground; the lower levels contain streets and houses and constitute a complete village. Travellers have given glowing descriptions of the crystal vaults, sparkling aisles, and fairy palaces of this mine. The salt is grayish, and somewhat resembles granite in appearance.

In the well-known district of the Austrian and Bavarian Alps the mine of Salzburg (Salzkammergut) is perhaps the most familiar. The Austrian portion of the district includes the towns of Aussee, Ischl, Hallstadt, and Hallein, and the Bavarian includes Berchtesgaden, Reichenhall,

Traunstein, and Rosenheim. In the last-named salt is made from brine conveyed in pipes from Berchtesgaden, passing by Reichenhall, 15 miles in all, with a total fall of 1552 feet. There are also large salt works at Hall near Innsbruck. Here, as in the Carpathian region, most of the rock salt is sold merely ground, or in lumps, and the trade is, as in other parts of Austria-Hungary, a strict Government monopoly, producing an annual revenue of two and a quarter to two and a half millions sterling.

The German mines are numerous; they extend north and south from Segeberg in Holstein to Sulz on the Neckar, and east and west from Kreuznach to Halle. Brine springs and small workings lie scattered all over the country. But two formations of special importance are Stassfurt in Saxony and the Lüneburg Heath in Hanover. Fig. 2 represents a section of the Stassfurt beds, and will give an idea of their formation. It appears less than most others to have been subjected to denudation since being formed, and consequently better than many others illustrates the formation

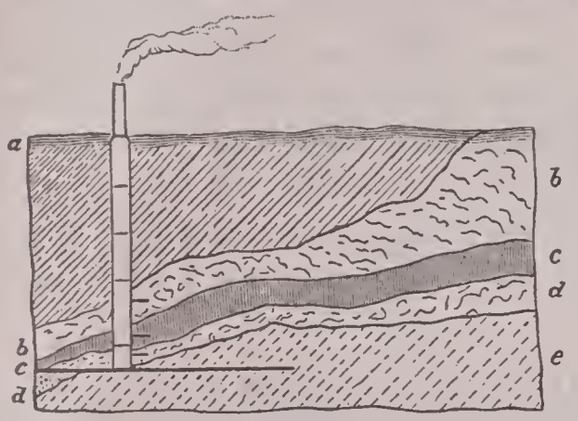


Fig. 2.—Section of Stassfurt Salt Beds.

of such deposits. Overlying the salt properly so called (*e*) is a thin band of anhydrite, and above this *b*, *c*, *d*, beds of variously-colored clay, red and gray, containing highly deliquescent salts, forming three distinct layers. The lowest, *d*, called "polyhalite," contains some sodium chloride and with it other deliquescent chlorides. Next to this comes *c*, the "kieserite" region, about 30½ yards thick—here are chiefly potassium and magnesium sulphates; and lastly we have *b*, the upper layer or "carnallite" region, 23 yards thick, containing almost exclusively the double potassium and magnesium chlorides, together with other deliquescent salts, nodules of boracite, etc. It has been computed that a sea depth of 12½ miles would be required for the production of such a series as this.

The Vosges, which is a very important district, supplied a large part of the east of France with salt, till lost by the war of 1870–1871, since which time Nancy has gained considerably in importance. Geologically speaking, Nancy is included in this basin.

In Switzerland the chief salt district lies on the right bank of the Rhone, near the Lake of Geneva. The principal centres are Aigle, Roche, and Bex, the last being the most important.

The Pyrenees are rich on both sides in brine springs and rock-salt formations. In the southwest of France we have the rock salt of Dax and Villefranche, and the brine springs of Salies and Briscous, as well as that of Camarade. In Spain both rock salt and brine are plentiful, as is indicated by the frequent recurrence of the syllable "Sal" in the names of towns (Salinas, Salinillas, Poza de la Sal, etc.).

The Celtiberian or exclusively Spanish district includes various towns scattered over Spain—Salinas de Saelices (Guadalajara), Villafáfila (Zamora), Torreximeno, Cazorla, and Hinojares (Jaen), etc.; but perhaps the most remarkable deposit of salt in Spain is that of Cardona in the province of Barcelona, 45 miles northwest of that city. Here is a veritable mountain composed of a bed of remarkably pure salt 142 to 164 yards thick, and forming two masses, each about a mile in circumference. The salt is as usual stratified, and bears very strong evidence of denudation. It is chiefly pure white, but in parts varies from light-blue to brick-red. It is extracted by an open-air working like stone from a quarry.

There are some brine and rock-salt deposits which can hardly be classified as belonging to any particular district. Such are—in France, at the foot of the Alps, the brine springs of Moutiers and Castellane; in Italy, Volterra; in Sicily, Nicosia and Mussomeli; in Croatia, Szambor; in Bosnia, Tusia; in Russia, Bachmutz on the Donetz, Balachna on the Volga, Staraya-Russa near Lake Ilmen, Eupatoria and other places in the Crimea; in Prussia, Waltersdorff, Sperenberg, etc.

The chief centres of manufacture in England are at Northwich, Middlewich, Winsford, and Saudbach in Cheshire, Weston-on-Trent in Staffordshire, Stoke Prior and Droitwich in Worcestershire, and Middlesborough in Yorkshire.[1] Duncrue near Carrickfergus in Ireland also possesses a large deposit of salt. The Cheshire and Worcestershire salt deposits are up to the present time by far the most important, the Duncrue deposit being only partially worked. Although brine springs have been known to exist in both these counties ever since the Roman occupation, and salt had been made there from time immemorial, it was not till 1670 that rock salt about 30 yards thick was discovered at Marbury near Northwich by some men exploring for coal, at a depth of 34 yards. In 1779 three beds of rock salt were discovered at Lawton, separated from one another by layers of indurated clay. The Marston mine, the property of Messrs. Rigby and Fletcher of Northwich, is the largest and perhaps the oldest (there are twenty-five in England altogether where rock salt is raised). It was worked for about a hundred years in only its upper bed, but in 1781 its owners decided on sinking farther, and, after traversing a layer of indurated clay intersected with small veins of salt 10½ yards thick, they came on another of rock salt. This—the bed which has continued to be worked ever since—is 33 to 37 yards thick. Beneath it are others, but they are thin and impure. The total depth of the mine to the bottom of the lower level is 120 yards. At Winsford, where the same formation seems to occur, it is 159 yards from the surface. The Marston mine covers an area of about 40 acres. The salt is first reached at 35–40 yards in the Northwich district, and the upper layer is 25–50 yards in thickness (Marston 23–26 yards); it has above it, apparently lying in the recesses of its surface, a layer of saturated brine. This is the brine which is raised at the various pumping stations in Northwich and elsewhere around, and which serves when evaporated to produce white salt. The beds are reached by sinking through the clays and variegated marls typical of this formation. The salt is blasted out with gunpowder. The Middlesborough deposit bids fair soon to become of very great importance. It was discovered by Messrs. Bolckow and Vaughan in boring for water in 1862 at a depth of 400 yards, but was not utilized, and was again found by Messrs. Bell Bros. at Port Clarence at a depth of 376 yards, and is being now worked by them, the heat used for evaporation being the waste gases of their blast furnaces. Encouraged by their success the Newcastle Chemical Company have also bored on the opposite side of the river. They failed at first to find the salt, but ultimately succeeded by a fresh boring. The extent of the bed is not yet ascertained, but evidently by the failure of the Newcastle Chemical Company at first it cannot extend far to the north. Its thickness has been proved in so far as the spot where Messrs. Bell Bros. made their boring is concerned. These gentlemen have introduced the method employed at Nancy of raising the salt in the form of brine without the trouble or expense of sinking a shaft. In Cheshire the surface-water trickling through the overlaying strata dissolves the salt, which is subsequently pumped as brine, but here the great depth and impermeability of the strata precludes this, so another method has been resorted to. A bore is made into the salt, and lined with tubing in the usual manner, and this tube where it traverses the salt is pierced with holes. Within this is hung loosely a second tube of much smaller dimensions so as to leave an annular space between the two. Through this space the fresh surface-water finds its way, and dissolving the salt below rises in the inner tube as brine, but only to such a level that the two columns bear to one another the relation of ten to twelve, this being the inverse ratio of the respective weights of saturated brine and fresh water. For the remaining distance the brine is raised by a pump. At first, while the cavity remains small, there is some difficulty in getting a continuous supply of brine of full strength, but this ceases to be the case as the solution chamber (as it is called) becomes enlarged. The fresh water, however, as it descends rises to the surface of the salt, tending rather to dissolve its upper layers and extend superficially, so that after a time the superincumbent soil, being without support, falls in. These interior landslips, besides choking the pipes and breaking the communication, often produce sinkings at the surface, such as occurred some time ago at Dieuze (Lorraine). The same inconvenience is beginning

[1] The termination "wich" in English place-names often points to ancient salt manufacture,—the word "wich" (creek, bay; Icel. *vik*) having acquired a special sense in English usage. In Germany the various forms of the non-Teutonic words Hall, Halle, occurring in place-names point in the same way to ancient salt-works.

to make itself felt in the environs of Nancy, and a similar one produces on a larger scale the sinking and subsidences at Winsford and Northwich so much complained of. The deposits of salt in the United States are unimportant. The country possesses no really considerable salt industry, but is supplied so far as interior consumption is concerned to a small extent by brine springs. The principal supplies, however, are derived from England and the shores of Spain and Portugal. The same remark applies to Canada. South America possesses several salt deposits and brine springs, but also takes all its supplies from Europe. Asiatic Russia is very abundantly supplied with salt, as likewise is China; and Persia is perhaps one of the countries most abundantly endowed with this natural and useful product. British India cannot be said to be similarly favored. In the north, it is true, is the great salt range of the Punjab, as well as the Sambhur Lake, and salt is obtained from sea water at many places along its extensive seaboard; but India is not well supplied in many parts, and is dependent largely for this article on the Cheshire salt works. In fact this export is one of the most important branches of their trade.

Table II. is from Spon's *Encyclopædia of the Industrial Arts*, etc. The clay and insoluble matters given for the Stassfurt salt seem to be somewhat abnormally large.

Rock salt is probably the origin of more than half the salt manufactured in the world. It occurs in all degrees of purity, from that of mere salty clay to that of the most transparent crystals. In the former case it is often difficult to obtain the brine at a density even approaching saturation, and, as at Moutiers in Savoy and in several of the German salt works, chambers and galleries are excavated within the saliferous bed to increase the dissolving surface, and water let down fresh is pumped up as brine. Many brine springs also occur in a more or less saturated condition. In such cases the water is sometimes caused to trickle over fagots arranged under large open sheds called "graduation houses" (*Gradirhäuser*), whereby a more extensive surface of evaporation is obtained, and the "graduation houses" is dying out, except in particular localities where competition from sea salt or purer rock salt is difficult, as both their construction and their maintenance are expensive. The purer rock salt is often simply ground for use, as we have seen to be the case at Wieliczka and elsewhere, but it is more frequently pumped as brine, produced either by artificial solution as at Middlesborough and other places, or by natural means as in Cheshire and Worcestershire. One great drawback to the use of even the purest rock salt simply ground is its tendency to revert to a hard unwieldy mass, when kept any length of time in sacks. This is partly but not wholly obviated by packing in casks, which, however are dear and not always obtainable. As usually made, white salt from rock salt may be

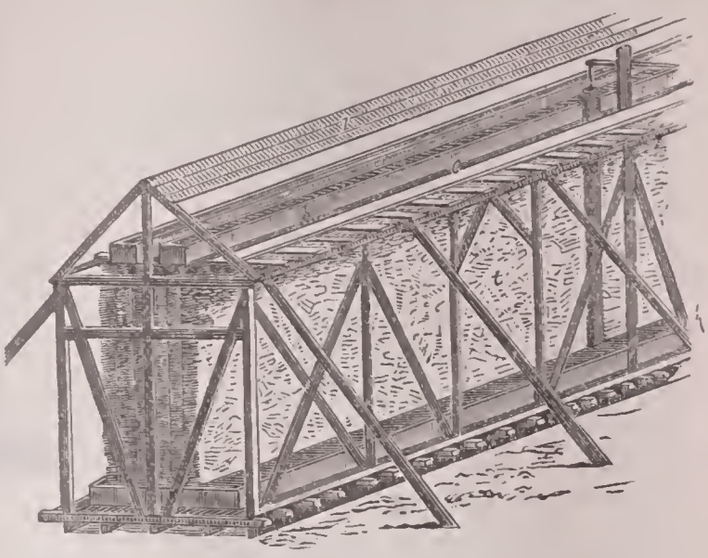


FIG. 3.—Gradirhaus.

TABLE II.—*Percentage Composition of Rock-Salt from Well-known Localities.*

Country	Germany.								France.	Austria.		England.	
Locality	Schwäbisch-Hall, Würtemburg.		Berchtesgaden, Bavaria.	Stassfurt, near Magdeburg.	Château Salins, Lorraine.	Vic, Lorraine.			Dax.	Hall.	Wieliczka, Galicia.	White Salt from Rock Salt, Cheshire.	Marston Mine, Northwich.
Authority	Fehling.		Bischof.	Rammelsberg.	Mathieu de Dombasle.	Berthier.		Cordier.	Maxwell-Lyte.	Bischof.	Bischof.	Richardson and Watts.	Crace Calvert.
Sodium chloride	99.97	98.81	99.85	94.57	97.05	99.30	97.80	97.45	96.97	99.43	100.00	98.30	96.70
Calcium chloride	...	0.02	trace	...	...	...	...	...	...	0.25	...	...	0.68
Magnesium chloride	...	trace	0.15	0.97	0.45	...	...	...	0.51	0.12	...	0.05	trace
Potassium chloride	...	...	...	...	...	...	...	...	trace	...	...	...	trace
Calcium sulphate	0.02	0.11	...	0.89	1.50	0.50	0.30	0.25	0.23	0.20	...	1.65	0.25
Magnesium sulphate	...	...	...	...	trace	. .	...	2.30	...	...	...	...	...
Magnesium carbonate	...	0.15	...	...	...	...	...	...	...	...	...	...	...
Calcium carbonate	...	0.16	...	...	...	...	...	...	...	...	...	...	...
Ferric chloride	...	...	...	...	...	...	...	...	0.01	...	...	...	...
Clay or insoluble matters	0.01	0.80	...	3.35	...	0.20	1.90	...	2.28	...	...	...	1.74
Water or loss	...	...	...	0.22	1.00	...	...	...	...	...	...	...	0.63

the brine becomes rapidly concentrated. Fig. 3 shows one of these "Gradirhäuser." It consists of a long shed, the floor of which is a shallow cistern kept filled with the brine to be concentrated, the body of the house being occupied by a single or double row of fagots of blackthorn *t*, and above these a trough or troughs *b*, into which the brine is pumped; escaping from these into the channel *c*, it is allowed to flow or drip slowly over the fagots, and finds its way back to the basin beneath. The shed has its sides open and exposed to the prevailing winds, and the brine, being thus spread over a large surface, there is much scope for evaporation, and it becomes rapidly concentrated. Several such sheds are often built in series, and the brine, being conveyed from one to the other as it becomes denser, attains at last a specific gravity of about 1.18, when it is stored in large cisterns till required for evaporation. This is done in large iron pans by the method to be hereafter described when speaking of rock-salt brine. The use, however, of classified into two groups:—(1) boiled: known as fine, table, lump, stoved lump, superfine, basket, butter, and cheese salt (Fr. *sel fin-fin, sel à la minute*, etc.); (2) unboiled: common, chemical, fishery, Scotch fishery, extra fishery, double extra fishery, and bay salt (Fr. *sel de* 12, 24, 48, 60, 72 *heures*). All these names are derived from the size and appearance of the crystals, their uses, and the modes of their production. The boiled salts, the crystals of which are small, are formed in a medium constantly agitated by boiling. The fine or stoved table salts are those white masses with which we are all familiar. Basket salt takes its name from the conical baskets from which it is allowed to drain when first it is "drawn" from the pan. Butter and cheese salts are not stove-dried, but left in their more or less moist condition, as being thus more easily applied to their respective uses. Of the unboiled salts the first two, corresponding to the Fr. *sel de* 12 *heures* and *sel de* 24 *heures*, show by their English names the uses to which they are applied, and the

others, the applications of which are equally shown by their names, merely depend for their quality on the length of time which elapses between successive "drawings," and the temperature of the evaporation. The time varies for the unboiled salts from twelve hours to three or four weeks, the larger crystals being allowed a longer time to form, and the smaller ones being formed more quickly. The temperature varies from 55° to 180° Fahr.

One striking difference between the manufacture of salt from rock-salt brine as carried on in Britain and on the Continent lies in the almost exclusive use in the latter case of closed or covered pans, except in the making of fine salt, whereas in Britain open ones are employed. With open pans the vapor is free to diffuse itself into the surrounding atmosphere, and the evaporation is perhaps more rapid. When covered pans are used, the loss of heat by radiation is less, and the salt made is also cleaner. In works published in France and Germany the statement is frequently made that it would be impossible to sell there a grain of salt manufactured by English methods, but one is fairly justified in doubting this assertion, seeing the ease with which the public are induced to purchase the *sel gris* of the marais salants. In fact, it is customary in some places to make a special article, which is sold in competition with sea salt, by mixing with the purer one 10 or 12 per cent. of mud or earth. The most advantageous mode of evaporation would evidently be to cause the heated gases from the furnace to pass over the surface of the liquid itself. No wearing-out of the pans need thus be feared, no lowering of the conductive power by incrustation, but the vapor as fast as formed would diffuse itself into heated air in rapid motion, this air being far from its point of saturation and greedy of moisture. The plan, however, which was tried in Britain by Otto Pohl and in Germany by Born has hitherto been a failure, the salt being for one thing very much soiled with the soot and other products of combustion. Again, this mode of evaporation hardly consorts with the slow progress and perfect stillness required for the production of the larger-grained salts, and gives only fine salt.

Figs. 4 and 5 represent a French pan, while Fig. 6 is a British pan, only differing from the Continental ones in not being covered in, and in usually having three or four fires

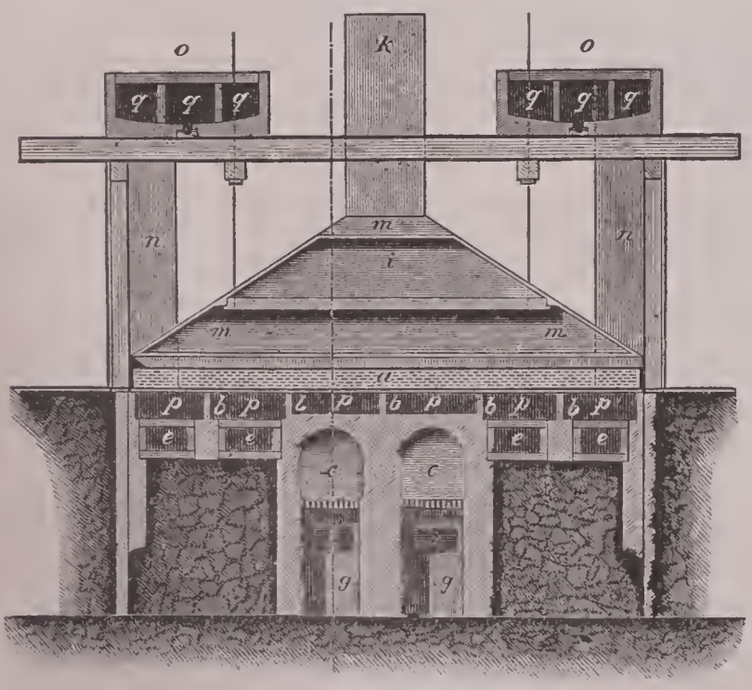


Fig. 4.—Drawing in transverse section of a Fishery Salt Pan, with all the latest improvements, as used in France.

in place of two or three, and a separate chamber beyond the pan in which the salt is stoved, heated by the flues conveying the furnace gases to the chimney after leaving the pan. The first two represent a pan of 64 feet long by 21½ feet wide filled with brine, etc., and with circulating flues beneath for economy of heat. This pan, *a*, is supported all round its lower edges on a wall and on the pillars *b*, *b*, and heated by two fires *c*, *c*. The flame and the heated gases of each fire circulate in the flues *p*, *p*, *p*, in which are holes at various convenient points for cleaning; thus then these gases are made to traverse the length of the pan three times before arriving at the chimneys *n*, *n* or the drying floors *o*, *o*. The channels *e*, *e* beneath the flues (Fig. 5) serve to warm the air which feeds the fires, and, entering at the further end of the pan, traverses them and issues warm into the ash pit *g*, which is of course otherwise closed by the door *h*. The

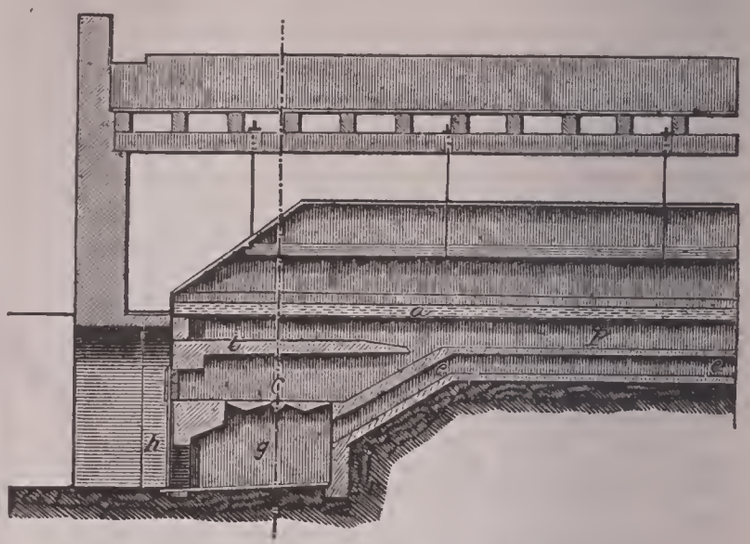


Fig. 5.—The same in longitudinal section.

steam, collecting beneath the cover *m*, of which the upper portion *i* is attached to the timbers of the roof, issues by the chimney *k*, while below a series of shutters allow access for the various manipulations.

The two drying floors *o*, *o*, are each heated by three flues *q*, *q*, *q*, continuations of those below the pan, within which circulate the heated gases on their way to the main chimney, and on this floor is spread the salt to be dried. The floor of a pan is generally at first slightly arched towards the centre, so that when new a pan is rather deeper at the sides than in the middle, but they soon flatten out and warp in all directions on being fired. This warping is a great inconvenience, opening communications between the flues and interfering sadly with the arrangements of these latter just described, so much so that some makers prefer simple iron or brick supports placed here and there, without any definite arrangement. On the Continent the pan is often suspended by iron rods from the beams of the roof. The warping or buckling, the scaling, and the

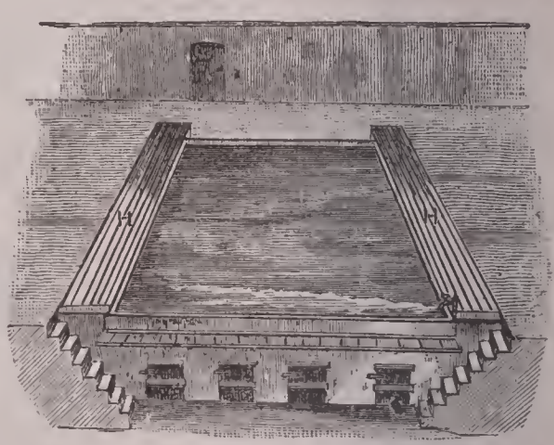


Fig. 6.—British Salt Pan. H, H, hurdles into which the salt is drawn.

formation of "cats," as the workmen call the sort of stalactites of salt which form in the flues, arising from leaks in the pan, are perhaps among the worst annoyances of the saltmakers. The pans are of ordinary boiler plates riveted together. The plates vary in size, but usually are 2 feet by 4 feet, and rather smaller over the fire. The grate, which should be such as to produce a moderate and diffused heat, is of the ordinary kind, and the firing is usually done from a pit below the end of the pan. In England they use "slack" sometimes called "burgey"; abroad they use all kinds of fuel—wood, coal, lignite, and turf; and they also in many places are in the habit of protecting the pan from the more intense heat immediately over the fire *c* by a guard *t* at that particular part. As a means of producing a diffused and gentle heat without smoke, water gas will probably come to be used by and by. On the Continent the flues are often 2 or 2¼ feet high, and in Britain they are usually half that height. As, however, a slow and regular draught is to be aimed at, on the principle enun-

ciated by Mr. Fredk. Siemens, the Continental plan seems the more rational. Space does not here admit of a description of the so-called machine paus—the clay pans of the Cheshire Amalgamated Salt Company or Otto Pohl's system.[1]

In Britain the briue is so pure that, keepiug a small stream of it running into the pan to replace the losses by evaporation and the removal of the salt, it is only uecessary occasionally (not often) to reject the mother-liquor when at last it becomes too impure with magnesium chloride; but in some of the works on the Continent, especially those of North Germany, the mother-liquor not only coutains more of this impurity but becomes quite brown from organic matter on concentratiou, and totally unfit for further service after yielding but two or three crops of salt crystals. Sometimes, to get rid of these impurities, the brine is treated in a large tub (*bessoir*) with lime; on settliug it becomes clear and colorless, but the dissolved limc forms a skin on its surface iu the pan, retards the evaporation, and impedes the crystallization. At times sodium sulphate is added to the brine, producing sodium chloride and magnesium sulphate by double decompositiou with the maguesium chloride. A slight degree of acidity seems more favorable to the crystallization of salt than alkalinity; thus it is a practice to add a certain amount of alum, 2 to 12 lb per pan of brine, especially wheu, as in fishery salt, fine crystals are required. The salt is "drawu" from the pan and placed (in the case of boiled salts) iu small conical baskets hung round the pan to drain, and theuce moulded iu square boxes, and afterwards stove-dried, or (in case of unboiled salts) "drawn" in a heap on to the "hurdles," ou which it drains, and thence is carried to the store.

In most Contineutal countries a heavy tax is laid on salt; and the coarser as well as the finer crystals are therefore often dried so as uot to pay duty on more water than can be helped.

The brine used in the salt manufacture in England is very nearly saturated, containing 25 or 26 per cent. of sodium chloride, the utmost water can take up being 27 per cent.; and it ranges from 38 to 42 ounces of salt per gallon. In some other countries, as has been explained, the brine has to be concentrated before usc, and every ounce per gallon by which the brine is below saturatiou indicates a difference of cost in the production from it of salt of about 4¾d. to 4½d. per ton. Subjoined are four analyses of brine taken from Messrs. Richardson and Watt's *Chemistry applied to the Arts and Manufactures:*

Constituents in 100 Parts Brine.	Cheshire.		Worcestershire.	
	Marston.	Wheelock.	Droitwich.	Stoke.
Chloride of sodium	25.322	25.333	22.452	25.492
Chloride of potassium	...	...	...	...
Bromide of sodium	.011	.020	trace	trace
Iodide of sodium	trace	trace	trace	trace
Chloride of magnesium	...	.171	...	...
Sulphate of potash	trace	trace	trace	trace
Sulphate of soda	.146	...	.390	.594
Sulphate of magnesia	...	...	...	...
Sulphate of lime	.391	.418	.387	.261
Carbonate of soda	.036	...	.115	.016
Carbonate of magnesia	.107	.107	.034	.034
Carbonate of manganese	trace	trace	...	...
Carbonate of lime	trace	trace	trace	trace
Phosphate of lime	trace	trace	trace	trace
Phosphate of ferric oxide	trace	trace	trace	trace
Alumina	trace	trace	...	...
Silica	...	...	trace	trace
	26.013	26.049	23.378	26.397

The price of salt at the works may be said to range from 4s. 6d. [$1.09] to 6s. [$1.46] per tou, the former being less than the cost price as giveu before the British parliamentary commission in 1881. It is there stated to be—briue, 6d. [12 cts.]; labor, 10d. [20 cts.]; fuel, 3s. [73 cts.]; rent, iuterest, etc., 1s. [24.3 cts.]; total, 5s. 4d. [$1.29]. Thus the margin for profit is but small, almost the only gain being said to accrue from the lightering, most of the salt manufacturers doing the carriage in their own "flats."

[1] See Spon's *Encyclopædia of the Industrial Arts, etc.*

Saltmaking is by no means an uuhealthy trade, some slight soreness of the eyes being the only affection sometimes complaiued of; indeed the atmosphere of steam saturated with salt iu which the workmen live seems specially preservative agaiust colds, rheumatism, neuralgia, etc. It is said that wages are rather better and employment more regular in Worcestershire thau in Cheshire.

The parliamentary commission above referred to was appointed with a view to the investigation of the causes of the disastrous subsidences which are constantly taking place in all the salt districts, and the provisiou of a remedy. It led to no legislative action; but the evil is recognized as a grave one. At Northwich aud Winsford scarcely a house or a chimney-stack remains straight. Houses are keyed up with "shaps," "face plates," and "bolts," aud only kept from falling by leaniug ou one another. The doors and windows have become lozenge-shaped, the walls bulged, aud the floors crooked. Buildiugs have sunk,—some of them disappearing altogether. Lakes have been formed where there was solid ground before, and incalculable damage done to property iu all quarters. At the same time it is difficult to see how this grievance can be remedied without inflicting serious injury, almost ruin, upon the salt trade. The workings in Great Britain represeut the abstractiou of rather more than a cubic mile of rock every five years, and of this by far the larger part is in Cheshire.

Manley gives the following statistics of the production of salt in Englaud for 1881:

Cheshire	Northwich	500,000 tons.
	Winsford	1,000,000 "
	Middlewich	30,000 "
	Wheelock and Lawton	100,000 "
Staffordshire	Shirleywick and Weston-on-Trent	4,000 "
Worcestershire	Droitwich	115,000 "
	Stoke Prior	105,000 "
	Total	1,854,000 "

He also gives the following details of the salt exported for years ending Dec. 31, 1881 to 1883 inclusive, quoted from the archives of the Salt Chamber of Commerce, whence the importance of the salt trade in England may be judged:

	1881.	1882.	1883.
From Liverpool:	Tons.	Tons.	Tons.
To United States	228,891	223,602	239,459
" British North America	80,784	81,716	99,352
" West Indies and South America	15,556	23,953	25,413
" Africa	25,181	34,287	36,896
" East Indies	324,109	274,866	316,327
" Australia	23,872	17,232	10,860
" Baltic and North Europe	100,957	116,509	107,978
" France and Mediterranean	1,187	5,001	2,803
" Holland and Belgium	67,780	67,334	72,353
Coastwise	41,653	32,462	46,753
Total from Liverpool	909,970	876,962	958,194
From Runcorn	148,122	146,716	141,021
" Western Dock	85,545	68,147	87,954
Grand total	1,143,637	1,091,825	1,187,169

(F. M. L.)

Ancient History and Religious Symbolism.—Indispensable as the use of salt appears to us, it must have been quite unattainable to primitive man in many parts of the world. Thus the *Odyssey* (xi. 122 *sq.*) speaks of inlanders (in Epirus?) who do not know the sea and use no salt with their food. In some parts of America, and even of India (among the Todas), salt was first introduced by Europeans; and there are still parts of central Africa where the use of it is a luxury confined to the rich. Indeed, where meu live mainly on milk and flesh, consuming the latter raw or roasted, so that its salts are not lost, it is not necessary to add sodium chloride, and thus we understand how the Numidian nomads in the time of Sallust and the Bedouins of Hadramaut at the present day never eat salt with their food. On the other haud, cereal or vegetable diet calls for a supplement of salt, and so does boiled meat. The important part played by the mineral in the history of commerce and religion depends on this fact; at a very early stage of progress salt became a necessary of life to most nations, and in many cases they could procure it only from abroad, from the sea-coast, or from districts like that of Palmyra where salty incrustations are found on the surface of the soil. Sometimes indeed a kiud of salt was got from the ashes of saline plants (*e.g.*,

by the Umbrians, Aristotle, *Met.*, ii. p. 459), or by pouring the water of a brackish stream over a fire of (saline) wood and collecting the ashes, as was done in ancient Germany (Tac., *Ann.*, xiii. 57), in Gaul, and in Spain (Plin., *H. N.*, xxxi. 7, 82 *sq.*); but these were imperfect surrogates. Among inland peoples a salt spring was regarded as a special gift of the gods. The Chaonians in Epirus had one which flowed into a stream where there were no fish; and the legend was that Heracles had allowed their forefathers to have salt instead of fish (Arist., *ut supra*). The Germans waged war for saline streams, and believed that the presence of salt in the soil invested a district with peculiar sanctity and made it a place where prayers were most readily heard (Tac., *ut sup.*). That a religious significance was attached to a substance so highly prized and which was often obtained with difficulty is no more than natural. And it must also be remembered that the habitual use of salt is intimately connected with the advance from nomadic to agricultural life, *i.e.*, with precisely that step in civilization which had most influence on the cults of almost all ancient nations. The gods were worshipped as the givers of the kindly fruits of the earth, and, as all over the world "bread and salt" go together in common use and common phrase, salt was habitually associated with offerings, at least with all offerings which consisted in whole or in part of cereal elements. This practice is found alike among the Greeks and Romans and among the Semitic peoples (Lev. ii. 13); Homer calls salt "divine," and Plato names it "a substance dear to the gods" (*Timæus*, p. 60; comp. Plutarch, *Sympos.*, v. 10). As covenants were ordinarily made over a sacrificial meal, in which salt was a necessary element, the expression "a covenant of salt" (Numb. xviii. 19) is easily understood; it is probable, however, that the preservative qualities of salt were held to make it a peculiarly fitting symbol of an enduring compact, and influenced the choice of this particular element of the covenant meal as that which was regarded as sealing an obligation to fidelity. Among the ancients, as among Orientals down to the present day, every meal that included salt had a certain sacred character and created a bond of piety and guest friendship between the participants. Hence the Greek phrase ἅλας καὶ τράπεζαν παραβαίνειν, the Arab phrase "there is salt between us," the expression "to eat the salt of the palace" (Ezra iv. 14, Rev. Ver.), the modern Persian phrase *namak harâm*, "untrue to salt," *i.e.*, disloyal or ungrateful, and many others.

It has been plausibly conjectured that the oldest trade routes were created for traffic in salt; at any rate salt and incense, the chief economic and religious necessaries of the ancient world, play a great part in all that we know of the ancient highways of commerce. Thus one of the oldest roads in Italy is the *Via Salaria*, by which the produce of the salt pans of Ostia was carried up into the Sabine country. Herodotus's account of the caravan route uniting the salt-oases of the Libyan desert (iv. 181 *sq.*) makes it plain that this was mainly a salt-road, and to the present day the caravan trade of the Sahara is largely a trade in salt. The salt of Palmyra was an important element in the vast trade between the Syrian ports and the Persian Gulf (see PALMYRA, vol. xviii. p. 204), and long after the glory of the great merchant city was past "the salt of Tadmor" retained its reputation (Mas'ûdi, viii. 398). In like manner the ancient trade between the Ægean and the coasts of southern Russia was largely dependent on the salt pans at the mouth of the Dnieper and on the salt fish brought from this district (Herod., iv. 53; Dio Chrys., p. 437). In Phœnician commerce salt and salt fish—the latter a valued delicacy in the ancient world—always formed an important item. The vast salt mines of northern India were worked before the time of Alexander (Strabo, v. 2, 6, xv. 1, 30) and must have been the centre of a wide-spread trade. The economic importance of salt is further indicated by the almost universal prevalence in ancient and mediæval times, and indeed in most countries down to the present day, of salt taxes or of Government monopolies, which have not often been directed, as they were in ancient Rome, to enable every one to procure so necessary a condiment at a moderate price. In Oriental systems of taxation high imposts on salt are never lacking and are often carried out in a very oppressive way, one result of this being that the article is apt to reach the consumer in a very impure state largely mixed with earth. "The salt which has lost its savor" (Mat. v. 13) is simply the earthy residuum of such an impure salt after the sodium chloride has been washed out.

Cakes of salt have been used as money in more than one part of the world,—for example, in Abyssinia and elsewhere in Africa, and in Tibet and adjoining parts. See the testimony of Marco Polo (bk. ii. ch. 48) and Col. Yule's note upon analogous customs elsewhere and on the use of salt as a medium of exchange in the Shan markets down to our own time, in his translation of Polo, ii. 48 *sq.* In the same work interesting details are given as to the importance of salt in the financial system of the Mongol emperors (ii. 200 *sq.*)[1]

(W. R. S.)

SALTA, capital of a province of the same name in the Argentine Republic, with a population of about 20,000 (1881), is a well-built town occupying a some-

[1] [UNITED STATES.—Salt is produced in fifteen of the States and Territories. Several States which formerly produced it furnished no statistics to the census of 1880. In Massachusetts and California it is obtained by solar evaporation from sea water, but the business in the former State is now decaying. Subterranean brines furnish salt in New York, Pennsylvania, Michigan, Ohio, Virginia, West Virginia, Kentucky, Kansas, Texas, Nevada, and Utah. The last three and Wyoming Territory have also surface brines. Rock salt has been found in New York, Virginia, and Louisiana. The most remarkable deposit is in the latter State on the island of Petite Anse, Iberia parish, and extends over 140 acres, with an explored depth of 75 feet. This deposit was mined by the Confederates in 1862, who were distressed for salt by the blockade, but the works were broken up by the Union forces in the next year. They have since been resumed with a prospect of financial success.

In Michigan the manufacture of salt is an adjunct of the lumber industry, and thus the product is cheapened beyond the competition of the eastern States. In Nevada salt is produced from salt lakes and brines to be used in the chlorination process for reducing precious metals.

The following statistics, from the census of 1880, show the extent of the salt industry in that year:

Establishments	268
Furnaces	308
Vats or Ponds	47,462
Capital	$8,225,740
Value of salt produced	$4,829,566
Bushels of salt produced	29,805,298

Although the production had increased in ten years over 69 per cent., yet, owing to active competition and especially to the importation of Liverpool salt in ballast, its total value had increased less than one-fourth of one per cent.

Nine States and Utah returned in 1880 a production of over 100,000 bushels, as follows:

	Works.	Bushels.	Value of all Products.
California	25	884,743	$121,650
Louisiana	1	312,000	56,160
Michigan	86	12,425,885	2,271,913
Nevada	7	182,408	92,640
New York	69	8,748,203	1,107,760
Ohio	25	2,650,301	363,791
Pennsylvania	16	851,450	177,415
Utah	10	483,800	60,280
Virginia	1	425,895	127,678
West Virginia	15	2,679,438	380,369

Besides the foregoing there were 8 refineries, whose total product was 1,044,600 bushels, valued at $361,656. This is to be credited chiefly to New York.

The results of the different processes of manufacture were as follows:

	Bushels.
Solar evaporation from sea-water, lakes, and subterranean brines	4,829,776
Steam evaporation, subterranean brines	16,115,351
Kettle or pan process, subterranean brines	8,860,171
Rock salt	312,000
	30,117,298

The total consumption of salt in the United States in 1880 was estimated at 48,000,000 bushels.

The following table shows the principal solid constituents of the brines of the United States:

Locality.	Sodium Chloride.	Calcium Chloride.	Magnesium Chloride.	Calcium Sulphate.	Total Solids.
Syracuse, N. Y.	15.357	.0795	.1449	.5747	16.159
Saginaw, Mich	17.912	2.1420	1.5220	.1160	22.017
East Saginaw, Mich	16.871	3.2873	1.7743	.0982	22.157
Saltsburgh, Pa	7.132	1.5726	.3986	...	9.115
Charleston, W. Va	7.309	1.5162	.3744	...	9.200
Saltville, Va	25.975	...	...	.3221	26.400
Great Salt Lake, Utah	11.863	...	1.4909	.0858	14.994
Petite Anse, La. (rock salt)	99.617	...	.3180	...	99.997

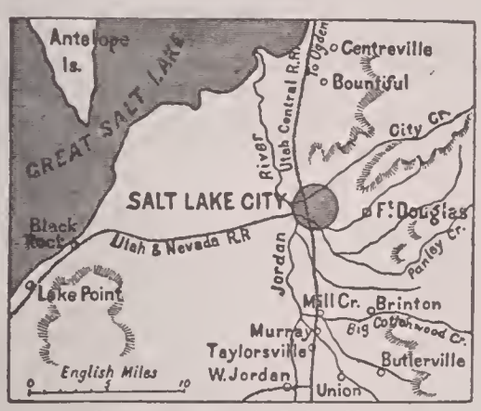
—AM. ED.]

what insalubrious situation, 3780 feet above the sea, at the confluence of the Rio de la Sillata and Rio de Arias, head streams of the Rio Salado (there called Rio Pasaje or Juramanto), about 820 miles northwest of Buenos Ayres. The town, founded by Abreu in 1582, was originally known as San Clemente de Nueva Castilla, took the name of San Felipe de Lerma when Hernando de Lerma removed it to its present site, and began to be called Salta in the 17th century. A large trade is carried on with Bolivia.

SALTCOATS, a seaport and watering-place of Ayrshire, Scotland, contiguous to Ardrossan, and 19 miles north of Ayr. It possesses a good sea-beach, and of late years has become a favorite watering-place. The town received a charter as a burgh of barony in 1528, but afterwards lost its privileges and fell into decay. At a very early period marine salt was manufactured, and saltpans were erected by Sir Robert Cunningham in 1656, but that industry has now ceased. A harbor was also constructed and for a considerable time there was a large shipment of coal, but the trade has now passed to Ardrossan. The population, 4624 in 1871, in 1881 was 5096.

SALTILLO, the capital of the state of Coahuila in Mexico, 65 miles southwest of Monterey by the Mexican National Railway, on the slope of a hill overlooking a fertile valley. It has well-paved streets, several good public buildings, and cotton factories and other industrial establishments. The population is about 17,000.

SALT LAKE CITY (originally Great Salt Lake City), a city of the United States, the capital of Utah Territory and the metropolis of Mormonism, stands nearly in 41° N. lat. and 112° W. long., at a height of 4250 feet above the sea, on the brow of a slight decline at the western base of the Wahsatch range, and on the right bank of the Jordan, a stream which flows from Utah Lake into Great Salt Lake.[1] By the Utah Central Railroad the city is 36 miles south of Ogden



Environs of Salt Lake City.

Junction on the Union and Central Pacific Railroad, and it is the terminus of the Southern and Western Utah Railroads. The city is laid out chessboard fashion, with all the streets 137 feet wide and all the blocks 40 rods square. Shade and fruit trees have been freely planted, and on each side of every north and south street flows a stream of pure water in an open channel. With the exception of some modern erections, the houses are nearly all of sun-dried bricks. The largest and ugliest public building is the tabernacle, with its huge oval wooden dome. It is said to accommodate 8000 to 10,000 persons, and has the second largest organ in America. Within the same enclosure as the tabernacle are the endowment house, where the initiation ceremonies of Mormonism are performed, and the new Mormon temple (1874–5) erected at a cost of $10,000,000. Other conspicuous buildings are the city-hall, used as the Territorial capitol, the theatre, Walker's opera house, the Salt Lake pavilion, the museum, the Deseret university, several hospitals, and the city prison. The population was 5000 in 1850, 8230 in 1860, 12,813 in 1870, and 20,768 in 1880 (86 colored).

When Great Salt Lake City was founded in July, 1847 (*cf.* MORMONISM, vol. xvi. p. 853) the whole region lay far beyond the advancing wave of western civilization. But the city did not long remain the isolated oasis in the desert which its first settlers made it; and it now has a considerable non-Mormon population, a United States garrison at Camp Douglas (between 2 and 3 miles distant), and United States judges.

SALTPETRE, or NITRATE OF POTASH (KNO_3), is a salt obtained as a commercial product in three different ways. (1) It occurs as an efflorescence on the surface or in the superficial stratum of the soil in many parts of the world, but specially to a great extent in the Ganges valley and other parts of India. (2) It is obtained in a semi-artificial manner in nitraries or saltpetre plantations. These consist of heaps of decomposing animal matter mixed with lime ashes, road scrapings, and other rubbish covered over from rain, and from time to time damped with the runnings from stables and other urine. Such heaps develop within them small proportions of the salt and other nitrates, and are, in effect, artificial imitations of the saltpetre-bearing soil of India. They were formerly very common in Switzerland, France, Germany, and Sweden. (3) A large quantity of saltpetre is now prepared from Chili saltpetre, the nitrate of soda, by double decomposition of the soda salt with another salt of potash. See NITROGEN, vol. xvii. p. 531, and GUNPOWDER, vol. xi. pp. 283, 285. Saltpetre is of importance in numerous industries, among the most prominent of which are gunpowder manufacture and pyrotechny. It is also used as an oxidizing agent in glass-making and in metallurgical operations. In the curing of meat it is extensively employed with common salt and sugar, and it also occupies an important place in pharmacy.

In the year 1884 337,708 cwt. of saltpetre was imported into the United Kingdom, the estimated value being £306,113 [$1,487,709.18]. Of this amount 200,065 cwt. came from Bengal and British Burmah alone, and 78,545 cwt. of converted saltpetre came from Germany. During each of the two years 1883 and 1884 the imports of Chili saltpetre, under the name of cubic nitre, exceeded 2,000,000 cwt., nearly the whole supply coming from Bolivia and Peru.

SALUS (Safety), a goddess worshipped in various parts of ancient Italy. At Rome a temple adorned with paintings by Fabius surnamed the Painter (*Pictor*) was dedicated to her in 302 B.C.; and public prayers were offered to her on behalf of the Roman people and the emperor. In 180 B.C., on the occasion of a plague, vows were made to Apollo, Æsculapius, and Salus. Here the special attribute of the goddess appears to be "health"; and in later times she was identified with the Greek goddess of health, Hygeia. On coins of Tiberius, Nero, etc., she is represented as a young maiden with the symbol of Hygeia, a serpent drinking out of a goblet.

SALUTATIONS, or greetings, are customary forms of kindly or respectful address, especially on meeting or parting or on occasions of ceremonious approach. Etymologically the word *salutation* (Lat. *salutatio*, "wishing health") refers to words spoken, but the conventional gestures are even more purposeful, and both should be considered together. The principal modes of saluting, when classified, fall into a few groups, with well-defined meanings, the examination of which explains the practice of any particular tribe or nation.

Forms of salutation frequent among savages and barbarians may last on almost unchanged in civilized

[1] This lake, about 10 miles from the city, the principal body of water in the Great Fremont basin, is 70 miles long by 45 miles broad, has an area of 1900 square miles, and lies 4200 feet above the sea. The water of the lake contains about 6¼ times more than the average solid constituents of sea water, being almost as heavily impregnated (22.4 per cent.) as that of the Dead Sea (24.5 per cent.). The salt is used in the city without artificial refining.

custom, or may be found in modified shapes, while in other cases they may have disappeared altogether and been replaced by new greetings. The habit of affectionate clasping or embracing is seen at the meetings of the rude Andamaners and Australians, or where the Fuegians in friendly salute hug "like the grip of a bear."[1] This natural gesture appears in old Semitic and Aryan custom: "Esau ran to meet him (Jacob) and embraced him, and fell on his neck, and kissed him, and they wept" (Gen. xxxiii. 4); so, when Ulysses makes himself known, Philœtius and Eumæus cast their arms round him with kisses on the head, hands, and shoulders (*Odyss.*, xxi. 223):

κλαῖον ἄρ' ἀμφ' Ὀδυσῆϊ δαΐφρονι χεῖρε βαλόντε,
καὶ κύνεον ἀγαπαζόμενοι κεφαλήν τε καὶ ὤμους.
ὣς δ' αὔτως Ὀδυσεὺς κεφαλὰς καὶ χεῖρας ἔκυσσεν.

The embrace continues habitual through later ages, and, though in modern times a good deal restricted, it still marks the meetings of near kinsfolk and lovers. But the kiss, associated with it in passages like those just cited, has no such universality. The idea of the kiss being an instinctive gesture is negatived by its being unknown over half the world, where the prevailing salute is that by smelling or sniffing (often called by travellers "rubbing noses"), which belongs to Polynesians, Malays, Burmese and other Indo-Chinese, Mongols, etc., extending thence eastward to the Eskimo and westward to Lapland, where Linnæus saw relatives saluting by putting their noses together.[2] This seems the only appearance of the habit in Europe. On the other hand the kiss, the salute by tasting, appears constantly in Semitic and Aryan antiquity, as in the above cases from the book of Genesis and the *Odyssey*, or in Herodotus's description of the Persians of his time kissing one another—if equals on the mouth, if one was somewhat inferior on the cheek (Herod., i. 134). In Greece in the classic period it became customary to kiss the hand, breast, or knee of a superior. In Rome the kisses of inferiors became a burdensome civility (Martial, xii. 59):

"Te vicinia tota, te pilosus
Hircoso premit osculo colonus."

The early Christians made it the sign of fellowship: "greet all the brethren with an holy kiss" (1 Thess. v. 26; *cf.* Rom. xvi. 16, etc.); and this may even now be seen among Anabaptists, who make an effort to retain primitive Christian habit. It early passed into more ceremonial form in the kiss of peace given to the newly baptized and in the celebration of the Eucharist;[3] this is retained by the Oriental Church. After a time, however, its indiscriminate use between the sexes gave rise to scandals, and it was restricted by ecclesiastical regulations—men being only allowed to kiss men, and women women, and eventually in the Roman Church the ceremonial kiss at the communion being only exchanged by the ministers, but a relic or cross called an *osculatorium* or *pax* being carried to the people to be kissed.[4] While the kiss has thus been adopted as a religious rite, its original social use has continued. Among men, however, it has become less effusive, the alteration being marked in England at the end of the 17th century by such passages as the advice to Sir Wilfull by his London-bred brother: "in the country, where great lubberly brothers slabber and kiss one another when they meet; . . . 'T is not the fashion here."[5] The kiss on both cheeks between parents and children on Continental railway platforms now surprises the undemonstrative Englishman, who, when servants sometimes kiss his hand in Southern Europe, is even more struck by this relic of servile ages. Court ceremonial keeps up the kiss on the cheek between sovereigns and the kissing of the hand by subjects, and the pope, like a Roman emperor, receives the kiss on his foot. A curious trace which these osculations have left behind is that when ceasing to be performed they are still talked of by way of politeness: Austrians say, "küss d'Hand!" and Spaniards, "beso a Vd. las manos!" "I kiss your hands!"

Strokings, pattings, and other caresses have been turned to use as salutations, but have not a wide enough range to make them important. Weeping for joy, often occurring naturally at meetings, is sometimes affected as a salutation; but this seems to be different from the highly ceremonious weeping performed by several rude races when, meeting after absence, they renew the lamentations over those friends who have died in the meantime. The typical case is that of the Australians, where the male nearest of kin presses his breast to the new comer's, and the nearest female relative, with piteous lamentations, embraces his knees with one hand, while with the other she scratches her face till the blood drops.[6] Obviously this is no joy-weeping, but mourning, and the same is true of the New Zealand *tangi*, which is performed at the reception of a distinguished visitor, whether he has really dead friends to mourn or not.[7]

Cowering or crouching is a natural gesture of fear or inability to resist that belongs to the brutes as well as man; its extreme form is lying prostrate face to ground. In barbaric society, as soon as distinctions are marked between master and slave, chief and commoner, these tokens of submission become salutations. The sculptures of Egypt and Assyria show the lowly prostrations of the ancient East, while in modern Dahomey or Siam subjects crawl before the king, and even Siberian peasants grovel and kiss the dust before a noble. A later stage is to suggest, but not actually perform, the prostration, as the Arab bends his hand to the ground and puts it to his lips or forehead, or the Tongan would touch the sole of a chief's foot, thus symbolically placing himself under his feet. Kneeling prevails in the middle stages of culture, as in the ceremonial of China; Hebrew custom sets it rather apart as an act of homage to a deity (1 Kings xix. 18; Isa. xlv. 23); mediæval Europe distinguishes between kneeling in worship on both knees and on one knee only in homage, as in the *Boke of Curtasye* (15th century):

"Be curtayse to god, and knele doun
On bothe knees with grete deuocioun;
To mon þou shalle knele opon þe toũ,
þe toþer to þy self þou halde aloũ."

Bowing, as a salute of reverence, appears in its extreme in Oriental custom, as among the ancient Israelites: "bowed himself to the ground seven times" (Gen. xxxiii. 3).[8] The Chinese according to the degree of respect implied bow kneeling or standing.[9] The bowing salutation, varying in Europe from something less than the Eastern salaam down to the slightest inclination of the head, is interesting from being given mutually, the two saluters each making the sign of submission to the other, which would have been absurd till the sign passed into mere civility. Uncovering is the common mode of salutation, originally a sign of disarming or defencelessness or destitution in the presence of a superior. Polynesian or African chiefs require more or less stripping, such as the uncovering to the waist which Captain Cook describes in Tahiti.[10] Taking off the hat by men has for ages been the accepted mode in the Western world, done in a frequent, demonstrative way by such as make a show of politeness, and who by being "free of cappe and full of curtesye" pay cheaply social debts; but modern

[1] W. P. Snow, in *Trans. Ethnol. Soc.*, n. s., vol. i. p. 263.
[2] J. E. Smith, *Linnæus's Tour in Lapland*, vol. i. p. 315.
[3] Bingham, *Antiquities of the Chr. Church*, bk. xii. c. 4, xv. c. 3.
[4] The latter term has supplied the Irish language with its term for a kiss, *póg*, Welsh *poc*; see Rhys, *Revue Celtique*, vol. vi. p. 43.
[5] Congreve's *Way of the World*, Act iii.
[6] Grey, *Journals*, vol. ii. p. 255.
[7] A. Taylor, *New Zealand*, p. 221.
[8] See the Egyptian bow with one hand to the knee; Wilkinson, *Anc. Eg.*
[9] S. Wells Williams, *Middle Kingdom*, vol. i. p. 801.
[10] See references to these customs in Tylor, *Early History of Mankind*, ch. iii.

society has moderated this bowing and scraping (the scrape is throwing back the right leg as the body is bent forward), as well as the curtseys (*courtoisie*) of women. Eastern nations are apt to see disrespect in baring the head, but insist on the feet being uncovered; the importance attached to entering barefoot is well known to English officials in India; Burmah was agitated for years by "the great shoe question," whether Europeans should be called on to conform to native custom, rather than their own, by taking off their shoes to enter the royal presence.[1] Grasping hands is a gesture which makes its appearance in antiquity as a legal act symbolic of the parties joining in compact, peace, or friendship; this is well seen in marriage, where the hand grasp was part of the ancient Hindu ceremony, as was the "dextrarum junctio" in Rome, which passed on into the Christian rite. In the classic world we see it passing into a mere salutation, as where the tiresome acquaintance met by Horace on his stroll along the Via Sacra seizes his hand (Hor., *Sat.*, i. 9):

"Arreptaque manu, 'Quid agis, dulcissime rerum?'"

Giving the right hand of fellowship (Gall. ii. 9) passed naturally into a salutation throughout Christendom, and spread, probably from Byzantium, over the Moslem world. The emphatic form of the original gesture in "striking hands" is still used to make the greeting more hearty. The variety called in English "shaking hands" (Germ. *Hände-schütteln*) only appears to have become usual in the Middle Ages.[2] In the Moslem legal form of joining hands, the parties press their thumbs together.[3] This has been adopted as a salute by African tribes. But it has been especially English traders and missionaries who of late years have introduced shaking hands far and wide in the world, so that even such rude peoples as Australians and Hottentots, Eskimo and Fuegians, unite in practicing this modern civilized custom.

As to words of salutation, it is found even among the lower râces that certain ordinary phrases have passed into formal greetings. Thus among the Tupis of Brazil, after the stranger's silent arrival in the hut, the master, who for a time had taken no notice of him, would say, "*Ereioubé?*" that is, "Art thou come?" to which the proper reply was, "Yes, I am come!"[4] Many formulas express difference of rank and consequent respect, as where the Basuto salute their chiefs with "*Tama sevata!*" *i. e.*, "Greeting, wild beast!" Congo negroes returning from a journey salute their wives with an affectionate *Okoiee!* but they, meekly kneeling round him, may not repeat the word, but must say *Ka! ka!*[5] Among cultured nations, salutations are apt to be expressions of peace and good-will, as in the Biblical instances, "Is it well with thee?" (2 Kings iv. 26); "Peace to thee, and peace to thine house," etc. (1 Sam. xxv. 6; see Ezra iv. 17). Such formulas run on from age to age, and the latter may be traced on to the Moslem greeting, *Salám 'alaikum!* "The peace be on you," to which the reply is *Wa-'alaikum as-salám!* "And on you be the peace (*sc.* of God)!"[6] This is an example how a greeting may become a password among fellow-believers, for it is usually held that it may not be used by or to an infidel. From an epigram of Meleager (*Anth.*, ed. Jacobs, vii. 119; *cf.* Plautus, *Pœn.*, v., *passim*) we learn that, while the Syrian salutation was *Shelōm* ("Peace!"), the Phœnicians greeted by wishing life (חוו ארני, the חוא, etc., of Neo-Punic gravestones). The cognate Babylonian form, "O king, live forever!" (Dan. iii. 9), represents a series of phrases which continue still in the *Vivat rex!* "Long live the king!" The Greeks said χαῖρε, "Be joyful!" both at meeting and parting; the Pythagorean ὑγιαίνειν and the Platonic εὖ πράττειν wish health; at a later time ἀσπάζομαι, "I greet!" came into fashion. The Romans applied *Salve!* "Be in health!" especially to meeting, and *Vale!* "Be well!" to parting. In the modern civilized world, everywhere, the old inquiry after health appears, the "How do you do?" becoming so formal as often to be said on both sides without either waiting for an answer. Hardly less wide in range is the set of phrases "Good day!" "Good night!" etc., varying according to the hour, and translating into every language of Christendom. Among other European phrases, some correspond to our "welcome!" and "farewell!" while the religious element enters into another class, exemplified by our "Good-bye!" ("God be with you!"), and French *Adieu!* Attempts have been made to shape European greetings into expressions of orthodoxy, or even tests of belief, but they have had no great success. Examples are a Protestant German salutation "*Lobe Jesum Christum!*" answered by "*In Ewigkeit, Amen!*" and the formula which in Spain enforces the doctrine of the Immaculate Conception, "*Ave Maria purisima!*" answered by "*Sin pecado concebida!*" On the whole, though the half-meaningless forms of salutation may often seem ridiculous, society would not carry them on so universally unless it found them useful. In fact, they serve the substantial purpose of keeping up social intercourse, and establishing relations between the parties in an interview, of which their tone may strike the keynote. Montaigne, a master of the courtesy of an age more ceremonious than ours, truly asserts their importance, "C'est au demourant une très utile science que la science de l'entregent." (E. B. T.)

SALUZZO, or SALUCES, a city of Italy, at the head of a circondario in the province of Cuneo, 42½ miles south of Turin (with which it is connected by railway and a steam tramway), is situated 600 to 650 feet above the sea, just where the last hills of the Monte Viso die away into the plain between the Po and its tributary the Vraita. The upper town preserves some part of the fortifications which protected it when, previous to the plague of 1630, the city had upwards of 30,000 inhabitants; and the hill is crowned by the ruins of an ancient castle. The more important castle of the marquises (in which according to the legend the patient Griselda was confined) is in the lower town and now serves as a penitentiary. Besides the cathedral (Gothic, 1480–1511), with the tombs of the old marquises, other conspicuous buildings are the churches of San Giovanni (formerly San Domenico) and San Bernardo (the former the finest architectural monument of the marquisate), the old town-house (1462), the new town-house (formerly belonging to the Jesuits), and the theatre (1829). To the north of the city lies the abbey of Staffarda (1130–1737). The population of the city was 10,145 (commune 16,237) in 1880.

By some authorities Saluzzo is identified with Augusta Vagiennorum. The line of its marquises began (1142) with Manfred, son of Boniface, marquis of Savona, and continued till 1548, when the death of Gabriel, imprisoned by Henry II. of France in the castle of Pinerolo, allowed city and territory to be seized by the French. The marquises of Saluzzo being great opponents of the house of Savoy, and frequently taking part in the struggles between France and the empire, the city often had to suffer severely from the fortunes of war. Henry IV. restored the marquisate to Charles Emmanuel I. of Savoy at the peace of Lyons in 1601. Among the celebrities of Saluzzo are Silvio Pellico (whose statue, 1863, gives name to the Piazza del Statuto), Bodoni the famous printer, and Casalis the historian of Sardinia. The history of the marquisate was written by Delfino Muletti, 5 vols., 1829–1833.

SALVADOR. See SAN SALVADOR.

SALVAGE is "the reward which is earned by those who have voluntarily saved or assisted in saving a ship or boat, or their apparel, or any part thereof; or the lives of persons at sea; or a ship's cargo or any part thereof from peril; or a wreck from total loss"

[1] Shway Yoe, *The Burman*, vol. ii. pp. 158, 205.
[2] See Tylor in *Macmillan's Mag.*, May, 1882, p. 76.
[3] Lane, *Mod. Eg.*, vol. i. p. 219.
[4] Jean de Lery, part ii. p. 204.
[5] Magyar, *Reise in Sud-Afrika*.
[6] *Cf.* vol. xvi. p. 576, note 4.

(Roscoe, *Admiralty Law and Practice*, p. 13). The word salvage is indifferently used to denote the claim, the reward, or the property saved. Salvage is interesting as being perhaps the one case in English law in which a person may become liable to a claim upon him for services rendered to him without his request, express or implied. Salvage may be either military or civil. Claims for military salvage, *i.e.*, salvage on recapture (for which see PRIZE), are decided by a prize court. The tribunal for determining cases of civil salvage, the usual kind, is a court having admiralty jurisdiction. In England or Ireland the High Court of Justice (Admiralty Division), in Scotland the Court of Session, have cognizance of salvage claims to any amount. The Merchant Shipping Act, 1854, confers jurisdiction on justices of the peace to arbitrate on claims not exceeding £200 [$972], or where the value of the property saved does not exceed £1000 [$4860]. Certain county courts named by order in council have by the County Courts Admiralty Jurisdiction Act, 1868, jurisdiction in any claim in which the value of the property saved does not exceed £1000 [$4860], or in which the amount claimed does not exceed £300 [$1458]. The jurisdiction of the inferior courts is protected by provisions depriving the suitor in the High Court of his costs without a certificate from the judge in cases where the claim might have been made before justices or in a county court. In addition there are various local tribunals exercising a more or less limited jurisdiction in salvage claims. Such are the Commissioners within the Cinque Ports, the Court of Passage of the city of Liverpool, and the Royal Courts of Jersey and Guernsey, besides the various Vice-Admiralty Courts throughout the British empire.

The rules which guide the courts in the award of salvage are reducible to a few simple principles, depending partly upon the general maritime law, partly upon the Merchant Shipping Acts, 1854 and 1862. (1) The salvage services must have been rendered within the jurisdiction of the ADMIRALTY (*q.v.*). (2) There must be no legal duty on the part of the salvors to render assistance. Therefore there must be very meritorious and exceptional services on the part of the crew, or even of a pilot, a passenger, or the crew of a tug, to entitle any of them to salvage. The same is the case with the officers and crew of a queen's ship, coastguardsmen, etc., who are bound by their position to assist. (3) The property must have been in peril, and rescued by the salvors. (4) The services must have been successful. Of course where a request for help has actually been made, and the property perishes, the right of remuneration nevertheless survives, on the ordinary principles of contract. The basis of salvage proper is service independently of contract.

If these conditions be satisfied, salvage claims take priority of all others against the property saved, and give the salvors a maritime lien upon such property, enforceable by an action *in rem*. Salvage of life from a British ship or a foreign ship in British waters ranks before salvage of goods. In distributing the salvage reward the court considers (1) the extent of the peril of the property saved, (2) its value, (3) the nature of the services. This is subject to any contract, not inequitable, made between the parties. Seamen cannot abandon their right to salvage unless they specially engage themselves on a ship to be employed on salvage duty. Salvage of life is rewarded at a higher rate than salvage of property. Misconduct of salvors may operate as a bar to their claim. Salvage reward is commonly apportioned between the officers and crew of the salving ship, its owners, and other persons assisting. The amount is at the discretion of the distributing authority. It seldom exceeds in the whole one-half the value of the property saved. Apportionment for salvage services rendered within the United Kingdom, where the sum does not exceed £200 [$972], due by agreement or the order of justices, may be made by the receiver of wreck on application of the parties liable to pay it.

Salvage is a term also applied by analogy to property not saved at sea, but from fire on land, and also to property recovered from destruction by the aid of voluntary payments. The person making the last advance is entitled to priority in the nature of quasi-salvage, as the continued existence of the property at all may be due to him, *e.g.*, the ease of a payment made to prevent the forfeiture of a policy of insurance. Charges in favor of a solicitor upon property recovered or preserved by his means have been several times declared by the courts to be in the nature of salvage of this kind.

The law of the United States is in general agreement with that of England. The court of admiralty jurisdiction is the district court. The area in which salvage services may be rendered is much wider than in England, as it includes the great freshwater navigable rivers and lakes. This difference arises from the greater importance of inland navigation in the United States. See RIPARIAN LAWS.

SALVIAN, a Christian writer of the 5th century, was born in Gaul, and most probably in the neighborhood of Treves or Cologne (*De Gub. Dei*, vi. 8, 13). His birth has been conjecturally assigned to the period from 390 to 420. He was probably brought up as a Christian, though of this there is no absolute proof. Zschimmer considers his writings to show that he had made a special study of the law; and this is the more likely as he appears to have been of noble birth and could describe one of his relations as being "of no small account in her own district and not obscure in family" (*Ep.* i.). He was already a Christian when he married Palladia, the daughter of heathen parents, Hypatius and Quieta, whose displeasure he incurred by persuading his wife to retire with him to a distant monastery, which is almost certainly to be identified with that so lately founded by St. Honoratus at Lerins. For seven years there was no communication between the two branches of the family, till at last, when Hypatius had become a Christian, Salvian wrote him a most touching letter in his own name, his wife's, and that of his little daughter Auspiciola, begging for the renewal of the old affection (*Ep.* iv.). This whole letter is a most curious illustration of Salvian's reproach against his age that the noblest man at once forfeited all esteem if he became a monk (*De Gub.*, iv. 7; *cf.* viii. 4).

It was presumably at Lerins that Salvian made the acquaintance of St. Honoratus (*ob.* 429), St. Hilary of Arles (*ob.* 449), and St. Eucher of Lyons (*ob.* 449). That he was a friend of the former and wrote an account of his life we learn from St. Hilary (*Vita Hon.*, ap. Migne, l. 1260). To St. Eucher's two sons, Salonius and Veranus, he acted as tutor in consort with St. Vincent of Lerins. As he succeeded St. Honoratus and St. Hilary in this office, this date cannot well be later than the year 426 or 427, when the former was called to Arles, whither he seems to have summoned Hilary before his death in 429 (*Eucherii Instructio ad Salonium*, ap. Migne, l. 773; Salv., *Ep.* ii.). Salvian continued his friendly intercourse with both father and sons long after the latter had left his care; it was to Salonius (then a bishop) that he wrote his explanatory letter just after the publication of his treatise *Ad Ecclesiam;* and to the same prelate a few years later he dedicated his great work, the *De Gubernatione Dei*. The above facts, as will be seen, render it almost certain that he must have been born a good deal before 420. If French scholars are right in assigning Hilary's *Vita Honorati* to 430, Salvian, who is there called a priest, had probably already left Lyons for Marseilles, where he is known to have spent the last years of his life (Genn., ap. Migne, lviii. 1099). It was probably from Marseilles that he wrote his first letter—presumably to Lerins—begging the community there to receive his kinsman, the son of a widow of Cologne, who had been reduced to poverty by the barbarian invasions. It seems a fair inference from this letter that Salvian, acting up to the precepts of his own treatise *Ad Ecclesiam*, had divested himself of all his property in favor of that society and, having no longer any possessions of his own, sent his relative to Lerins for assistance (*Ep.* i., with which compare *Ad Eccles.*, ii. 9,

10; iii. 5). It has been conjectured that Salvian paid a visit to Carthage; but this is a mere inference based on the minute details he gives of the state of this city just before its fall (*De Gub.*, vii., viii.). He seems to have been still living at Marseilles when Gennadius wrote under the papacy of Gelasius (492–496).

Of Salvian's writings there are still extant two treatises, entitled respectively *De Gubernatione* and *Ad Ecclesiam*, and a series of nine letters. The *De Gubernatione*, Salvian's greatest work, was published after the capture of Litorius at Toulouse (439), to which he plainly alludes in vii. 10, and after the Vandal conquest of Carthage in the same year (vi. 12), but before Attila's invasion (450), as Salvian speaks of the Huns, not as enemies of the Empire, but as serving in the Roman armies (vii. 9). The words "proximum bellum" seem to denote a year very soon after 439. In this work Salvian deals with the same problem that had moved the eloquence of St. Augustine and Orosius. Why were these miseries falling on the empire? Could it be, as the pagans said, because the age had forsaken its old gods? or, as the semi-pagan creed of some Christians taught, that God did not constantly overrule the world he had created (i. 1)? With the former Salvian will not argue (iii. 1). To the latter he replies by asserting that "just as the navigating steersman never loses the helm, so does God never remove his care from the world." Hence the title of the treatise. In books i. and ii. Salvian sets himself to prove God's constant guidance, first by the facts of Scripture history, and secondly by the enumeration of special texts declaring this truth. Having thus "laid the foundations" of his work, he declares in book iii. that the misery of the Roman world is all due to the neglect of God's commandments and the terrible sins of every class of society. It is not merely that the slaves are thieves and runaways, wine-bibbers and gluttons,—the rich are worse (iv. 3). It is their harshness and greed that drive the poor to join the Bagaudæ and fly for shelter to the barbarian invaders (v. 5 and 6). Everywhere the taxes are heaped upon the needy, while the rich, who have the apportioning of the impost, escape comparatively free (v. 7). The great towns are wholly given up to the abominations of the circus and the theatre, where decency is wholly set at nought, and Minerva, Mars, Neptune, and the old gods are still worshipped (vi. 11; *cf.* vi. 2 and viii. 2). Treves was almost destroyed by the barbarians; yet the first petition of its few surviving nobles was that the emperor would re-establish the circus-games as a remedy for the ruined city (vi. 15). And this was the prayer of Christians, whose baptismal oath pledged them to renounce "the devil and his works . . . the pomps and shows (spectacula)" of this wicked world (vi. 6). Darker still were the iniquities of Carthage, surpassing even the unconcealed licentiousness of Gaul and Spain (iv. 5); and more fearful to Salvian than all else was it to hear men swear "by Christ" that they would commit a crime (iv. 15). It would be the atheist's strongest argument if God left such a state of society unpunished (iv. 12),—especially among Christians, whose sin, since they alone had the Scriptures, was worse than that of barbarians, even if equally wicked, would be (v. 2). But, as a matter of fact, the latter had at least some shining virtues mingled with their vices, whereas the Romans were wholly corrupt (vii. 15, iv. 14). With this iniquity of the Romans Salvian contrasts the chastity of the Vandals, the piety of the Goths, and the ruder virtues of the Franks, the Saxons, and the other tribes to whom, though heretic Arians or unbelievers, God is giving in reward the inheritance of the empire (vii. 9, 11, 21). It is curious that Salvian shows no such hatred of the heterodox barbarians as was rife in Gaul seventy years later.

Ad Ecclesiam is sufficiently explained by its common title, *Contra Avaritiam*. It is quoted more than once in the *De Gubernatione*. Salvian published it under the name of Timothy, and explained his motives for so doing in a letter to his old pupil Bishop Salonius (*Ep.* ix). This work is chiefly remarkable because in some places it seems to recommend parents not to bequeath anything to their children, on the plea that it is better for the children to suffer want in this world than that their parents should be damned in the next (iii. 4). Salvian is very clear on the duty of absolute self-denial in the case of sacred virgins, priests, and monks (ii. 8–10). Several works mentioned by Gennadius, notably a poem "in morem Græcorum" on the six days of creation (hexaemeron), and certain homilies composed for bishops, are now lost (Genn., 67).

The *Ad Ecclesiam* was first printed in Sichard's *Antidoton* (Basel, 1528); the *De Gubernatione* by Brassican (Basel, 1530). The two appeared in one volume at Paris in 1575. Pithœus added variæ lectiones and the first seven letters (Paris, 1580); Ritterhusius made various conjectural emendations (Altorf, 1611), and Baluze many more based on MS. authority (Paris, 1663–1663). Numerous other editions appeared from the 16th to the 18th century, all of which are now superseded by the excellent ones of C. Halm (Berlin, 1877) and F. Pauly (Vienna, 1883). The two oldest MSS. of the *De Gubernatione* belong to the 10th century (Cod. Paris, No. 13,385) and the 13th (Brussels, 10,628; of the *Ad Ecclesiam* to the 10th (Paris, 2172) and the 11th (Paris, 2785); of *Epistle IX.* to the 9th (Paris, 2785); of *Epistle VIII.* to the 7th or 8th century (Paris, 95,559) and to the 9th or 10th century (Paris, 12,237, 12,236). Of the first seven epistles there is only one MS. extant, of which one part is now at Bern (No. 219), the other at Paris (No. 3791). See *Histoire Littéraire de France*, vol. ii.; Zschimmer's *Salvianus* (Halle, 1875). Salvian's works are reprinted (after Baluze) in Migne's *Cursus Patrologiæ*, vol. liii. For bibliography see T. G. Schoenemann's *Bibliotheca Patrum* (ii. 823) and the prefaces to the editions of Halm and Pauly. Gennadius, St. Hilary, and St. Eucher may be consulted in Migne, vols. lviii. and l. (T. A. A.)

SALWIN HILL TRACTS, a district in the Tenasserim division of British Burmah, extending from the northern portion of the province southwards to Kaw-ka-rit on the Salwin river, and occupying the whole of the country between that river on the east and the Poung-loung mountains on the west. The district contains an area of about 4646 square miles, and is bounded on the north by the Kareng-ni state, on the east by Zeng-mai, on the south by Amherst and Shwe-gyeng and on the west by Shwe-gyeng and Toung-gnú. From the annexation of Pegu until 1872 the Hill Tracts formed a subdivision of the Shwe-gyeng district, but in that year it was constituted into a separate jurisdiction. Nearly the whole district is a mass of mountains intersected by deep ravines, the only level land of any considerable extent being found in the valley of the Rwon-za-leng, while every part of the country is covered with dense forest.

The Hill Tracts are drained by three principal rivers, the Salwin, Rwon-za-leng, and Bhi-leng, fed by numerous mountain torrents which rush down narrow ravines. The Salwin is the largest river in the Tenasserim division. Its source has never been explored, but it appears to take its rise far north in the Himalayas or in the mountains which form their extension eastward. After traversing the Chinese province of Yunnan and the Shan and Kareng-ni states to the south, it enters British Burmah at its extreme northeastern corner, and for some distance marks the eastern limits of the province. It has a known course of about 700 miles, but its breadth seldom exceeds 100 yards, and in some parts the bed does not occupy more than 30 yards. The Salwin is greatly obstructed by rapids, and is not navigable by large craft for more than 100 miles from its mouth. The Rwon-za-leng, which rises in the extreme north, is navigable with some difficulty in the dry season as far as Pa-pwon, the administrative headquarters; the Bhi-leng is not navigable within the limits of the district except by small boats and rafts.

Of the total area of the district only 21 square miles are cultivated. The chief crops are rice and betel-nuts. The revenue of Salwin amounted in 1883–84 to only £1964 [$9,545.04], of which £940 [$4,568.40] were raised from the land-tax. The population in 1881 was returned at 30,009 (males 15,509, females 14,500).

SALZA, Hermann von (*c.* 1180–1239), one of the most illustrious knights of the Teutonic order, was a scion of the house of Langensalza in Thuringia, where he was born about 1180. He was a faithful and influential councillor of the emperor Frederick II., and took a prominent part in the contemporary affairs of the German empire. The events of his life are involved in the history of the Teutonic Order (*q.v.*) of which he was elected master in 1210 or 1211.

SALZBRUNN, a small German watering-place, visited annually by about 4000 patients, is situated in Silesia, 30 miles to the southwest of Breslau. Its alkalo-saline springs, which are especially efficacious in pulmonary complaints, were known as early as 1316, but afterwards fell into disuse until their merits were once more discovered at the beginning of this century. The resident population in 1880 numbered 5777.

SALZBURG, capital of the present Austrian crownland and formerly of the archbishopric of the same name, occupies a position of singular beauty on the Salzach, 87 miles southeast of Munich, and 154 miles west by south of Vienna. The river, flowing northwest from the glaciers of the Salzburg Alps to the Bavarian plain, passes at this point between two

isolated hills, the Mönchsberg (1732 feet) on the left and the Capuzinerberg (2132 feet) on the right; in the lovely valley so formed, and stretching into the plain beyond, lies Salzburg. The picturesque and wooded confining hills, the lofty citadel of Hohen-Salzburg, rising like a Greek acropolis above the towers and spires of the city at its foot, and the magnificent background of the Salzburg Alps, overhanging the broad plain, make Salzburg the most beautifully situated town in Austria or Germany. The older and main part of the city lies on the left bank of the Salzach, in a narrow semicircular plain at the base of the Mönchsberg; the newer town is on the right bank at the foot of the Capuzinerberg, which is separated from the river by the narrow suburb of Stein. At the south end of the old town, below the Nonnberg, or southeast spur of the Mönchsberg, is the suburb of Nonnthal; and at the north end is Mülln. The steep sides of the Mönchsberg rise directly from amidst the houses of the town, some of which have cellars and rooms hewn out of the rock; and the ancient cemetery of St. Peter, the oldest in Salzburg, is bounded by a row of vaults cut in the side of the hill. The narrowest part of the ridge, which has a length of above two miles, is pierced by the Neu Thor, a tunnel 436 feet long and 23 feet broad, completed in 1767, to form a convenient passage from the town to the open plain. The south end of the Mönchsberg is occupied by the imposing Hohen-Salzburg, a citadel originally founded in the 9th century, though the present building, the towers of which rise 400 feet above the town, date chiefly from 1496-1519. The streets in the older quarters are narrow, crooked, and gloomy; but the

Plan of Salzburg.

newer parts of the city, especially those laid out since the removal of the fortifications about 1861, are handsome and spacious. Owing to the frequent fires the private buildings of Salzburg are comparatively modern; and the present flat-roofed houses, lavishly adorned with marble, are, like many of the public buildings, monuments of the gorgeous taste of the prince archbishops of the 17th and 18th centuries. The style of the houses, the numerous open squares, and the abundant fountains give an Italian air to the town. Both sides of the river are bordered by fine promenades, planted with trees; and a public park has been laid out to the north of the new town. The Salzach is spanned by four bridges, including a railway bridge.

Salzburg is full of objects and buildings of interest. The cathedral, one of the largest and most perfect specimens of the Renaissance style in Germany, was built in 1614-28 by the Italian architect Santino Solari, in imitation of St. Peter's at Rome. On three sides it is bounded by the Dom-Platz, the Capitel-Platz, and the Residenz-Platz; and opening on the northeast and northwest of the last are the Mozart-Platz and the Markt-Platz. In the Mozart-Platz is a statue of Mozart, who was born in Salzburg in 1756. On one side of the Residenz-Platz is the palace, an irregular though imposing building in the Italian style, begun in 1592 and finished in 1725. It is now occupied by the grand duke of Tuscany. Opposite is the Neu Bau, begun in 1588, in which are the Government offices and the law courts. The palace of the present archbishops is in the Capitel-Platz. Across the river, with its French garden adjoining the public park, is the Mirabell palace, formerly the summer residence of the prince archbishops. Built in 1607, and restored after a fire in 1818, it was presented to the town in 1867 by the emperor Francis Joseph. The building close to the Neu Thor, now the cavalry barracks, was formerly the sumptuous stables of the archbishops, built in 1607 to accommodate 130 horses. Beside it is an amphitheatre, partly hewn out of the rock of the Mönchsberg in 1693, known as the Summer Riding School. The Winter Riding School, in the adjacent building, has its ceiling decorated with the painting of a tournament, dating from 1690. The town-house of Salzburg was built in 1407 and restored in 1675. Other interesting secular buildings are the Chiemseehof, founded in 1305 and rebuilt in 1697, formerly the palace of the suffragan bishop of Chiemsee, and now the meeting-place of the Salzburg diet; the united school building, erected in 1873; St. John's hospital; the Carolino-Augusteum museum; and the handsome Curhaus, erected in the public park in 1868.

Of the twenty-four churches the majority are interesting from their antiquity, their architecture, or their associations. Next to the cathedral, the chief is perhaps the abbey church of St. Peter, a Romanesque basilica of 1127, tastelessly restored in 1745. It contains monuments to St. Rupert, and to the "Monk of Salzburg," a religious poet of the latter half of the 14th century. St. Margaret's, in the midst of St. Peter's churchyard, built in 1485 and restored in 1865, is situated near the cave in the side of the Mönchsberg, said to have been the hermitage of St. Maximus, who was martyred by the pagan Heruli in 477. The Franciscan church, with an elegant tower built in 1866, is an interesting example of the transition style of the 13th century, with later baroque additions. St. Sebastian's, on the right bank, built in 1505-12 and restored in 1812, contains the tomb of Paracelsus, whose house stood in the Platzl, or square at the north end of the chief bridge. The oldest and most important of the eight convents (four for each sex) at Salzburg is the Benedictine abbey of St. Peter, founded about 582 by St. Rupert as the nucleus of the city. It contains a library of 40,000 volumes, besides MSS. The Capuchin monastery, dating from 1599, gives name to the Capuzinerberg. The oldest nunnery is that founded on the Nonnberg by St. Rupert in 585. The single Protestant church in Salzburg was not built until 1865.

A theological seminary is the only relic now left of the university of Salzburg, founded in 1623 and suppressed in 1810. A considerable number of other educational institutions, lay and clerical, have their seat in the town. The public library contains 62,000 volumes and a collection of MSS., and the museum library contains 10,000 volumes. The number of benevolent and charitable institutions is large. Salzburg carries on a variety of small manufactures, including musical instruments, iron-wares, marble ornaments, cement, artificial wool, etc. Its trade has become more important since direct railway communication has been opened with Munich and Vienna. A large number of tourists visit Salzburg annually; and its baths also attract many visitors. It is the seat of important judicial and administrative departments, and also of an archbishop, with a cathedral chapter and a consistory. In 1880 the population (including the suburbs) was 20,336.

The origin and development of Salzburg were alike ecclesiastical, and its history is involved with that of the archbishopric to which it gave its name. The old Roman town of Juvavum was laid in ruins, and the incipient Christianity of the district overwhelmed, by the pagan Goths and Huns. The nucleus of the present city was the monastery and bishopric founded here about 700 (some say about 582) by St. Rupert of Worms, who had been invited by Duke Theodo of Bavaria to preach Christianity in his land. The modern name of the town, due like several others in the district to the abundance of salt found there,

appears before the end of the 8th century. When Charlemagne took possession of Bavaria in 798 he made Bishop Arno of Salzburg an archbishop. Thenceforward the dignity and power of the see steadily increased. Before the end of the 11th century Arno's successors had been named primates of Germany and perpetual papal legates; in the course of time they obtained high secular honors also; and in 1278 Rudolph of Hapsburg made the archbishops imperial princes. The able and ambitious line of prince archbishops, chosen from the noblest families of Germany, eagerly enlarged their possessions by purchase, exchange, and gift, and did not hesitate to come into warlike collision with the rulers of Bavaria and Austria, or even with the emperor himself. They took an active share in the affairs of the empire, and held an influential position in the electoral college. As a constituent of the German empire, Salzburg embraced an area of 3700 square miles, with a population of 250,000. The last independent archbishop was Hieronymus, count of Colleredo, elected in 1772, who ruled with energy and justice but without popularity. The see was secularized by the peace of Lunéville in 1802.

The strife between lord and people had always been keen in Salzburg; and in 1511 the archbishop, Leonhard, was besieged in Hohen-Salzburg by the inhabitants. The Peasants' War also raged within the see. From the beginning an orthodox stronghold of the Roman Catholic faith, Salzburg expelled the Jews in 1498, and energetically opposed the Protestant Reformation. Under Wolfgang Dietrich many Protestant citizens were driven from the town and their houses demolished. In spite, however, of rigorous persecution the new faith spread in secret, especially among the landward subjects of the archbishop, and a new and more searching edict of expulsion was issued by Archbishop Von Firmian in 1727. The Protestants invoked the aid of Frederick William I. of Prussia, who procured for them permission to sell their goods and to emigrate; and in 1731 and 1732 Salzburg parted to Prussia with about 30,000 industrious and peaceful citizens. About 6000 of these came from the capital.

By the peace of Lunéville Salzburg was given to the archduke of Austria and grand-duke of Tuscany in exchange for Tuscany; and its new owner was enrolled among the electoral princes. In the re-distribution following the peace of Pressburg in 1805, Salzburg fell to Austria. Four years later it passed to Bavaria, but the peace of Paris in 1814 restored it to Austria, to which it has since belonged. Under the designation of a duchy the territory formed the department of Salzach in Upper Austria until 1849, when it was made a separate crown-land, with the four departments of Salzburg, Zell, Tamsweg, and St. Johann. In 1861 the management of its affairs was entrusted to a local diet, consisting of the governor, the archbishop, and twenty-five representatives. The area of the duchy is 2762 square miles and the population in 1880 was 163,570, almost exclusively Roman Catholic and of German stock. (F. MU.)

SALZKAMMERGUT, a district in the southwest angle of Upper Austria, between Salzburg and Styria, famous for its fine scenery, forms a separate imperial domain about 250 square miles in area, and with a population of over 18,000. The beauty of its lofty mountains, sequestered lakes, and green valleys has made it one of the favorite tourist resorts of Europe, and has gained for it the title of the "Austrian Switzerland;" but it owes its name (literally "salt-exchequer property") and its economic importance to its extensive and valuable salt mines. The chief lakes are the Traunsee or Lake of Gmunden, the Lake of Hallstatt, the Attersee or Kammersee (the largest lake in Austria), the Mondsee, and the St. Wolfgang Lake. The principal mountains are the Dachstein (9849 feet), Thorstein (9659 feet), the Todte Gebirge with the summits of Priel (8238 feet), and others, and the Höllengebirge (6371 feet). The Schafberg (5840 feet) or "Austrian Rigi" and the Traunstein (5548 feet), isolated peaks among the lakes, are well-known tourist points. In the very heart of the salt-yielding district lies the fashionable spa of Ischl; but the capital of the Salzkammergut is Gmunden, situated on the Traunsee at the exit of the Traun, the chief river of the district. Cattle-rearing and forestry are carried on to a certain extent by the people, but between 6000 and 7000 of them are engaged in the salt-mines and evaporating works, which yield annually about 60,000 tons of salt. The sale of the salt is an Austrian crown-monopoly. The most important salt-works are at Ischl, Hallstatt, Ebensee, and Aussee. See SALT.

SALZWEDEL, an ancient town of Prussian Saxony, lies on the Jeetze, a tributary of the Elbe, 32 miles to the northwest of Stendal. It is an industrial place of some importance, with linen, cotton, and woollen manufactures, carries on a brisk river trade in grain, and possesses a fine Gothic church of the 13th century. But its chief claim to notice lies in the fact that it was for about a century (*c.* 1070–1170) the capital of the Old or North Mark (also for a time called the "Mark of Soltwedel"), the kernel of the Prussian state. The old castle, perhaps founded by Charlemagne, was purchased in 1864 by the king of Prussia, anxious to preserve this interesting relic. Salzwedel was also a member of the Hanseatic League, and at the beginning of the 16th century seems to have engrossed great part of the inland commerce of North Germany. The population in 1880 was 8780.

SÁMÁNID DYNASTY, the name of the third among those native dynasties which sprang up in the 9th and 10th centuries in the eastern portions of Persia, and, although nominally provincial governors under the suzerainty of the caliphs of Baghdád, succeeded in a very short time in establishing an almost independent rule over the vast territories round the Oxus and Jaxartes. The Ma'mún, Hárún-al-rashíd's son, to whose patronage the Táhirid family owed their supremacy in Khorásán and Transoxiana (820–872, 205–259 A. H.) appointed three sons of Sámán, originally a Tartar chief who claimed descent from the old Sásánian kings, governors of Herát and some districts beyond the Oxus; and these soon gained such an ascendency over all rival clanships that in 872, when the Táharids were overthrown by the Saffárids under the leadership of Ya'ḳúb b. Laith (868–878), they were strong enough to retain in their family the governorship of Transoxiana, with the official sanction of the caliph Mo'tamid (870–892), and to establish a semi-royal court in Bokhárá, the seat of the new Sámânid government. During the reign of Ya'ḳúb's brother 'Amr b. Laith (878–900) Isma'íl b. Aḥmad, Sámán's great-grandson (892–907, 279–295 A. H.), crossed the Oxus with a powerful army, invaded the territory of the Saffárids, sent 'Amr as prisoner to Baghdád, and gradually extended his rule over Khorásán, Khwárizm, Jurján, and the neighboring countries. His successors, all renowned by the high impulse they gave both to the patriotic feelings and the national poetry of modern Persia (see PERSIA, vol. xviii. p. 668 *sq.*), were Aḥmad b. Isma'íl (907–913, 295–301 A. H.), Naṣr II. b. Aḥmad, the patron and friend of the great poet Rúdagí (913–942, 301–331 A.H.); Núḥ I. b. Naṣr (942–954, 331–343 A.H.); 'Abd al-Malik I. b. Núḥ (954–961, 343–350 A.H.); Manṣúr I. b. Núḥ, whose vizier Bal'amí translated Tabarí's universal history into Persian (961–976, 350–366 A.H.); Núḥ II. b. Manṣúr, whose court-poet Daḳíḳí commenced the *Sháhnáma* (976–997, 366–387 A.H.); Manṣúr II. b. Núḥ (997–998, 387–389 A. H.); and 'Abd al-Malik II. b. Núḥ (999), with whom the Sámánid dynasty came to a rather abrupt end. The rulers of this powerful house, whose silver dirhems had an extensive currency during the 10th century all over the northern part of Asia, and were brought, through Russian caravans, even so far as to Pomerania, Sweden, and Norway, where Sámánid coins have lately been found in great number, suffered in their turn the fate they had prepared for their predecessors; they were overthrown by a more youthful and vigorous race, that of Sabuktagín, which founded the illustrious Ghaznawid dynasty and the Mussulman empire of India. Under 'Abd al-Malik I. a Turkish slave, Alptagín, had been entrusted with the government of Bokhárá, but showing himself hostile to 'Abd al-malik's successor Mansúr I., he was compelled to fly and to take refuge in the mountainous regions of Ghazna, where he soon established a semi-independent rule, to which, after

his death in 977 (367 A. H.), his son-in-law Sabuktagín, likewise a former Turkish slave, succeeded. Núḥ II., in order to retain at least a nominal sway over those Afghán territories, confirmed him in his high position and even invested Sabuktagín's son Maḥmúd with the governorship of Khorásán, in reward for the powerful help they had given him in his desperate struggles with a confederation of disaffected nobles of Bokhárá under the leadership of Fá'ik and the troops of the Dailamites, a dynasty that had arisen on the shores of the Caspian Sea and wrested already from the hands of the Sámánids all their western provinces. Unfortunately, Sabuktagín died in the same year as Núḥ II. (997, 387 A.H.), and Maḥmúd, confronted with an internal contest against his own brother Isma'íl, had to withdraw his attention for a short time from the affairs in Khorásán and Transoxiana. This interval sufficed for the old rebel leader Fá'ik, supported by a strong Tartar army under Ilekkhán, to turn Núḥ's successor Mansúr II. into a mere puppet, to concentrate all the power in his own hand, and to induce even his nominal master to reject Maḥmúd's application for a continuance of his governorship in Khorásán. Maḥmúd refrained for the moment from vindicating his right; but, as soon as, through court intrigues, Mansúr II. had been dethroned, he took possession of Khorásán, deposed Mansúr's successor 'Abd al-Malik II., and assumed as an independent monarch for the first time in Asiatic history the title of "sultán." The last descendant of the house of Sámán, Prince Muntasir, a bold warrior and a poet of no mean talent, carried on for some years a kind of guerilla warfare against both Maḥmúd and Ilekkhán, who had occupied Transoxiana, till he was assassinated in 1005 (395 A.H.). Transoxiana itself was annexed to the Ghaznawid realm eleven years later, 1016 (407 A.H.).

SAMAR. See PHILIPPINE ISLANDS, vol. xviii. p. 765.

SAMARA, a government of southeastern Russia, on the left bank of the lower Volga, bounded on the north by Kazañ, on the west by Simbirsk and Saratoff, on the east by Ufa and Orenburg, and on the south by Astrakhan, the Kirghiz Steppes, and the territory of the Ural Cossacks. The area is 58,320 square miles, and the population in 1882 was 2,224,093. A line drawn eastwards from the great bend of the Volga—the Samarskaya Luka—would divide the province into two parts, differing in orographical character. In the north flat hills and plateaus, deeply intersected by rivers, cover the surface. Some of these are spurs of the Urals; the others are continuations of the flat swelling which traverses middle Russia from the Carpathians to the Urals and compels the Volga to make its characteristic bend before entering the Aral-Caspian lowlands. The Samara Hills, on the right bank of the river Samara; the Kinel Hills; the Falcon (Sokolii) Hills, to the north of the Buzuluk; the Sok Hills, with the Tsareff Kurgan at the junction of the Sok with the Volga; and the Zheguleff "Mountains" on the Volga opposite Samara are so many names given to separate elevations or parts of plateaus between the deep-cut river valleys. In their highest parts they rise about 1000 feet above the sea, while the level of the Volga at Samara is but 43 feet, and the broad valleys of the Volga affluents sink to a correspondingly low level. South of the Samarskaya Luka the country assumes the characters of a low and flat steppe, recently emerged from the great Post-Pliocene Aral-Caspian basin. Only two ranges of gentle swellings, spurs of the Obshchiy Syrt, enter the southeast corner of the province.

The geology of Samara is not yet fully known. Carboniferous limestones (Upper?) occupy large tracts in the northeast and east. When approaching the Volga the zechstein appears in wide islands surrounded by the (probably Triassic) variegated marls and sands. Some Jurassic deposits are mentioned about the Samarskaya Luka. Cretaceous deposits, which cover large tracts on the right bank of the Volga, appear on the left bank only in the southeast of Samara. Older Tertiary deposits appear also in the very south of Samara; while Pliocene limestones and sandy clays, which cover the Obshchiy Syrt and Ust-Urt, protrude north as a narrow strip, reaching the bend of the Volga. The Glacial boulder-clay of middle Russia does not extend as far southeast as Samara, and the Post-Glacial deposits, not yet fully investigated, are represented by loess, black earth, and lacustrine formations. It is now established that during Post-Glacial times the Aral-Caspian sea extended in a wide gulf occupying the broad depression of the Volga as far north as the Samarskaya Luka, Caspian mussels having been traced as far as Samara. The soil is on the whole very fertile. All the northern part of the government is covered with a thick sheet of black earth; this becomes thinner towards the south, clays—mostly fertile—appearing from beneath; salt clays appear in the southeast.

Samara is inadequately watered, especially in the south. The Volga flows for 550 miles along its western border. Its tributaries the Great Tcheremshan (220 miles), the Sok (195 miles), the Samara (340 miles), with its sub-tributaries, and the smaller tributaries the Motcha, Elan-Irghiz or Tchagra, and the Little Irghiz are not navigable, partly on account of their shallowness, and partly because of water-mills. When the water is high, boats can enter some of them to a distance of 15 to 30 miles. The Great Irghiz alone, which has an exceedingly winding course of 335 miles, is navigated to Kutchum, and rafts are floated from Nikolaevsk. The banks of both Karamans are densely peopled. The Great and Little Uzeñ water southeastern Samara and lose themselves in the Kamysh sands before reaching the Caspian. A few lakes and marshes occur in the river valleys and salt marshes in the southeast.

The whole of the region is rapidly drying up. The forests, which are disappearing, are extensive only in the north. Altogether they still cover an area of 3,043,000 acres, or 8 per cent. of the whole surface; prairie and grazing land occupies 11,495,000 acres, and only 4,193,000 acres are uncultivable.

The climate is one of extremes, especially in the steppes, where the depressing heat and drought of summer are followed in the winter by severe frosts, often accompanied by snow storms. The average temperature at Samara (53° 11′ N. lat.) is only 39.2° (January, 9.3°; July, 70.4°).

The population, which was only 1,388,500 in 1853, has almost doubled since then, mostly in consequence of immigration; it reached 2,224,093 in 1862, and must now (1886) be about 2,250,000. Only 139,300 of these live in towns, the remainder being distributed over 4470 villages, which are often very large, no fewer than 150 ranging in population from 2000 to 6000. The Great Russians who have immigrated in compact masses, now constitute 65 per cent. of the population; the Little Russians, who were settled by the Government about the salt lakes, number about 30,000; and the White Russians, also sent to Samara from West Russia, may number about 15,000. A special feature of Samara is its population of German colonists, from Würtemberg, Baden, Switzerland, and partly also from Holland and the Palatinate, whose immigration dates from the invitation of Catherine II. in 1762. Protected as they were by free and extensive grants of land, by exemption from military service, and by self-government, they have developed rich colonies of Catholics, Protestants, Unitarians, Anabaptists, Moravians, and Mennonites, most of which have adopted the Russian village-community system, slowly modified by the existence of a special capital reserved for the purchase of land for the increasing population.[1] They now constitute 40 per cent. of the population of the district of Novo-Uzeñ, and 9 per cent. of that of Nikolaevsk, their aggregate number reaching 150,000. The Moksha and Erzya Mordvinians, now nearly quite Russified, gathered in Samara during the reign of Peter I., when they abandoned in great numbers the left bank of the Volga; they constitute about 10 per cent. of the population. Some 70,000 Tchuvashes and 1500 Votyaks may be added to the above. The Turkish stem is represented by some 100,000 Tartars, 70,000 Bashkirs, and a few Kirghizes. Some baptized Kalmucks were settled in 1730 at Stavropol; and about 600 Adyghe Circassians, settled at Novo-Uzeñ, may still be found there. All these varied elements, living in close juxtaposition, nevertheless continue to maintain their own ethnographical features; the Mordvinians alone have lost their ethnological individuality and rapidly undergo a modification of type as they adopt the life of Russian peasants. As regards religion, the great bulk of the population are Orthodox Greeks; the Nonconformists, who still

[1] See the interesting work of M. Clauss on "Our Colonies" (Russian).

retain their numerous and widely celebrated communities and monasteries on both the rivers Uzeñ, number several hundred thousands (officially 100,000); next come Mohammedans, 12 per cent.; a variety of Protestant sects, 5 per cent.; Roman Catholics, about 2 per cent.; and, lastly, some 4000 pagans.

The chief occupation is agriculture,—summer wheat, rye, oats, millet, oil-yielding plants, and tobacco being the principal crops. Owing to its great fertility, Samara usually has a surplus of grain for export, varying from 1½ to 4 million quarters (exclusive of oats) annually. In 1883, which was an average year for summer wheat, but under the average for winter rye, the total crops were—wheat, 3,219,600 quarters; rye, 717,800; oats, 1,800,000; barley, 127,300; and other grains, 1,310,000. Notwithstanding this production, varying from 5,000,000 to 9,000,000 quarters of grain (exclusive of oats) for a population of only 2¼ millions, Samara is periodically liable to famine to such an extent that men die by thousands of hunger-typhus, are compelled to send (as in 1879) to adjoining provinces to purchase orach as food, or are forced to go by hundreds of thousands in search of employment on the Volga, while millions of quarters of corn are nevertheless exported. The population have no store of corn, or reserve capital for years of scarcity (there were in 1882 only 245,100 quarters of corn in the public granaries, and 503,022 roubles [in paper $244,468.69] of capital for that purpose), and some 210,000 males have in all only 845,000 acres of arable and pasture land. But even this soil, although all taxed as arable, is often of such quality that only 50 to 55 per cent. of it is under crops, while the peasants are compelled to rent from two to two and a half million acres for tillage from large proprietors. At present 8,549,000 acres, or about one-quarter of the total area of Samara, purchased from the crown or from the Bashkirs at nominal prices—very often a few copecks per acre—are in the hands of no more than 1704 persons. The aggregate taxes exacted from the peasants amounting to 5,782,870 roubles [in paper $2,810,474.82] (1879), that is to say, from 8 [$3.89] to 10 [$4.86] roubles per male, they are, when account is taken of the advances received during scarcity, reduced to absolute destitution whenever the crops are short, so as to be compelled to sell their last horse and cow. In 1880 the arrears reached 7,000,000 roubles [$3,402,000], to which must be added about 8,000,000 roubles [$3,888,000] of advances, and in 1882, out of the 1,196,646 roubles [$581,569.95] proposed to be levied by the zemstvos, 376,643 [$183,048.50] remained in arrears. The general impoverishment may be judged from the death-rate, which for several years has ranged from 46 to 48 per thousand. In 1879 61,488 families were compelled to abandon their homes and disperse throughout Russia in search of employment; while 100,000 families were left wholly destitute of cattle in 1880. Notwithstanding an increase of population by nearly one-third during the last twenty years the numbers of sheep and cattle decreased by about one-half from 1863 to 1882.

The manufactures of Samara are unimportant, the aggregate production (chiefly from tanneries, flour-mills, tallow-melting houses, and distilleries) in 1882 reaching only 7,671,000 roubles (£767,100 or $3,728,106). Petty trades, especially the weaving of woollen cloth, are making progress in the south. The culture of oil-yielding plants is developed in several districts, as is also that of tobacco (10,690 acres, yielding 101,980 cwts. in 1884). Trade is very active—corn, tallow, potash, salt, and some woollen cloth being exported; the imports of raw cotton from Central Asia by the Orenburg railway to be forwarded to the interior of Russia are increasing. The aggregate value of merchandise shipped on the Volga and its tributaries within the government reached 27,025,000 roubles [$13,134,150] in 1882; while 9,100,000 cwts. of merchandise were carried in both directions on the Orenburg railway. The chief loading places are Samara, Stavropol, Bałakova, and Pokrovsk on the Volga, Staro-Mainsk on the Maina, and Ekaterininsk on the Bezentchuk.

The government is divided into seven districts, the chief towns of which, with population as estimated in 1879, are—Samara (63,400 inhabitants), Bugulma (13,000), Buguruslan (18,000), Buzuluk (10,500), Nikolaevsk (9900), Novo-Uzeñ (9700), and Stavropol (4265). Serghievsk (1000) also has municipal institutions; its mineral waters are becoming more and more frequented. Pokrovskaya Sloboda (20,000), Ekaterinenstadt, Glushitza, and Alexandroff Gay, each with more than 5000 inhabitants, the loading place of Bałakova (2500), and several others, although still but villages, have more importance than most of the above towns.

The territory now occupied by Samara was until last century the abode of nomads. The Bulgarians who occupied it until the 13th century were followed by Mongols of the Golden Horde. The Russians penetrated thus far in the 16th century, after the defeat of the principalities of Kazañ and Astrakhan. To secure communication between these two cities, the fort of Samara was erected in 1586, as well as Saratoff, Tsaritsyn, and the first line of Russian forts, which extended from Byełyi Yar to the neighborhood of Menzelinsk near the Kama. A few settlers began to gather under its protection. In 1670 it was taken by the insurgent leader Steuka Raziu, whose name is still remembered in the province. In 1732 the line of forts was removed a little farther east, so as to include Krasnyi Yar and parts of what is now the district of Bugurusłan. The Russian colonists also advanced eastwards as the forts were pushed forwards and increased in number. The southern part of the territory, however, remained still exposed to the raids of the nomads. In 1762 Catherine II. invited foreigners, especially Germans, and Nonconformists who had left Russia, to settle within the newly-annexed territory. Emigrants from various parts of Germany responded to the call, as also did the Raskolniks, whose communities on the Irghiz soon became the centre of a formidable insurrection of the peasantry which broke out in 1775 under Pugatcheff and was supported by the Kalmucks and the Bashkirs. After the insurrection, in 1787, a new line of forts from Uzeñ to the Volga and the Urals was erected to protect the southern part of the territory. At the end of the 18th century Samara became an important centre for trade. As soon as the southern part of the territory became quiet, great numbers of Great and Little Russians began to settle there—the latter by order of Government for the transport of salt obtained in the salt lakes. In the first half of the present century the region was rapidly colonized. In 1847–50 the Government introduced about 120 Polish families; in 1857–59 Mennonites from Dantzic also founded settlements; and in 1859 a few Circassians were brought hither by Government; while an influx of Great Russian peasants continued and still goes on. The territory of Samara remained long under Kazañ, or Astrakhan, or Simbirsk and Orenburg. The separate government dates from 1851. (P. A. K.)

SAMARA, capital of the above government, is situated on the slopes of the left bank of the Volga, 743 miles to the southeast of Moscow, at the mouth of the Samara and opposite the hills of Zheguleff. It is one of the most important towns of the lower Volga for its trade, and its importance cannot fail to increase as the railway to Central Asia advances eastwards. Its population rose from 34,500 in 1869 to 63,400 in 1879. Samara is built mostly of wood, and large spaces remain vacant on both sides of its broad unpaved streets. Its few public buildings are insignificant. A number of the inhabitants support themselves by agriculture and gardening, for which they rent large areas in the vicinity of the town. The remainder are engaged at the harbor, one of the most important on the Volga. Three fairs are held annually, with aggregate returns exceeding 2,000,000 roubles [$972,000]. Samara is becoming more and more a resort for consumptives on account of its koumiss establishments (see vol. xvi. p. 318).

SAMARANG. See JAVA, vol. xiii. p. 617.

SAMARCAND. See SAMARKAND.

SAMARIA (Heb. שֹׁמְרוֹן, *Shômĕrôn*; LXX. Σαμάρεια, except in 1 Kings xvi. 24[1]), the capital of Northern Israel from the time of Omri to the fall of the kingdom, which was consummated in the long siege of the royal city by Shalmaneser (2 Kings xvii. 5) and its capture by his successor Sargon (*c.* 721 B.C.). The choice of Samaria as his capital by the warlike and energetic prince to whom the kingdom of Ephraim mainly owed its greatness is easily understood. It stands in the very centre of Palestine and of the country of the dominating tribe of Joseph, and, built on a steep and almost isolated hill, with a long and spacious plateau for its summit, was naturally a position of much strength, commanding two of the most important roads — the great north and south road

[1] The first ô in *Shômerôn* can hardly represent the old pronunciation. In 1 Kings xvi. 24, the name of the city is derived from that of Shemer, from whom Omri bought the site, and here LXX. seems to have originally had Σαμερών or Σεμερών (Cod. Vat. Σαεμηρων), afterwards corrected to Σομορών (as in Lagarde's edition of Lucian's text) from the Hebrew tradition (compare Field's *Hexapla* on the passage). The Assyrian monuments have *Samirina*.

which passes immediately under the eastern wall, and the road from Shechem to the maritime plain which runs a little to the west of Omri's capital. The hill of Samaria is separated from the surrounding mountains (Amos iii. 9) by a rich and well-watered plain, from which it rises in successive terraces of fertile soil to a height of 400 or 500 feet. Only on the east a narrow saddle, some 200 feet beneath the plateau, runs across the plain towards the mountains; it is at this point that the traveller coming from Shechem now ascends the hill to the village of Sebastiya (now pronounced Sebastíya), which occupies only the extreme east of a terrace beneath the hill-top, behind the crusading church of John the Baptist, which is the first thing that draws the eye as one approaches the town. The hill-top, the longer axis of which runs westward from the village, rises 1450 feet above the sea, and commands a superb view towards the Mediterranean, the mountains of Shechem, and Mount Hermon. The situation as a whole is far more beautiful than that of Jerusalem, though not so grand and wild. The line of the ancient walls has not been determined, the chief visible ruins being of the time of Herod; but, if they followed the natural lines of defence, the city may have been almost a mile in length from east to west.

The foundation of the new capital was speedily followed by the wars with Damascus, in which repeated ineffectual sieges by the Syrians proved the value of the stronghold; and even the Assyrians, as has been mentioned, reduced the place with difficulty. During part of the struggle with Damascus the kings of Israel often resided at Jezreel, which was nearer the seat of war; but Omri's city never lost its preëminence. While it stood, Samaria and not Jerusalem was the centre of Hebrew life, and the prophets sometimes speak of it as also the centre of corrupt Jehovah-worship and idolatry (Hos. viii. 5, Mic. i. 5, Isa. x. 10). The *ashera* of Samaria, which was not removed by the house of Jehu, is mentioned in 2 Kings xiii. 6; and Hos. viii. 5 seems to speak of calf-idols there, unless the prophet is already using the name of Samaria for the kingdom as a whole, as later writers often do. Ultimately, in the Greek period, the name of Samaria or Samaritis was applied to the whole tract of which it is the centre—the region between Judæa and Galilee, the country of the SAMARITANS (*q.v.*); and the New Testament uses Samaria in this sense. The city of Samaria was Hellenized by Alexander, who settled Macedonian colonists in it. It became a fortress and was twice taken by siege in the wars of the Diadochi (by Ptolemy I. in 312 and by Demetrius Poliorcetes about 296). Under the Ptolemies Samaria was the head of a separate province, and it continued to be a strong city till John Hyrcanus took and utterly destroyed it after a year's siege (*c.* 110 B.C.; see Jos., *Ant.*, xiii. 10, 2 *sq.*). Taken from the Jews by Pompey, Samaria was one of the ruined cities which Gabinius ordered to be restored (Jos., *Ant.*, xiv. 5, 3); then given by Augustus to Herod the Great, it was refounded by him on a splendid scale probably in 27 B.C., the autumn of which year, according to Schürer's calculations, is the probable epoch of the new city of Sebaste, as it was now called in honor of Augustus. Many remains of Herod's buildings, described by Josephus (*Ant.*, xv. 8, 5; *B. J.*, i. 21, 2), still remain; the most notable belong to a long colonnade just above the line of Herod's wall and those of the great temple of Cæsar. The tombs of John the Baptist, Elisha, and Obadiah were visited at Samaria in the time of Jerome (see OBADIAH), and that of St. John must have been shown there still earlier, for it was violated by Julian. The old crusading church, now a mosque, was built over the tomb of the Baptist, who is reverenced as a prophet by the Moslems. A view and plan of the church, with details, are given in the *Survey of W. Pal.* (*Memoirs*, vol. ii. p. 211 *sq.*), where also there is a plan of the city. (W. R. S.)

SAMARITANS. This term, which primarily means "inhabitants of Samaritis or the region of Samaria," is specially used, as in the New Testament and in Josephus, as the name of a peculiar religious community which had its headquarters in the Samaritan country, and is still represented by a few families (about 150 souls) at Nábulus, the ancient Shechem. They regard themselves as Israelites, descendants of the ten tribes, and claim to possess the orthodox religion of Moses, accepting the Pentateuch and transmitting it in a text which for the most part has only microscopic variations from the Torah of the Jews. But they regard the Jewish temple and priesthood as schismatical, and declare that the true sanctuary of God's choice is not Zion but Mount Gerizim, overhanging Shechem (John iv. 20); here they had a temple which was destroyed by John Hyrcanus about 128 B.C. (Jos., *Ant.*, xiii. 9, 1), and on the top of the mountain they still celebrate the passover. The sanctity of this site they prove from their Pentateuch, reading Gerizim for Ebal in Deut. xxvii. 4. With this change the chapter of Deuteronomy can be interpreted with a little straining as a command to select Gerizim as the legitimate sanctuary (comp. ver. 7); and accordingly in Exod. xx. and Deut. v. a commandment taken from Deut. xxvii. is inserted at the close of the decalogue. Thus on their reckoning the tenth commandment is the direction to build an altar and do sacrifice on Gerizim,—from which of course it follows that not only the temple of Zion but the earlier temple of Shiloh and the priesthood of Eli were schismatical. Such at least is the express statement of the later Samaritans; the older Samaritans, as they had no sacred books except the Pentateuch, probably ignored the whole history between Joshua and the captivity, and so escaped a great many difficulties. The contention that the Pentateuch is a law given by Moses for a community worshipping on Mount Gerizim is of course glaringly unhistorical. By the (unnamed) sanctuary of God's choice the Deuteronomist certainly designed the temple of Zion; and the priestly law, which is throughout based on the practice of the priests of Jerusalem before the captivity, was reduced to form after the exile, and was first published by Ezra as the law of the rebuilt temple of Zion. The Samaritans must therefore have derived their Pentateuch from the Jews after Ezra's reforms, *i.e.*, after 444 B.C. Before that time Samaritanism cannot have existed in a form at all similar to that which we know; but there must have been a community ready to accept the Pentateuch. In point of fact the district of Mount Ephraim was not entirely stripped of its old Hebrew population by the Assyrian captivity, and the worship of Jehovah went on at the old shrines of Northern Israel side by side, or even interfused, with the old heathenish rites of the new settlers whom the Assyrians brought to fill up the lands desolated by war. The account of the religious condition of the country given in 2 Kings xvii. 24 *sq.* dwells only on the partial adoption of Jehovah-worship by the foreigners who had come into the land, but by no means implies that the foreigners constituted the whole population. Josiah extended his reforms beyond the limits of Judæa proper to Bethel and other Samaritan cities (2 Kings xxiii. 19), and the narrative shows that at that date things were going on at the Northern sanctuaries much as they had done in the time of Amos and Hosea. To a considerable extent his efforts to make Jerusalem the sanctuary of Samaria as well as of Judæa must have been successful, for in Jer. xli. 5 we find fourscore men from Shechem, Shiloh, and Samaria making a pilgrimage to "the house of Jehovah," after the catastrophe of Zedekiah. And so it is not surprising to find that the people of this district came to Zerubbabel and Joshua after the restoration, claiming to be of the same religion with the Jews and asking to be associated with them in the rebuilding of the temple. Their overtures were rejected by the leaders of the new theocracy, who could not but fear the results of interfusion with so large a mass of men of mixed blood and very questionable orthodoxy; and so the Jehovah-worshippers of Samaria were thrown into the ranks of "the adversaries of Judah and Benjamin" (Ezra iv.). Nevertheless, down to the time of Nehemiah, the breach was not absolute; but the expulsion from Jerusalem in 432 B.C. of a man of high-priestly family who had married a daughter of Sanballat made it so; and it is

more than probable, as has been explained in ISRAEL, vol. xiii. p. 429, that this priest is the Manasseh of Josephus, who carried the Pentateuch to Shechem, and for whom the temple of Gerizim was built. For, though the story in Josephus (*Ant.*, xi. 8) is falsely dated and mixed with fable, it agrees with Neh. xiii. in too many essential points to be wholly rejected, and supplies exactly what is wanted to explain the existence in Shechem of a community bitterly hostile to the Jews, and yet constituted in obedience to Ezra's Pentateuch.

When we consider what difficulties were met with in the introduction of Pentateuchal orthodoxy even at Jerusalem, the foundation of a community of the Law in the Samaritan country, among the mixed populations whom the Judæan leaders did not venture to receive into fellowship, must appear a very remarkable exploit. The Samaritan religion was built on the Pentateuch alone; and the fact that they did not receive even those prophetic books and historical narratives which originated in Northern Israel (all which have been preserved to us only by the Jews) shows that, before they received the Pentateuch, their Jehovah-worship was a mere affair of traditional practice, uninspired by prophetic ideas and unsupported by written record of the great deeds of Jehovah in time past. It can hardly in any respect have risen above the level of the popular religion of North Israel as described and condemned by Hosea and Amos. In Judæa the duty of conformity to the Pentateuch was enforced by appeal to the prophets and to the history of the nation's sins and chastisements, and the acceptance of a vast and rigid body of ordinances was more easy because they came as the consolidation and logical development of a movement that had been in progress from the days of Isaiah. Among the Samaritans, on the other hand, the acceptance of the Pentateuch implied a tremendous breach of continuity. They must indeed have felt that they had fallen behind the Judæans in religious matters, and the opportunity of putting themselves on a par with them by securing a copy of the institutes of Moses and the services of a Judæan priest would naturally be grasped at. But what is remarkable is that, having got the Pentateuch, they followed it with a fidelity as loyal and exact as the Jews themselves, save in the one matter of the change of the sanctuary. No concessions were made to heathenism or to the old lax Jehovah-worship; the text of the sacred book was transmitted with as much conscientiousness as was practiced by Jewish scribes in the first centuries after Ezra;[1] and even from the unwilling witness of their enemies the Jews we can gather that they fulfilled all righteousness with scrupulous punctiliousness so far as the letter of the written law was concerned, though of course they did not share in the later developments of the oral law, and so were heretics in the eyes of the Pharisees.[2]

That it was possible to establish such a community on such a soil is a remarkable evidence that in that age the tendency to a legal religion was favored by general causes, not confined to Judæa alone; it must be remembered that elaborate hierocracies sprang up after the fall of the old nationalities in many parts of western Asia (comp. PRIEST, vol. xix. p. 745). At the same time it must be remembered that, as Ezra could not have succeeded without Nehemiah, Manasseh had Sanballat's civil authority to back him. It is probable, too, that Josephus is right in assuming that he was strengthened by a considerable secession of Judæans, and it is not to be supposed that the "Samaritans" ever embraced anything like the whole population of the Samaritan country. Samaria itself was Hellenized in the time of Alexander; and in Ecclus. l. 26 the foolish people that dwell at Shechem are distinguished from the inhabitants of the Samaritan hill-country in general.[3] The Samaritans, like the Jews, throve and multiplied under the discipline of the law, but at no time in their history do they appear to have had the political importance that would have accrued to so closely knit a religious body if it had held all the fertile Samaritan district.

Jews and Samaritans were separated by bitter jealousies and open feuds (Jos., *Ant.*, xii. 4, 1), but their internal development and external history ran closely parallel courses till the Jewish state took a new departure under the Maccabees. The religious resemblance between the two bodies was increased by the adoption of the institution of the synagogue, and from the synagogue there certainly grew up a Samaritan theology and an exegetical tradition. The latter is embodied in the Samaritan Targum or Aramaic version of the Pentateuch, which in its present form is, according to Nöldeke's investigations, not earlier than the fourth Christian century, but in general agrees with the readings of Origen's τὸ Σαμαρειτικόν. For the dogmatic views of the Samaritans our sources are all late; they embrace hymns and other books of little general interest, and mainly at least of mediæval origin. Like the Jews, too, the Samaritans had a haggada; indeed the Arabic books they still possess under the name of chronicles are almost entirely haggadic fable with very little admixture of true tradition. The recent date of all this literature seems to show that the old Samaritans had not nearly so vigorous an intellectual life as the Jews, though what life they had moved in similar lines; indeed, having no sacred book but the Pentateuch, and having passed through no such national revival as that of the Maccabees, they lacked two of the most potent influences that shaped the development of Judaism. On the other hand, they shared with the Jews the influence of a third great intellectual stimulus, that of Hellenism. Samaritans as well as Jews were carried to Egypt by Ptolemy Lagi; the rivalry of the two sects was continued in Alexandria (Jos., *Ant.*, xii. 1, 1), and Hellenized Samaritans wrote histories and epic poems in Greek with exactly the same patriotic mendacity which characterizes Jewish Hellenism. Of this, the oldest surviving Samaritan literature, some fragments have been preserved in the remains of Alexander Polyhistor.[4]

The troubles that fell on the Jews for their fidelity to the law, under Antiochus Epiphanes, were not escaped by the Samaritans (2 Mac. v. 23, vi. 2); the account in Josephus (*Ant.*, xii. 5, 5) which makes them voluntarily exchange their religion for the wor-

[1] This appears especially by comparison of the Samaritan Pentateuch with the Septuagint. It is not of course to be wondered at that the Judæan text is on the whole superior to the Samaritan, for the Samaritans had no opportunity of revising their text by Judæan copies. The Samaritan character is an independent development of the old Hebrew writing as it was about the time when they first got the Pentateuch. This in itself is an indication that from the first their text ran a separate course, and that there was no opportunity of checking corruptions that had got into it by reference to different recensions. In Judæa also there were important variations between MSS. down to the time of the Septuagint and even later, and in many cases the Septuagint readings agree with the Samaritan Pentateuch, showing an affinity between the sources of these two texts. But ultimately the Jewish scribes were able to constitute or rather to select an authoritative text, and whether by good luck or by judgment the text they chose was on the whole one of a singularly good type. The Samaritans never had opportunity to do anything of this kind.

[2] Compare, for details and references, Nutt, *Fragments of a Samaritan Targum*, p. 37 *sq.*, 42 *sq.*, and Schürer, *Gesch. des Jüdischen Volkes*, p. 7. Josephus (*Ant.*, xi. 8, 7) says they received Judæans who were accused of ritual irregularities, but, as he adds that the fugitives professed that they were falsely accused, it is plain that even this partisan writer did not venture to represent them as indifferent to ritual orthodoxy. No doubt, in addition to the legal ordinances, the Samaritans retained some ancient traditional practices, as they certainly introduced some new observances. Their passover, for example, has some peculiar features, one of which, viz., the application of the sacrificial blood to the faces of the children, has an exact parallel in the old Arabic *'akîka*. See the account of an eye-witness (Prof. Socin) in Bädeker's *Palestine*.

[3] So all Greek MSS. The old Latin substitutes Mount Edom; the Syriac has "Gbel," which may mean Ebal or the Edomite country.

[4] See especially Friedländer, *Hellenistische Studien* (1875), p. 82 *sq.* An Egyptio-Samaritan fragment has also been suspected by Ewald to be embedded in the *Sibyllina*, xi. 239–244.

ship of the Grecian Zeus is certainly a malignant falsehood.[1]

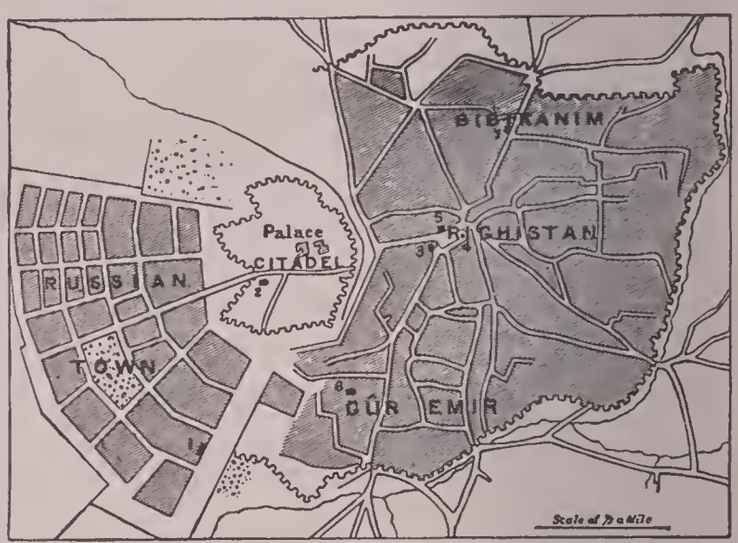
Under the Maccabees their relations with Judæa became very bitter, and they were severely chastised by Hyrcanus, who destroyed their temple. Hostilities between the two nations recurred from time to time; and in the New Testament, in Josephus, and in Jewish tradition we see how deep-seated was their mutual abhorrence.[2] But, with all this, the sects were too nearly alike not to have much in common. The Roman yoke galled both in the same way; the Samaritan false prophet whose movements Pilate put down with cruel slaughter (Jos., *Ant.*, xviii. 4, 1), and probably also Simon Magus and Dositheus (Orig., *Cont. Cels.*, i. p. 44), are parallel phenomena to the false Messiahs that arose among the Jews. The original views of the Samaritans were like those of the Sadducees, and they did not believe in a resurrection or a Messiah; but it was impossible for their faith to survive under the cruel pressure of foreign bondage without absorbing something from Jewish eschatology. And so, too, in the struggle of the Jews with Vespasian, perhaps also in that with Hadrain, the Samaritans forgot their old feud, and took part against the Romans. They seem also to have shared in great measure in the subsequent dispersion, for in later times we hear of Samaritans and Samaritan synagogues not only in Egypt but in Rome, and in other parts of the empire. The Christian emperors made hard edicts against them as well as the Jews, and at length excluded them from the public service. Under these circumstances they naturally came to be mainly traders and merchants' clerks; in Constantinople "a Samaritan" meant "a banker's clerk." In their old homes they still remained numerous enough to make a serious insurrection under Justinian (529 A.D.). Its suppression was followed by very stern decrees against the whole sect, and Europe heard little more of the Samaritans till, towards the close of the 16th century, Western scholars took an interest in the few congregations that still remained in the East, at Cairo and Damascus as well as at Nábulus. It was found that during the Middle Ages they had formed an Arabic literature of considerable size but of little intrinsic worth, and had continued faithfully to preserve their scriptures. Since then their numbers have been constantly on the wane, and they have almost lost their old learning, which was never very considerable.

Samaritan Literature.—Of this a full account is given, along with a sketch of Samaritan History, in the introduction to Nutt's *Fragments of a Samaritan Targum* (1874). The following list confines itself to what has been printed. (*a*) The Hebrew-Samaritan Pentateuch, *i.e.*, the Hebrew text in Samaritan recension and character, was first printed in the Paris polyglott. On the nature of this recension, see Gesenius, *De Pent. Sam. origine*, etc. (1815). A list of variations from the Massoretic text is given by Petermann, *Hebr. Formenlehre nach der Aussprache der Samaritaner* (1868). (*b*) Targum, also in the Paris and London polyglotts, but in very corrupt form. A critical edition of the whole is still lacking; the best text of part is that given by Nutt from a Bodleian MS. The dialect, apart from the corruptions of the text, differs little from other Palestinian Aramaic. (*c*) Aramaic having been supplanted in Palestine by Arabic, an Arabic version of the Pentateuch was made by Abû Sa'îd about 1100 A.D. The first three books have been edited by Kuenen (1851–54). On this version, see especially De Sacy in *Mém. Acad. Inscr. et Belles-Lettres*, vol. xlix. (*d*) The so-called Samaritan book of Joshua is an Arabic chronicle going down to Roman times, but of almost no historical use. It may date from the 13th century. Juynboll edited it in 1848 from a Leyden MS.; there are other MSS. in the British Museum and in Trinity College, Cambridge. (*e*) Another short chronicle, El-Tolidoth, published by Neubauer in *Jour. As.* (1869), seems to have used the Jewish *Book of Jubilees*. Both (*d*) and (*e*) with some other sources were used by—(*f*) The Chronicle of Abulfath, written in 1355, and continued by later hands; edited by Vilmar (Gotha, 1865). (*g*) A collection of hymns was published by Gesenius (*Carmina Samaritana*, 1824). Other liturgical pieces have been published by Heidenheim. (*h*) Specimens of Samaritan writings on Hebrew grammar were published by Nöldeke in the *Göttinger Nachrichten* (1862).

For the Samaritans in general, see Nutt, *op. cit.*; Juynboll, *Comm. in Hist. Gentis Samar.*, Leyden, 1846; Appel, *De Rebus Samaritanorum sub imperio Romano peractis*. De Sacy published in the *Notices et Extraits*, xii. (1831), all the correspondence of the Samaritans with European scholars, and other material about the modern Samaritans. For the modern Samaritans see also Petermann's *Reisen*, vol. i. (1860). For Makrîzî's account of the Sámaritans, see De Sacy, *Chrest. Ar.*, vol. i. Other literature in Nutt and very fully in Kautzsch's article in Herzog-Plitt, vol. xiii.

(W. R. S.)

SAMARKAND, a city of Central Asia, anciently *Marcanda*, the capital of Sogdiana, then the residence of the Sámánids, and subsequently the capital of Timur, is now chief town of the Zerafshan district of the Russian dominions. It lies in a richly cultivated region, 185 miles southwest of Tashkend, and 145 miles east of Bokhara, in 39° 39′ N. lat. and 67° 17′ E. long., 2150 feet above the sea, in the valley of the Zerafshan, at the point where it issues from the extreme western spurs of the Tian-Shan before entering the steppes of Bokhara. The Zerafshan now flows about three or four miles to the north of the city, supplying its extensive gardens with water.



Plan of Samarkand. 1, Governor's house; 2, Burying-place of Russian soldiers who fell in the defence of 1868; 3, College of Ulug-beg; 4, College of Shir-dar; 5, College of Tilla-kari; 6, Grave of Timur; 7, Grave of Timur's wives.

Marcanda,[3] a great city, whose walls had a compass of 90 stadia [10½ miles], was destroyed by Alexander the Great. It reappears as Samarkand at the time of the conquests of the Arabs, when it was finally reduced by Kotaiba ibn Moslim in 93 A.H. (711–712 A.D.). Under the Sámánids it became a brilliant seat of Arabian civilization. Its schools, its savants, were widely renowned; it was so populous that, when besieged by Jenghiz Khan in 1219, it is reported to have been defended by an army of 110,000 men. Destroyed and pillaged by the great conqueror, its population was reduced to one-quarter of what it had been, but it still reckoned 25,000 families within its walls. The great conqueror Timur made it his residence, and the inhabitants rose to 150,000. The magnificent buildings of the epoch of the successors of Timur, which still remain, testify to its former wealth. But new invaders again reduced it to ruin, so that at the beginning of last century it is reported to have been almost without inhabitants. It fell under Chinese dominion, and subsequently under that of the

[1] See Appel, *Quæstiones de Rebus Samaritanorum*, 1874, p. 37 *sq.*

[2] Josephus calls them Cuthæans (from 2 Kings xvii. 30), and will not admit that they are of Hebrew blood at all; the Rabbins use the same name, but are not always so positive in calling them pure Gentiles. The groundless accusation of dove-worship (which makes their religion that of the Syrian Aphrodite) arose in post-Mishnic times.

[3] [Also Maracanda. Curtius gives the walls as 70 stadia or eight miles.—AM. ED.]

emir of Bokhara, suffering again and again from wars which were fought for it and around it. But no follower of Islam enters it without feeling that he is on holy ground, although the venerated mosques and beautiful colleges of Samarkand are falling into ruins, its high influence as a seat of learning has vanished, and its very soil is profaned by infidels. It was not without a struggle that the Mohammedans permitted the Russians to take possession of their holy city; and, while other cities of Central Asia submitted almost without striking a blow, Samarkand revolted in 1868, the Russian garrison shut up in the citadel being rescued only by the timely arrival of a corps despatched from Tashkend.

The present city, which is but a wreck of its former self, is quadrangular in shape and is enclosed by a low wall 9 miles long. The citadel rises in the west, and to the westward of this again the Russians have laid out their new town, with broad streets and boulevards radiating from the citadel, while a pretty public garden, carefully irrigated, occupies the centre.

The central part of Samarkand is the Righistan—a square limited by the three *madrasahs* (colleges) of Ulug-beg, Shir-dar, and Tilla-kari; in its architectural symmetry and beauty this is rivalled only by some of the squares of Italian cities. Though differing in detail, the great lines of the three colleges are the same. An immense doorway decorates the front of each of these large quadrilateral buildings. A high and deep-pointed porch, whose summit almost reaches the top of the lofty façade, is flanked on each side by a broad quadrilateral pillar of the same height, subdivided into three sections, each of which has its own style of decoration. Two fine columns, profusely decorated, in turn flank these broad pillars. On each side of the high doorway are two lower archways connecting it with two elegant towers, narrowing towards their tops and slightly inclined. The whole of the façade and also the interior courts are profusely decorated with enamelled bricks, whose colors—blue, green, pink, or golden, but chiefly turquoise-blue—are wrought into the most fascinating designs, in striking harmony with the whole and with each part of the building. In the recess of the deep doorway is the wide door, with proportions of remarkable elegance, and above it are the broad decorations filling up the upper part of the arch. Over the interior are bulbed or melon-like domes, perhaps too heavy for the façade. The cool and shady courts are surrounded by three stories of small rooms, each having only one opening—the door. The majestic buildings are now merely the dwellings of mollahs, who live on the revenues of the Wakf lands at Katty-kurgan.

The college of Shir-dar (built in 1601) takes its name from the two lions, or rather tigers, figured on the top of its doorway, which is richly decorated with green, blue, red, and white enamelled bricks. It is the most spacious of the three, and 128 mollahs inhabit its 64 apartments. The Tilla-kari ("dressed in gold"), built in 1618, has 56 rooms. But the most renowned of the three madrasahs is that of Ulug-beg, built in 1420 or 1434, by Timur, the grandson of the great conqueror. It is smaller than the others, but it was to its school of mathematics and astronomy that Samarkand owed its wide renown in the 15th century.

A winding street running northeast from the Righistan leads to a much larger square having the college of Bibi-khanym on the west, the graves of Timur's wives on the south, and a clean bazaar on the east. The college was erected in 1388 by a Chinese wife of Timur, and is said to have once sheltered as many as a thousand students. It covers a large area, and has three mosques connected by a quadrangular building containing the students' rooms. The archway and towers of its façade are considered by Vambéry as a model for such buildings, and its decorations resist the destructive influences alike of time and of man. One of its mosques still raises its high bulbed dome above the outer walls, which are falling into ruins, and now give accommodation to the carts and the bazaar of traders in cotton. The lofty ruins of the grave of Timur's wives are really grand.

To the north, outside the walls of Samarkand, but close at hand, is the Hazreti Shah-Zindeh—the summer-palace of Timur; and near this is the grave of Shah-Zindeh, or, more precisely, Kotham ibn al-'Abbás ibn 'Abd al-Mottalib, a famous companion of the Prophet. This was already a famous shrine in the 14th century (Ibn Batuta, iii. 52); it is believed that the saint still lives in the mosque, and will one day rise for the defence of his religion. The Hazreti Shah-Zindeh covers a wide area on a terrace reached by forty marble steps. A series of galleries and rooms lead to the hall containing the relics of the saint. The decoration of the interior halls is marvellous.

Another street running southwest from the Righistan leads to the Gur-Emir—the grave of Timur. This consists of a chapel crowned with an elegant dome, enclosed by a wall and fronted by an archway. Time and earthquakes have greatly injured this fine building; one of the minarets is already in ruins. The interior consists of two apartments paved with white marble, the walls being covered with elegant turquoise arabesques and inscriptions in gold. The chief room is of great beauty, and its decorations, of a bolder style than the others, are in strict harmony with the impression it is designed to produce. A large pyramidal piece of jade broken into two, covers the grave of Timur, which has by its side that of his teacher, Mir Seid Berke, and those of several members of his family, all enclosed by a marble railing. A dark and narrow flight of steps leads down to the crypt, also ornamented with arabesques, where the graves are placed in the same order as in the upper hall.

The citadel is situated on the west of the city, upon a hill whose steep slopes render it one of the strongest in Central Asia. Its walls, 3000 yards in circuit and about 10 feet high, enclose a space of about 4 square miles. It contained the palace of the emir of Bokhara,—a vulgar modern building now transformed into a hospital,—and the audience hall of Timur,—a long narrow court, surrounded by a colonnade, and containing the *Kouk-tash*, a gray stone 10 feet long, 4 feet broad, and 4½ feet high, reported to have been brought from Brussa. On it Timur used to take his seat, surrounded by his numerous vassals; from it more recently the emirs of Bokhara also were wont to dispense their terrible justice.

Ruins of former buildings—heaps of plain and enamelled bricks among which Græco-Bactrian coins have been found—cover a wide area all around the present city, and especially on the west and north. The name of Aphrosiab is usually given to these ruins, which extend for nearly three miles to the westward of the present Russian town; this suburb of Samarkand was enclosed by a wall, the ruins of which can be traced for seven or eight miles. Five miles to the southwest of Samarkand is the college Khodja Akrar; its flower ornamentation in enamelled brick is one of the most beautiful of Samarkand. Rye is now grown in its courts, and its artistic ornamentation is going to ruin. To the north-northeast are the Tchupan-ata Hills, the chief of which has on its summit the grave of Daniar Polvan. On the right bank of the Zerafshan stands the village of Dehbid, peopled by descendants of Mahkdum Aazam (died in 1542), who possess a beautiful *khanka* (monastery), with pretty avenues of trees planted by Nezr Divabeghi in 1632. As for the famous Baghitchi-naran (the garden of plane trees), only the ruins of its palace now mark its former position; the trees have disappeared. Of the Græco-Armenian library said to have been brought to Samarkand by Timur no traces have been discovered, and Vambéry regards the whole legend as a fable invented by Armenians. Every trace of the renowned high school Kalinderkhany has also disappeared.

The present Moslem city is an intricate labyrinth of narrow winding streets, having on both sides clay walls concealing dirty court-yards and miserable houses. The population was estimated at 36,000 in 1879; it consists of Tajiks (Iranians) and Sarts or Uzbegs. The Europeans numbered 5380. Some 300 Jews occupy a separate quarter, remarkable for its filth. Numbers of Arabs, Persians, Afghans, Hindus, Kiptchaks, and Tsigans (Gipsies) may be met with in the streets. The chief occupation of the inhabitants is gardening; the gardens beyond the walls are extensive and very well kept. There is also a certain amount of manufacturing industry; the workshops, which are small, are thus enumerated by M. Kostenko: for metallic wares, 12; for tallow and soap, 34; tanneries, 30; potteries, 37; for various tissues, 246. Those for dyeing and the manufacture of harness, boots, and silver and gold wares are also numerous. The best harness, ornamented with turquoises, and the finer products of the goldsmith's art, are imported from Bokhara or Afghanistan. The products of local potteries are very fine.

The bazaars of Samarkand, the chief of which is in the centre of the town, close by the Righistan, are more animated and kept with much greater cleanliness than those of Tashkend or Namaugan. The trade carried on by local or Bokhara merchants is very brisk, the chief items being cotton, silk, wheat and rice, horses, asses, fruits, and cutlery. Wheat, rice, and silk are exported chiefly to Bokhara; cotton to Russia, *via* Tashkend. Silk-wares and excellent fruits are imported from Shahri-Syabs, and rock-salt from Hissar. (P. A. K.)

SAMBALPUR, or SUMBULPOOR, a British district in the chief-commissionership of the Central Provinces of India, between 21° 2′ and 21° 57′ N. lat. and between 83° 16′ and 84° 21′ E. long. Exclusive of attached native states by which it is surrounded, Sambalpur contains an area of 4521 square miles. Including the native states, it is bounded on the north by Chutia Nagpur, on the east and south by Cuttack district, Bengal, and on the west by the Bilaspur and Raipur districts. The Mahánadi, which is the only important river in the district, flows through it, dividing it into unequal parts. The greater portion of Sambalpur is an undulating plain, with ranges of rugged hills running in every direction, the largest of which is the Bará Pahár, a mountain chain covering an area of 350 square miles, and attaining at Dibrígarh a height of 2267 feet above the plain. The Mahánadi affords means of water communication for 90 miles. Its principal tributaries in Sambalpur are the Ib, Kelú, and Jhirá. To the west of the Mahánadi the district is well cultivated. The soil of the district is generally light and sandy. It is occupied for the greater part by crystalline metamorphic rocks; but part of the northwest corner is composed of sandstone, limestone, and shale. Gold dust and diamonds have been found near Hírakhudá or Diamond Island, at the junction of the Ib and Mahánadi. The climate of Sambalpur is considered very unhealthy; its average temperature is 79°, and its average annual rainfall is 58½ inches.

The census of 1881 disclosed a population of 693,499 (346,549 males and 346,950 females). Hindus numbered 632,747 and Mohammedans 2966. The only town in the district with a population exceeding 5000 is SAMBALPUR, the administrative headquarters, with 13,939 inhabitants, situated in 21° 27′ 10″ N. lat. and 84° 1′ E. long., on the north bank of the Mahánadi. It has much improved since 1864, when a cart could only with great difficulty pass through the main street. Of the total area of the district 1125 square miles are cultivated, and of the portion lying waste 888 are cultivable. Rice forms the staple crop; other products are food grains, oil-seeds, cotton, and sugar-cane. The manufactures are few and of no great value. The gross revenue in 1883-84 was £22,445, [$109,082.70] of which the land contributed £11,388, [$55,345.68].

Sambalpur lapsed to the British in 1849, who immediately adopted a system of exaction and confiscation by raising the revenue assessments one-fourth and resuming the land grants, religious and others. Great dissatisfaction was the consequence, and the Brahmans, who form a numerous and powerful community, made an appeal, but obtained no redress. In 1854 a second land settlement again raised the assessments everywhere one-fourth. This system of exaction produced its natural results. On the outbreak of the mutiny in 1857 a general rising of the chiefs took place, and it was not until the final arrest of Surandra Sá, a chief who for some years had been the cause of great disturbances, in 1864 that tranquillity was restored; since then the district has enjoyed profound peace.

SAMNITES, a people of ancient Italy, whose name figures conspicuously in the early history of Rome. They occupied an extensive tract in the centre of the peninsula, which derived from them the name of Samnium. The territory thus designated was a wholly inland district, bounded on the north by the Marsi, Peligni, and Frentani, who separated them from the Adriatic, on the east by Apulia, on the south by Lucania, and on the west by Campania and Latium. But the Samnites were from an early period a numerous and powerful nation, and formed rather a confederacy of tribes than a single people. Hence the name is sometimes used in a wider, sometimes in a more limited sense,—the Hirpini, especially, who occupied the southernmost portion of their territory, being sometimes included amongst them, sometimes distinguished from them. But according to the usual acceptation of the term—excluding the Frentani, who, though unquestionably of Samnite origin, were not usually regarded as belonging to the Samnite nation—they consisted of three principal tribes: the Caraceni in the north, the Pentri, who may be termed the Samnites proper, in the centre, and the Hirpini in the south. Almost the whole of Samnium, as thus defined, was a rugged, mountainous country, and, though the Apennines do not in this part of their range attain to so great an elevation as farther north, they form irregular masses and groups, filling up almost the whole territory, and in great part covered with extensive forests. On the side of Campania alone the valley of the Vulturnus was richer and more fertile, and opened a natural access from the south into the northern regions of Samnium, while the Calor, a tributary of the same river, which flows from the east past Beneventó, afforded in all ages a similar route into the upland districts of the Hirpini. Between the two, occupying the centre of the Pentrian territory and the very heart of Samnium, was the great mountain mass now known as the Monte Matese, of which the highest summit attains to an elevation of 6600 feet, and which must in all ages have been a region presenting peculiar difficulties of access.

All ancient writers agree in representing the Samnites as a people of Sabine origin, who migrated at an early period to the region of which we find them in the occupation when they first appear in history. The period of this emigration is wholly unknown, but, if we can trust the tradition reported by Strabo, that it was the result of a vow to send forth the produce of a "sacred spring" (see SABINES), it could hardly have been in the first instance very numerous, and it is probable that the invaders established themselves in the midst of an Oscan population, with whom they gradually coalesced. It is certain that no very long interval elapsed before the Samnites in their turn found themselves exceeding the resources of their barren and rugged territory, and extending their dominion over the more fertile and accessible regions by which they were surrounded. The first of these movements was probably that by which they occupied the land of the Frentani, a fertile district along the shores of the Adriatic, between the northern part of Samnium and the sea. The Hirpini also were in the first instance almost certainly a later offshoot of the central Samnite people, though they continued always in such close connection with them that they were generally reckoned as forming part of the Samnite confederacy, and almost uniformly took part with the more central tribes in their wars against Rome. The Frentani, on the contrary, generally either stood aloof from the contest or secured their own safety by an alliance with Rome.

To a later period belong the emigrations that gave rise to the two powerful nations of the Lucanians and Campanians. At the time when the Greek colonies were established in Southern Italy the native tribes that occupied the regions to the south of Samnium were the Œnotrians and other Pelasgic races, and it was not till after the middle of the 5th century B.C. that the pressure of the Lucanians from the interior began to make itself felt in this quarter. From this time they gradually extended their power throughout the whole country to the Gulf of Tarentum and the Sicilian Straits. It was probably at a somewhat earlier period (about 440 to 420 B.C.) that they effected the conquest of the fertile country to the west, intervening between the mountain regions of Samnium and the sea. Here they found an Oscan population, with whom they seem to have speedily coalesced, and thus gave rise to the people known thenceforth as Campanians, or "inhabitants of the plain." But in this case also the new nationality thus constituted had no political connection with the parent state, and retained its independent action both for peace and war. The first mention of the Samnites themselves in Roman history occurs in 354, when they concluded a treaty of alliance with the rising republic.

But it was not long before the course of events brought the two rival powers into collision. The Samnites, who appear to have been still actuated by aggressive tendencies, had attacked the Sidicini, a

petty tribe to the north of Campania, and the latter, feeling unable to cope with so powerful an adversary, invoked the assistance of the Campanians. These, however, were in their turn attacked by the Samnites, and sustained so crushing a defeat, under the very walls of Capua, that they were compelled to implore the aid of Rome. Their request was granted, though not without hesitation, and thus began (in 343) the first of the long series of the Samnite Wars, which ultimately led to the establishment of the Roman domination over the whole of southern Italy. The events of these wars, which are related in all histories of Rome, can only be very briefly noticed here. The first contest was of short duration; and after two campaigns the Romans were willing not only to conclude peace with Samnium but to renew the previously existing alliance, to which the Samnites continued faithful throughout the great struggle which ensued between the Romans and the allied Campanians and Latins. The Second Samnite War was of a very different character. Both nations felt that it was a struggle for supremacy, and, instead of being brought to a close within three years, it lasted for more than twenty years (326–304), and was marked with considerable vicissitudes of fortune, among which the celebrated disaster of the Caudine Forks (321) stands most conspicuous. Nor was the struggle confined to the two leading powers, many of the neighboring nations espousing the cause of the one side or the other, and often with fluctuating faith, in accordance with the varying fortunes of the war. The result, however, was on the whole favorable to the Roman arms, notwithstanding which they were willing to conclude peace in 304, on condition of the renewal of the previously existing alliance. This interval of tranquillity was of short duration, and little more than five years elapsed between the end of the Second Samnite War and the commencement of the Third (298). In this fresh contest they received a formidable auxiliary in a large body of Gauls, who had recently crossed the Alps, and, together with their countrymen the Senones, espoused the cause of the Samnites against Rome. Their combined forces were, however, defeated in the great battle of Sentinum (294), and after several successive campaigns the consul M. Curius Dentatus was able to boast of having put an end to the Samnite Wars (290), after they had lasted more than fifty years. It is true that a few years later the Samnites again appear in arms, though rather as auxiliaries than principals, and the name of Fourth Samnite War is given by some historians to the memorable contest which, commenced in 282 by the Lucanians, assumed a wholly different aspect when Pyrrhus, king of Epirus, appeared in Italy as their auxiliary. But the power of the Samnites was evidently broken, and after the final defeat of Pyrrhus they appear to have offered little resistance. Their final submission was made in 272, and according to the usual Roman policy was secured by the establishment in their territory of the two important colonies of Æsernia and Beneventum.

During the Second Punic War, Samnium became the frequent theatre of hostilities. The Hirpini were among the first of the Italian tribes to declare in favor of Hannibal after the battle of Cannæ (216); but their example was not followed by the more powerful tribe of the Pentri, and when Hannibal was finally driven out of Central Italy the Samnites were speedily reduced to submission. From this time we hear no more of them till the great outbreak of the Italian nations, commonly known as the Social War (90), in which they bore a prominent part. Two of the most distinguished of the Italian leaders, C. Papius Mutilus and C. Pontius Telesinus, were of Samnite birth, and after the fall of Corfinium the Samnite town of Bovianum became the temporary capital of the confederates. Their submission had not indeed been completed when the civil war between Marius and Sulla gave a fresh character to the contest. The Samnites warmly espoused the cause of the former, and it was the defeat of their leader C. Pontius Telesinus at the Colline Gate of Rome that secured the victory of Sulla and sealed the fate of the Samnite nation (82). Not content with putting all his Samnite prisoners to the sword, the ruthless conqueror organized a systematic devastation of the whole country, with the avowed object of extirpating the very name of the Samnites, as the eternal enemies of Rome. To such an extent was this cruel purpose carried into effect that more than a hundred years afterwards, in the time of Strabo, the whole country is described as being in a state of utter desolation, flourishing towns being reduced to mere villages, while others had altogether ceased to exist. Nor does it appear probable that it ever recovered this severe blow; and, though some attempt was made to revive its prosperity by the establishment of Roman colonies within its limits, none of these attained to any importance. The name of Samnium was indeed retained as that of a distinct province throughout the greater part of the Roman empire, and is still found in Cassiodorus. But under the Lombard rule the whole of this part of Italy was included in the duchy of Beneventо, which continued to subsist as an independent state long after the fall of the Lombard kingdom in the north of Italy. During the revolutions of the Middle Ages all trace of the name is lost; and though it was revived in the last century as the official designation of a part of the region comprised within the ancient limits, previously known as the Contado di Molise, this was a mere piece of official pedantry, and the name has again disappeared from the modern maps of Italy.

Very few towns of importance existed at any period within the limits of Samnium, and many of those mentioned in history had disappeared in the continual wars with which the country was ravaged. The only names that are worthy of special notice are—Aufidena, in the north, the capital of the Caracena, the ruins of which still exist a few miles from Castel di Sangro; Bovianum (still called Bojano), the ancient capital of the Pentri, in the heart of Monte Matese; Sæpinum (Sepino), in the same neighborhood; Æsernia, in the valley of the Vulturnus, still known as Isernia; Aquilonia (Lacedogna), in the land of the Hirpini, near the frontier of Apulia; and Compsa (Conza), on the borders of Lucania, near the sources of the Aufidus. Beneventum alone has retained its ancient consideration as well as name, an advantage which it derives from its position on the Via Appia, commanding the entrance to the mountain district of the Hirpini.

The language of the Samnites, like that of their parents the Sabines, must clearly have been closely related to that of the Oscans, and the two nationalities appear to have amalgamated so readily that before the historical period there was probably little difference in this respect. Several of the most important of the inscriptions that remain to us have been found within the limits of the Samnite territory, and may be considered as Sabello-Oscan in their character, rather than purely Oscan. See for these the articles ITALY and LATIN LANGUAGE. (E. H. B.)

SAMOA. See NAVIGATORS' ISLANDS.

SAMOS, one of the principal and most fertile of the islands in the Ægean Sea that closely adjoin the mainland of Asia Minor, from which it is separated by a strait of only about a mile in width. It is about 27 miles in length, by about 14 in its greatest breadth, and is occupied throughout the greater part of its extent by a range of mountains, of which the highest summit, near its western extremity, called Mount Kerkis, attains to the height of 4725 feet. This range is in fact a continuation of that of Mount Mycale on the mainland, of which the promontory of Trogilium, immediately opposite to the city of Samos, formed the extreme point. Various mythical legends were current to account for the original settlement of the city of Samos, and to connect its founders with the Greek heroic genealogies; but the earliest record that has any claim to an historical character is that of the occupation of the island by a colony of Ionian settlers under a leader named Procles, at the time of the great Ionian emigration to Asia Minor (about 1050 B.C). In the historical period Samos figures as a purely Ionic city, and was one of the most influential members of the Ionic confederacy. In the five centuries that intervened from its first settlement to the reign of Polycrates, Samos had rapidly attained to a great height of power and prosperity, had founded colonies at Perinthus and other places on the Propontis, as well as at Nagidus and Celenderis in Cilicia, and possessed a powerful navy, including, according to Thu-

cydides (i. 13), the first triremes that ever were constructed. It was a Samian named Colæus also who was the first Greek that ventured to penetrate between the Pillars of Hercules into the ocean beyond, and brought back a vast amount of wealth from these previously unknown regions (Herod., iv. 152).

Samos was doubtless protected by its insular position from conquest by the Persian general Harpagus; nor did it follow the example of the two other great islands of Chios and Lesbos by voluntary submission to the Persian monarch. On the contrary, it not only preserved its independence for a period of more than twenty years longer, but it was precisely in this interval that it rose to the highest pitch of power and prosperity under the enlightened and able, though tyrannical, government of the despot POLYCRATES (*q.v.*). Under his government Samos became "the first of all cities Hellenic or barbaric," and was adorned with three of the greatest public works that had ever been executed by Greeks—an aqueduct tunnelled through a mountain for a length of 7 stadia, a mole of more than 2 stadia in length for the protection of the harbor, and a temple (that of Hera) exceeding all others in size. How far these great works belong to the time of Polycrates cannot be determined with certainty; but there is little doubt that they were enlarged and completed, if not commenced, under his government. He was also the first to lay claim to the sovereignty of the Ægean Sea, or thalassocraty, which at that time there was none to dispute with him.

After the death of Polycrates (522 B.C.) Samos fell under the power of his brother Syloson who established himself in the sovereignty with the support of a Persian army, but this revolution was not accomplished without a massacre of the citizens, which must have given a heavy blow to the prosperity of the island. Henceforth it continued to be tributary to Persia till the great battle of Mycale (480), which not only freed the Samians from the Persian yoke, but became the beginning of a fresh era of great prosperity, during which they, like the neighboring Chians and Lesbians, were admitted as members of the Athenian confederacy, on free and equal terms, without payment of tribute. An abrupt termination was, however, put to this state of things in 439, when, the Samians having given offence to the Athenians, their city was besieged and taken by Pericles, who compelled them to raze their fortifications, to give up their ships of war, to furnish hostages, and to pay the expenses of the war. From this time, therefore, Samos became a mere dependency of Athens, and continued in this subordinate condition throughout the Peloponnesian War; but after the victory of the Spartans at Ægospotami, the city was besieged and taken by Lysander (404), and as usual an oligarchy was set up under Spartan control. Other revolutions, however, quickly followed. The victory of Conon at Cnidus in 394 restored the democracy, but the peace of Antalcidas shortly afterwards (387) placed the island under the government of a Persian satrap, and thus exposed it to the attacks of the Athenians, who sent an expedition against it under Timotheus, one of their ablest generals, who after a siege of eleven months reduced the whole island and took the capital city. A large part of the inhabitants were expelled, and their place supplied by Athenian emigrants (366).

From this time we hear but little of Samos. It passed without resistance under the yoke of Alexander the Great, and retained a position of nominal autonomy under his successors, though practically dependent, sometimes on the kings of Egypt, sometimes on those of Syria. After the defeat of Antiochus the Great at the battle of Magnesia (190), it passed with the rest of Ionia to the kings of Pergamum, but, having in an evil hour espoused the cause of the pretender Aristonicus, it was deprived of its freedom, and was united with the Roman provinces of Asia (129). Henceforth it of course held only a subordinate position, but it seems to have always continued to be a flourishing and opulent city. We find it selected by Antony as the headquarters of his fleet, and the place where he spent his last winter with Cleopatra, and a few years later it became the winter quarters of Augustus (21–20), who in return restored its nominal freedom. Its autonomy, however, as in many other cases under the Roman empire, was of a very fluctuating and uncertain character, and after 70 A.D. it lapsed into the ordinary condition of a Roman provincial town. Its coins, however, attest its continued importance during more than two centuries, and it was even able to contest with Smyrna and Ephesus the proud title of the "first city of Ionia." It still figures prominently in the description of the Byzantine empire by Constantine Porphyrogenitus, but little is known of it during the Middle Ages.

During the Greek War of Independence Samos bore a conspicuous part, and it was in the strait between the island and Mount Mycale that Canaris achieved one of his most celebrated exploits by setting fire to and blowing up a Turkish frigate, in the presence of the army that had been assembled for the invasion of the island, a success that led to the abandonment of the enterprise, and Samos held its own to the very end of the war. On the conclusion of peace the island was indeed again handed over to the Turks, but since 1835 has held an exceptionally advantageous position, being in fact self-governed, though tributary to the Turkish empire, and ruled by a Greek governor nominated by the Porte, who bears the title of "Prince of Samos," but is supported and controlled by a Greek council and assembly. The prosperity of the island bears witness to the wisdom of this arrangement. It now contains a population of above 40,000 inhabitants, and its trade has rapidly increased. Its principal article of export is its wine, which was celebrated in ancient times, and still enjoys a high reputation in the Levant. It exports also silk, oil, raisins, and other dried fruits.

The ancient capital, which bore the name of the island, was situated on the south coast, directly opposite to the promontory of Mycale, the town itself adjoining the sea and having a large artificial port, the remains of which are still visible, as are the ancient walls that surrounded the summit of a hill which rises immediately above it, and now bears the name of Astypalæa. This formed the acropolis of the ancient city, which in its flourishing times occupied a wide extent, covering the slopes of Mount Ampelus down to the shore. From thence a road led direct to the far-famed temple of Hera (Juno), which was situated close to the shore, where its site is still marked by a single column, but even that bereft of its capital. This miserable fragment, which has given to the neighboring headland the name of Capo Colonna, is all that remains of the temple that was extolled by Herodotus as the largest he had ever seen, and which vied in splendor as well as in celebrity with that of Diana at Ephesus. But, like the Ephesian Artemis, the goddess worshipped at Samos was really a very different divinity from the one that presided over Argos and other purely Greek cities, and was unquestionably in the first instance a native Asiatic deity, who was identified, on what grounds we know not, with the Hera of the Olympic mythology. Her image, as we learn from coins, much resembled that of the Ephesian goddess, and was equally remote from any Greek conception of the beautiful and stately Hera. Though so little of the temple remains, the plan of it has been ascertained, and its dimensions found fully to verify the assertion of Herodotus, as compared with all other Greek temples existing in his time, though it was afterwards surpassed by the later temple at Ephesus.

The modern capital of the island was, until a recent period, at a place called Khora, about two miles from the sea, and the same distance from the site of the ancient city; but since the change in the political condition of Samos the capital has been transferred to Vathy, situated at the head of a deep bay on the north coast, which has become the residence of the prince and the seat of government. Here a new town has grown up, well built and paved, with a convenient harbor, and already numbers a population of 6000.

Samos was celebrated in ancient times as the birth-place of Pythagoras, who, however, spent the greater part of his life at a distance from his native country. His name and figure are found on coins of the city of imperial date. It was also conspicuous in the history of art, having produced in early times a school of sculptors, commencing with Rhœcus and Theodorus, who are said to have invented the art of casting statues in bronze, and to have introduced many other technical improvements. The architect Rhœcus

also, who built the temple of Hera, was a native of the island. At a later period Samos was noted for the manufacture of a particular kind of red earthenware, so much valued by the Romans for domestic purposes that specimens of it generally occur wherever there are remains of Roman settlements.

All the particulars that are recorded concerning Samos in ancient times are collected by Panofka (*Res Samiorum*, Berlin, 1822). A full description of the island, as it existed in his time, will be found in Tournefort (*Voyage du Levant*, 4to, Paris, 1717), and more recent accounts in the works of Ross (*Reisen auf den Griechischen Inseln*, vol. ii., Stuttgart, 1843) and Guérin (*Patmos et Samos*, Paris, 1856). (E. H. B.)

SAMOTHRACE was the ancient name of an island in the northern part of the Ægean Sea, nearly opposite to the mouth of the Hebrus, and lying north of Imbros and northeast of Lemnos. It is still called Samothraki, and though of small extent is, next to Mount Athos, by far the most important natural feature in this part of the Ægean, from its great elevation—the group of mountains which occupies almost the whole island rising to the height of 5240 feet. The highest summit, named by Pliny Saoce, is estimated by him at an elevation of one Roman mile. Its conspicuous character is attested by a well-known passage in the *Iliad* (xiii. 12), where the poet represents Poseidon as taking post on this lofty summit to survey from thence the plain of Troy and the contest between the Greeks and the Trojans. This mountainous character and the absence of any tolerable harbor—Pliny, in enumerating the islands of the Ægean, calls it "importuosissima omnium"—prevented it from ever attaining to any political importance, but it enjoyed great celebrity from its connection with the worship of the CABIRI (*q.v.*), a mysterious triad of divinities, concerning whom very little is really known, but who appear, like all the similar deities venerated in different parts of Greece, to have been a remnant of a previously existing Pelasgic mythology, wholly distinct from that of the Greeks. Herodotus expressly tells us that the "orgies" which were celebrated at Samothrace were derived from the Pelasgians (ii. 51). These mysteries, and the other sacred rites connected therewith, appear to have attracted a large number of visitors, and thus imparted to the island a degree of importance which it would not otherwise have attained. The only occasion on which its name is mentioned in history is during the expedition of Xerxes (B.C. 480), when the Samothracians sent a contingent to the Persian fleet, one ship of which bore a conspicuous part in the battle of Salamis (Herod., viii. 90). But the island appears to have always enjoyed the advantage of autonomy, probably on account of its sacred character, and even in the time of Pliny it ranked as a free state. Such was still the reputation of its mysteries that Germanicus endeavored to visit the island, but was driven off by adverse winds (Tac., *Ann.*, ii. 54).

No modern traveller appears to have visited Samothrace till the year 1858, when it was fully explored by Conze, who published an account of it, as well as the larger neighboring islands, in 1860. The ancient city, of which the ruins are called Paleopoli, was situated on the north side of the island close to the sea; its site is clearly marked, and considerable remains still exist of the ancient walls, which were built in massive Cyclopean style, but no vestiges are found of temples or other public buildings. The modern village is on the hill above. The island is at the present day very poor and thinly peopled, and has scarcely any trade; but a considerable sponge fishery is carried on around its coasts by traders from Smyrna (Conze, *Reise auf den Inseln des Thrakischen Meeres*, Hanover, 1860).

The similarity of name naturally led to the supposition that Samothrace was peopled by a colony from Samos in Ionia, and this is stated as an historical fact by some Greek writers, but is rejected by Strabo, who considers that in both cases the name was derived from the physical conformation of the islands, Samos being an old word for any lofty height (Strabo, x. 2, p. 457). The same characteristic is found in Cephallenia, which was also called Samos in the time of Homer.

SAMOYEDES, a Ural-Altaic stock, scattered in small groups over an immense area, from the Altai Mountains down the basins of the Obi and Yenisei, and along the shores of the Arctic Ocean from the mouth of the latter river to the White Sea. They may be subdivided into two main groups. (A) Those inhabiting the southern parts of the governments of Tomsk and Yeniseisk have been so much under Tartar influence as to be with difficulty separated from the Tartars; their sub-groups are the Kamasin Tartars, the Kaibals, the Motors, the Beltirs, the Karagasses, and the Samoyedes of the middle Obi. (B) Those inhabiting the subarctic region form three separate sub-groups: (*a*) the Yuraks in the coast-region from the Yenisei to the White Sea; (*b*) the Tavghi Samoyedes, between the Yenisei and the Khatanga; (*c*) the Ostiak Samoyedes, intermingled with Ostiaks, to the south of the others, in the forest regions of Tobolsk and Yeniseisk. Their whole number may be estimated at from 20,000 to 25,000.

The proper place of the Samoyedes among the Ural-Altaians is very difficult to determine. As to their present name, signifying in its present Russian spelling "self-eaters," many ingenious theories have been advanced, but the current one, proposed by Schrenk, who derived the name "Samo-yedes" from "Syroyadtsy," or "raw-eaters," leaves much to be desired. Perhaps the etymology ought to be sought in quite another direction, namely, in the likeness to Suomi. The names assumed by the Samoyedes themselves are Hazovo and Nyänyäz. The Ostiaks know them under the names of Orghoy, or Workho, both of which recall the Ugrians; the name of Hui is also in use among the Ostiaks, and that of Yaron among the Zyrians.

The language now spoken by the Samoyedes is, like the Finnish languages, agglutinative, but in both lexicon and grammar it differs so widely from these that Prof. Ahlqvist does not regard the similarity as greater than, for instance, that between Swedish and Persian. Much remains to be done for the study of Samoyedic, but it may be regarded as the most remote cousin of the Ugrian. It is a sonorous speech, pleasant to the ear. No fewer than three separate dialects and a dozen sub-dialects are known in it.

The conclusions deducible from their anthropological features—apart from the general difficulty of arriving at safe conclusions on this ground alone, on account of the variability of the ethnological type under various conditions of life—are also rather indefinite. The Samoyedes are recognized as having the face more flattened than undoubtedly Finnish stocks; their eyes are narrower, their complexion and hair darker. Zuyeff describes them as like the Tunguses, with flattened nose, thick lips, little beard, and black, hard hair. At first sight they may be mistaken for Ostiaks,—especially on the Obi; but they are undoubtedly different. Castrén considers them as a mixture of Ugrians with Mongolians, and M. Zograf as brachycephalic Mongolians. Quatrefages classes them, together with the Voguls, as two families of the Ugrian sub-branch, this last, together with the Sabmis (Laponians), forming part the Ugrian or Boreal branch of the yellow or Mongolic race.

It is certain that formerly the Samoyedes occupied the Altai Mountains, whence they were driven northwards by Tuseo-Tartars—probably at the time of the rise of the empire of the Huns, that is, before the present era. Their further and later migration towards the north may be said to be going on still. Thus, the Kaibals left the Sayan Mountains and took possession of the Abakan steppe (Minusinsk region), abandoned by the Kirghizes, in the earlier years of last century, and in northeastern Russia the Zyrians are still driving the Samoyedes farther north, towards the Arctic coast. Since the researches of Schrenk it may be considered as settled that in historical times the Samoyedes were inhabitants of the so-called Ugria in the Northern Urals, while it would result from M. Radloff's extensive researches that the nnmberless graves containing remains of the Bronze Period which are scattered throughout West Siberia, on the Altai, and on the Yenisei in the Minusinsk region, are relics of a nation which he considers as Ugro-Samoyedes. This nation, very numerous at that epoch,—which precedes the Iron-Period civilization of the Turco-Tartars,—were pretty well acquainted with mining; the remains of their mines, sometimes 50 feet deep, and of the furnaces where they melted copper, tin, and gold, are very numerous; their weapons of a hard bronze, their pots (one of which weighs 75lb), and their melted and polished bronze and golden decorations testify to a high development of artistic feeling and industrial skill, strangely contrasting with the low level reached by their earthenware. They were not nomads, but husbandmen, and their irrigation canals are still to be seen. They kept horses (though

in small numbers), sheep, and goats, but no traces of their rearing horned cattle have yet been found. The Turkish invasion of southern Siberia by the Tukus, Khagases, and Uigurs, which took place in the 5th century, drove them farther north and probably reduced most of them to slavery, —these slaves seeming to have taught mining to their masters.

At present they are disappearing, and have almost entirely lost their earlier civilization. M. Polyakoff quite rightly observes that the Samoyedes, who now maintain themselves by hunting and fishing on the lower Obi, partly mixed in the south with Ostiaks, recall the condition of the inhabitants of France and Germany at the epoch of the reindeer. Clothed in skins, like the troglodytes of the Weser, they make use of the same implements in bone and stone, eat carnivorous animals—the wolf included—and cherish the same superstitions (of which those regarding the teeth of the bear are perhaps the most characteristic) as were current among the Stone-Period inhabitants of western Europe. Their heaps of reindeer horns and skulls—memorials of religious ceremonies—are exactly similar to those dating from the similar period of civilization in northern Germany. Their huts often resemble the well-known stone huts of the Esquimaux; their graves are mere boxes left in the tundra. The religion is fetichism mixed with Shamanism, the shaman (*tadji-bei*) being a representative of the great divinity, the Num. The Yalmal peninsula, where they find so great facilities for hunting, is especially venerated by the Obi Ostiak Samoyedes, and there they have one of their chief idols, Khese. They are more independent than the Ostiaks, less yielding in character, although as hospitable as their neighbors. Reduced almost to slavery by Russian merchants, and brought to the extreme of misery by the use of ardent spirits, they are disappearing rapidly, small-pox completing the work of destruction. They still maintain the high standard of honesty mentioned by historical documents; and, while the Russians plunder even the stores of their shamans, the Samoyedes never will take anything left in the tundra or about the houses by their "civilized" neighbors. The Yurak Samoyedes are courageous and warlike; they offered armed resistance to the Russian invaders, and it is only since the beginning of the century that they have paid tribute. The exact number of the Ostiak Samoyedes is not known; the Tavghi Samoyedes may number about 1000, and the Yuraks, mixed with the former, are estimated at 6000 in Obdorsk (about 150 settled), 5000 in European Russia in the tundras of the Mezeñ, and about 350 in Yeniseisk.

Of the southern Samoyedes, who are completely Tartarized, the Beltirs (3070 in 1859) live by agriculture and cattle-breeding in the Abakan steppe. They profess Christianity, and speak a language closely resembling that of the Sagai Tartars. The Kaibals, or Koibals, can hardly be distinguished from the Minusinsk Tartars, and support themselves by rearing cattle. Castrén considers that three of their stems are of Ostiak origin, the remainder being Samoyedic. The Kamasins, in the Kansk district of Yeniseisk, are either herdsmen or agriculturists. They speak the Samoyede language, with an admixture of Tartar words, and some of their stems contain a large Tartar element. The very interesting nomadic tribe of Karagasses, in the Sayan Mountains, is quite disappearing; the few representatives of this formerly much more numerous stem are rapidly losing their anthropological features, their Turkish language, and their distinctive dress. The Motors are now little more than a memory. One portion of the tribe emigrated to China and was there exterminated; the remainder have disappeared among the Tuba Tartars and the Soyotes. The Samoyedes on the Obi in Tomsk may number about 7000; they have adopted the Russian manner of life, but have difficulty in carrying on agriculture, and are a poverty-stricken population with little prospect of holding their own.

SAMPIERDARENA (population in 1881, 19,501). See GENOA, vol. x. p. 141.

SAMSON (Hebrew, *Shimshōn*), the great enemy of the Philistines, is reckoned as one of the judges of Israel in two editorial notes which belong to the chronological scheme of the book of Judges (xv. 20, xvi. 31); but his story itself, which is a self-contained narrative by a single hand (Jud. xiii. 2–xvi. 31*a*), represents him not as a judge but as a popular hero of vast strength and sarcastic humor, who had indeed been consecrated from his birth as the deliverer of Israel, and is not unaware of his vocation, but who yet is inspired by no serious religious or patriotic purpose, and becomes the enemy of the Philistines only from personal motives of revenge, the one passion which is stronger in him than the love of women. In his life, and still more in his death, he inflicts great injury on the oppressors of Israel, but he is never the head of a national uprising against them, nor do the Israelites receive any real deliverance at his hands. The story of his exploits is plainly taken from the mouths of the people, and one is tempted to conjecture that originally his Nazarite vow was conceived simply as a vow of revenge, which is the meaning it would have in an Arab story. Our narrator, however, conceives his life as a sort of prelude to the work of Saul (xiii. 5), and brings out its religious and national significance in this respect in the opening scene (ch. xiii.), which is closely parallel to the story of Gideon, and in the tragic close (ch. xvi.); while yet the character of Samson, who generally is quite forgetful of his mission, remains much as it had been shaped in rude popular tale in a circle which, like Samson himself, was but dimly conscious of the national and religious vocation of Israel.

The name of Samson (*Shamshōn*, of which the Massoretic *Shimshōn* is a more modern pronunciation, and later than the LXX., who write Σαμψών) means "solar," but neither the name nor the story lends any solid support to Steinthal's fantastic idea that the hero is a solar myth (compare Wellhausen-Bleek, p. 196). He is a member of an undoubtedly historical family of those Danites who had their standing camp near Zorah, not far from the Philistine border before they moved north and seized Laish (compare xiii. 25 with xviii. 8, 11, 12). The family of Manoah had an hereditary sepulchre at Zorah, where Samson was said to lie (xvi. 31), and their name continued to be associated with Zorah even after the exile, when it appears that the Manahethites of Zorah were reckoned as Calibbites. The name had remained though the race changed (1 Chron. ii. 52, 54). One of Samson's chief exploits is associated with a rock called from its shape "the Ass's Jawbone," from which sprung a fountain called En-hakkore, "the spring of the partridge," and these names have influenced the form in which the exploit is told. The narrative of Samson's marriage and riddle is of peculiar interest as a record of manners; specially noteworthy is the custom of the wife remaining with her parents after marriage (*cf.* Gen. ii. 24).

SAMUEL (שְׁמוּאֵל, Shĕmūēl),[1] a seer and "judge" of Israel in the time of the Philistine oppression. His history, as told in the first book of Samuel (compare Psalm xcix. 6; Ecclus. xlvi. 13 *sq.*), is too familiar to call for repetition here, and a critical estimate of his place in Hebrew history has been given in ISRAEL, vol. xiii. p. 413. There remain, however, one or two points of detail which may be noticed here. His birthplace was Ramah, or, as it is called in the Hebrew text of 1 Sam. i. 1, Ha-Ramathaim (Ramathem, 1 Macc. xi. 34; Arimathæa, Mat. xxvii. 57); the identity of the two names is supported by the Septuagint, which has Arimathaim for Ramah in several passages. Ramah, which appears in 1 Kings xv. 17 as a stronghold on the frontier of the kingdoms of Ephraim and Judah, is probably identical with the modern El-Râm, about 5 miles north of Jerusalem, on a hill on the east side of the main road to Shechem and the north. Ramah was also the place where Samuel usually resided in his later days, and from which he made a yearly circuit through a very limited district in the immediate neighborhood "judging Israel" (1 Sam. vii. 16). None of the cities which he visited is more than a few miles from Ramah. Ramah, according to 1 Sam. i. 1 (where the text is to

[1] This is one of an obscure class of proper names (רְעוּאֵל, פְּנוּאֵל, etc.), the analogy of which seems to exclude the idea that it is softened from שְׁמוּעֵאל, "heard of God." It seems rather to mean "name of El," *i.e.*, "manifestation of God's power or will." Compare the title Shem Baal, "name of Baal," given to Astarte on the epitaph of Eshmunazar.

be corrected by the Septuagint), was a town in the district of Zuph, belonging to the tribe of Ephraim (comp. 1 Sam. ix. 5 and 1 Sam. x. 2, where the grave of Rachel lies on the frontier between Ephraim and Benjamin; a different localization is given in Gen. xxxv. 19, 20, unless the identification of Bethlehem and Ephrath there is a later gloss).

The original text of 1 Sam. i. 1 does not seem to say explicitly that Samuel's father was an Ephrathite (*i.e.*, of the tribe of Ephraim), though the city was Ephrathite; and 1 Chron. vi. 28, 33 [vi. 13, 18] makes him a Levite, apparently because a post-exile family of singers traced their stock from him. The old accounts certainly represent Samuel even as a child doing priestly service at Shiloh, girt with the ephod and wearing the priestly robe (*mĕ'îl*, E. V. "coat," 1 Sam. ii. 18 *sq.*), but at that early date priesthood was by no means confined to Levites, and the story certainly implies that it was not by birth, but only by his mother's vow that he was dedicated to the service of the sanctuary. On Samuel's relation to the prophets, see vol. xix. p. 837. Compare also SAMUEL, BOOKS OF.

SAMUEL, BOOKS OF. The Hebrew Book of Samuel, like the Hebrew Book of Kings, is in modern Bibles divided into two books, after the Septuagint and Vulgate, whose four books of "kingdoms" answer to the Hebrew books of Samuel and Kings. The connection between the books of Samuel and Kings has been spoken of in the article KINGS (*q.v.*). These two books, together with Judges, are made up of a series of extracts and abstracts from various sources worked over from time to time by successive editors, and freely handled by copyists down to a comparatively late date, as the variations between the Hebrew text and the Septuagint show. The main redaction of Judges and Kings has plainly been made under the influence of the ideas of the book of Deuteronomy, and it was in connection with this redaction that the history from the accession of Solomon onwards was marked off as a separate book (see KINGS). In Samuel the Deuteronomistic hand is much less prominent, but in 1 Sam. vii. 2–4, and in the speech of Samuel, ch. xii., its characteristic pragmatism is clearly recognizable; the nature of the old narrative did not invite frequent insertions of this kind throughout the story. So, too, the chronological system which runs through Judges and Kings is not completely carried out in Samuel, though its influence can be traced (1 Sam. iv. 18, vii. 2, xiii. 1 *sq.*, xxvii. 7, 2 Sam. ii. 10 *sq.*, v. 4 *sq.*). In 1 Sam. xiii. 1, in the note "Saul was —— years old when he became king and reigned [two] years over Israel" (lacking in LXX.), one of the numbers has been left blank and the other has been falsely filled up by a mere error of the text; the similar note in 2 Sam. ii. 10 seems also to have been filled up at random; it contradicts and disturbs the context. But, though the book of Samuel has been much less systematically edited than Kings, unsystematic additions to and modifications of the oldest narratives were made from time to time on a very considerable scale, and in this book, as in Judges, we not seldom find two accounts of the same events which not only differ in detail but plainly are of very different date.

The book as a whole may be divided into three main sections: (1) *Samuel and Saul*, 1 Sam. i.–xiv.; (2) *The rise and kingdom of David*, 1 Sam. xv.–2 Sam. viii.; (3) *The personal history of David's court at Jerusalem* (mainly from a single source, which also includes 1 Kings i., ii.), 2 Sam. ix.–xx. Finally, the appendix, 2 Sam. xxi.–xxiv., must have been added after the book of Kings had been separated from the context to which 1 Kings i., ii. originally belonged. As the greater part of the book of Samuel is occupied with the history of David, which has been discussed at length in his article, and with that of Samuel and Saul, the chief points of which have been critically examined in the article ISRAEL, a very brief résumé of the contents of each of the main sections must here suffice.

I. The story of Samuel's birth, consecration to the service of the sanctuary at Shiloh, and prophetic calling (1 Sam. i.–iii.) connects itself through the prophecy of the rejection of the house of Eli (iii. 11 *sq.*) with the history of the disaster of Ebenezer and the capture and restoration of the ark (iv. 1–vii. 1). But the second of these two sections does not seem to have been originally written as the sequel to chaps. i.–iii.; in it we lose sight of Samuel and his prophecy altogether. The song of Hannah (ii. 1–10) and the prophecy of the nameless man of God (ii. 27–36) are later insertions (see Wellhausen-Bleek, *Einl.*, p. 207).

Chap. vii., with its Deuteronomistic introduction (verses 2–4) and its account of a victory at Ebenezer (the counterpart of the defeat in chap. iv.) which delivered Israel from the Philistines during all the days of Samuel, is inconsistent with the position of the Philistine power at the accession of Saul. The chapter in its present form must be late, though hardly post-exilic, and it is the necessary introduction to the later and less authentic account of the way in which Saul came to the kingdom (chaps. viii., x. 17–27, xii.). It should be noted, however, that, though Samuel is taken by the late narrator to have a widespread authority, inconsistent with the facts disclosed in the older narrative of the choice of Saul, the sphere assigned to him in vii. 16, 17 is very narrow and agrees with chap. ix.

Of the beginnings of the kingship of Saul we have a twofold account, the older being that in ix. 1–x. 16, xi. The relative value of the two accounts has been already discussed in ISRAEL, vol. xiii. p. 413. The older history is continued in chaps. xiii., xiv., but here xiii. 7*b*–15—a doublet of the account of the rejection of Saul in chap. xiv.—is certainly foreign to the original context. The summary of Saul's exploits in xiv. 47 *sq.* is written by an admirer, who appears to ascribe to him some of David's victories. But this does not affect the value of the preceding more detailed narrative, which is plainly based on a full and authentic tradition.

II. The account of the campaign against Amalek (chap. xv.) does not merely supply details supplementary to xiv. 48 but puts the war with Agag in quite a different light by laying the chief weight on Saul's disobedience to Samuel and rejection by the prophet. This passage is closely allied to 1 Sam. xxviii. 3–25, which, however, is no part of the original story of Saul's defeat and death, as appears by comparing the position of the two armies in xxviii. 4 and xxix. 1. Chap. xv., in like manner, is probably no original part of the narrative of David's rise, to which it now forms the introduction, and both passages, though relatively ancient additions, represent a type of religious thought and a view of prophecy which can hardly be older than the epoch of Elisha (comp. PROPHET, vol. xix. p. 837). The anointing of David (xvi. 1–13) presupposes chap. xv., and is consistent with what follows only if we suppose that the meaning of Samuel's act was not understood at the time. The older history repeatedly indicates that David's kingship was predicted by a divine oracle, but would hardly lead us to place the prediction so early (1 Sam. xxv. 30, 2 Sam. iii. 9, v. 2 compared with 1 Sam. xvii. 28, xviii. 23).

The story of David's introduction to Saul is told in two forms (xvi. 14–23; xvii. 1–xviii. 5). In the former David is already a man of approved courage and parts when he is attracted to the court; in the latter he is an obscure and untried shepherd lad (as in chap. xvi.) when he volunteers to meet Goliath. In the Hebrew text the contradiction between the two accounts is absolute, but the Septuagint omits xvii. 12–31, xvii. 55–xviii. 5, which greatly lessens if it does not entirely remove the difficulty.[1] The rise of Saul's jealousy against David (xviii. 6–30) and the open breach between them, with David's flight from the court (xix., xx.), are very confused in the Hebrew text. Some serious difficulties are escaped by following the Septuagint recension, but others remain, and there is a good deal of confusion also in the accounts of David's life as an outlaw (xxi., xxvi.) and with Achish (xxvii.). For details see DAVID, vol. vi. pp. 737–8 *sq.* The narrative is largely made up of detached anecdotes, and sometimes there were two divergent anecdotes based on a single incident. This is clear as regards the two stories of David's generosity to Saul (xxiv., xxvi.) and still more clear where the LXX. omits one of two parallel anecdotes (see DAVID, *ut supra*), while the same account may perhaps be given of the twofold narrative of David's flight from Saul and of his betaking himself to Achish. At the same time there is sufficient con-

[1] A further difficulty is caused by 2 Sam. xxi. 19, which makes Elhanan the Bethlehemite slayer of Goliath.

nection to show that the doublets and additions are strung on an original thread of continuous history—a history of David, which becomes more free from foreign accretions at the point when the outlaw and refugee acquires, through the death of Saul, a position of commanding importance. Saul's defeat and death (1 Sam. xxviii. 1, 2, xxx.) are related as part of the history of David, which runs on from this point with little evidence of editorial additions to the close of 2 Sam. v. The summary account of David's war and government in 2 Sam. viii. appears to be the continuation of the same document; chaps. vi. and vii., on the other hand, seem to have an independent source.

III. The history of David's court, a vivid picture of events which must be referred in substance if not in form to a contemporary observer, is in its origin a distinct book from the life of David that closes with 2 Sam. viii. It extends over 2 Sam. ix.–1 Kings ii. with very little appearance of interpolation except the great appendix, 2 Sam. xxi.–xxiv., and is throughout one of the most admirable remains of ancient history.

The appendix is made up of various pieces,—chap. xxiv. appearing to attach itself directly to xxi. 1–14, while xxi. 15 *sq.* is akin in subject to xxiii. 8 *sq.*; the two poems, chap. xxii. (Psalm xviii.) and xxiii. 1–7, have no relation to the context, so that we can only say of them that they were accepted as Davidic at the time—posterior to the Deuteronomistic redaction—when the miscellaneous matter of the appendix was incorporated with our book.

In this rapid sketch it has not been attempted to notice all the minor marks of editorial retouching found in one or both of the two great recensions of the text. For all details the reader must refer principally to Wellhausen's repeated studies of the book, first in his *Text der Bücher Samuelis*, 1871, then in the fourth edition of Bleek's *Einleitung*, 1878, and finally in his *Prolegomena to the History of Israel* (Eng. tr., 1885). Of earlier works on the subject the relative parts of Ewald's *Geschichte* are the most important. The commentaries of Thenius (1st ed. 1842, 2d ed. 1864, and Keil (1864, Eng. tr. 1866) are not very satisfactory. In English Prof. Kirkpatrick's short commentary (in the Cambridge Bible for Schools) will be found useful. See also F. H. Woods in *Studia Biblica*, Oxford, 1885.

SANAA (San'á), the capital of Yemen in Arabia, and seat of the Turkish governor of that province, is situated in 15° 22′ N. lat. and 44° 31′ E. long., in a well-watered upland valley, 4000 feet above the sea and six to nine miles broad, running north and south between two table-lands. The Western table-land, over which lies the road to the port of Ḥodaida on the Red Sea, rises 1200 feet above the town, the eastern (J. Noḳom) is some 300 feet higher, and crowned by the ruins of the fortress Birásh which local tradition connects with the name of Shem, son of Noah, to whom the foundation of the city is attributed by Hamdání, *Jazírat*, p. 55. Under Mount Noḳom in the valley is the hill Ghomdán with the citadel, which Halévy in 1870 found in ruins. The ancient fortress of Ghomdán, which is often referred to by poets and is described in extravagant terms by later writers, is said to have been destroyed by the caliph 'Othmán. The city proper, which is walled, extends from the citadel on the east to the garden and ruined palace of the imám Motawakkil on the west. Beyond this is the quarter known as Bîr al-'Azab, where the imáms had their pleasure gardens, adjoining which, to the south, is the ancient Jewish settlement (Ḳá' al-Yáhúd). In Niebuhr's time (1763) the two last were open suburbs, but they have since been walled in. Though Sanaa is a very old town, the earliest buidings now standing are perhaps those which date from the Turkish occupation (1570–1630)—some mosques, parts of the fortifications, the aqueduct. In last century, under the independent imáms of Yemen, as the capital of the coffee country and the most fertile region of Arabia, it was, with its palaces and gardens, its mosques, (caravanserais), and good private houses, by much the first city of the peninsula. The Wahhábí movement and Turko-Egyptian intervention in the affairs of Yemen shook the power of the imáms and diminished the prosperity of their capital, but Cruttenden in 1836 still estimated the population at 40,000, or, with the three neighboring towns of Rauḍa, Jiráf and Wády Dahr, at not less than 70,000. In 1870, when the imamate had been extinct for twenty years, and the town was governed by an elected sheikh and had lost its provinces, Halévy found it much decayed, with many of the palaces and public buildings demolished or used as quarries, but still presenting a comely aspect, with good streets, houses, and mosques. In 1872, having been hard pressed by the Bedouins for several years, Sanaa opened its gates to the Turks, who were then engaged in the reconquest of Yemen. In the following year Millingen estimated the population at only 20,000.

The climate is good, though the extreme dryness of the air is trying. Rain usually falls in January and June, and more copiously in the end of July; the markets are well supplied with grain and fruit; vineyards were formerly numerous, but were largely given up after an attack of vine disease some thirty years ago.

Arabic writers give many discordant and fabulous traditions about the oldest history of Sanaa and its connection with the ancient kingdom of Ḥimyar. But most agree that its oldest name was Azál, which seems to be same word with Uzal in Gen. x. 27. A Himyarite nation of Auzalites occurs in a Syriac writer of the 6th century. The better-informed Arab writers knew also that the later name is due to the Abyssinian conquerers of Yemen, and that it meant in their language "fortified" (Bakrí, p. 606; Nöldcke, *Gesch. d. Pers. u. Arab.*, p. 187). Sanaa became the capital of the Abyssinian Abraha (*c.* 530 A.D.) who built here the famous church (*Kalís*), of whose splendor the Arabs give exaggerated pictures, and which was destroyed two centuries later by order of the caliph Manṣúr, (Azraḳí, p. 91).

SANÁ'Í. Abulmajd Majdúd b. Ádam, commonly known as the ḥakím or philosopher Saná'í, the earliest among the great Ṣúfic poets of Persia, was a native of Ghazna or Ghaznín (in the present Afghánistán), and flourished in the reigns of the Ghaznawid sultáns Ibráhím (1059–1099, 451–492 A.H.), his son Mas'úd (1099–1114), and his grandson Bahrámsháh, who, after some years of desperate struggle among members of his own family, ascended the throne in 1118 (512 A.H.) and died after a long and prosperous reign in 1152 (547 A.H.). The exact dates of the poet's birth and death are uncertain, Persian authorities giving the most conflicting statements. At any rate, he must have been born in the beginning of the second half of the 11th century and have died between 1131 and 1150 (525 and 545 A.H). He gained already at an early age the reputation of a very learned and pious man and of an accomplished minstrel. Like his contemporaries Mas'úd b. Sa'd b. Salmán (died 1131), Ḥasan of Ghazna (died 1179), and Uthmán Mukhtárí (died 1149 or 1159), who was his master in the poetical art, he composed chiefly ḳasídas in honor of his sovereign and the great men of the realm, but a peculiar incident made him forever abandon the highly remunerative although often perilous career of a court-panegyrist, and turn his poetical aspirations to higher and less worldly aims. One day, when he was proceeding to the royal palace to present an encomiastic song to Sultán Ibráhím, he was taunted by a half-mad but witty jester, who proposed a toast to the poet's blindness, because with all his learning and piety he had as yet only succeeded in flattering kings and princes, who were mere mortals like himself, and entirely misinterpreted God's motive in creating him. Saná'í was so struck with the appropriateness of this satirical remark that he forthwith gave up all the luxuries of court-life, retired from the world, and devoted himself after the due performance of the pilgrimage exclusively to devotional exercises, pious meditations, and the composition of Ṣúfic poetry in praise of the Godhead and the divine unity. For forty years he led a life of retirement and poverty, and, although Sultán Bahrámsháh offered him not only a high position at court, but also his own sister in marriage, he remained faithful to the austere and solitary life he had chosen. But, partly to show his gratitude to the king, partly to leave a lasting monument of his genius behind him, that might act as a stimulus to all disciples of the pantheistic creed, he began to write his great double-rhymed poem on ethics and religious life, which has served as model to Farid-uddín 'Attár's and Jalál-

uddín Rúmí's Súfic masterpieces, the *Ḥadíḳat-ulḥaḳíḳat*, or "Garden of Truth" (also called *Alkitáb alfakhrí*), in ten cantos, dealing with the following topics: unity of the Godhead, the divine word, the excellence of the prophet, reason, knowledge and faith, love, the soul, worldly occupation and inattention to higher duties, stars and spheres and their symbolic lore, friends and foes, separation from the world, etc. One of Saná'í's earliest disciples, who wrote a preface to this work, 'Alí al-Raffá, *alias* Muhammed b.'Alí Raḳḳám, assigns to its composition the date 1131 (525 A.H.), which in a considerable number of copies appears as 1140 (535 A.H.), and states besides that the poet died immediately after the completion of his task. Now, Saná'í cannot possibly have died in 1131, as another of his mathnawís, the *Ṭaríḳ-i-taḥḳíḳ*, or "Path to the Verification of Truth," was composed, according to a chronogram in its last verses, in 1134 (528 A.H.), nor even in 1140, if he really wrote, as the Átashkada says, an elegy on the death of Amír Mu'izzí; for this court-poet of Sultán Sanjar lived till 1147 or 1148 (542 A.H.). It seems, therefore, that Takí Káshí, the most accurate among Persian biographers, is right after all in fixing Saná'í's death in 1150 (545 A.H.), the more so as 'Alí al-Raffá himself distinctly says in his preface that the poet breathed his last on the 11th of Sha'bán, "which was a Sunday," and it is only in 1150 that this day happened to be the first of the week. Saná'í left, besides the *Ḥadíḳah* and the *Ṭaríḳ i-taḥḳíḳ*, several other Súfic mathnawís of similar purport: for instance, the *Sair ul'ibád ilá'ma'ád*, or "Man's Journey towards the Other World" (also called *Kunúz-urrumúz*, "The Treasures of Mysteries"); the *'Ishḳnáma*, or "Book of Love;" the *'Aḳlnáma*, or "Book of Intellect"; the *Kárnáma*, or "Record of Stirring Deeds," etc.; and an extensive díwán, or collection of lyrical poetry. His tomb, called the "Mecca" of Ghazna, is still visited by numerous pilgrims.

Saná'í's *Ḥadíḳah* still lacks a critical edition, for which 'Abd-ullatíf al-'Abbási's commentary (completed 1632 and preserved in a somewhat abridged form in several copies of the India office Library) would form an excellent basis. See, on the poet's life and works, Ouseley, *Biogr. Notices*, pp. 184–187; Rieu's and Flügel's *Catalogue*, etc.

SAN ANTONIO, a city of the United States, incorporated in 1873, the county-seat of Bexar (Bejar) county and the principal centre of western Texas, is situated in the fertile plain watered by the head-streams of the San Antonio river, which, after a course of 200 miles, falls into the Gulf of Mexico at Espiritu Santo Bay. It is an important junction for several of the Texan railways, lying on the main routes from the States to Mexico, 153 miles north of the frontier at Laredo. San Antonio proper, or the business part of the city, lies between the San Antonio and the San Pedro, and has been nearly all rebuilt since 1860. Chihuahua (formerly San Antonio de Valero), west of the San Pedro, is still almost exclusively Mexican; and Alamo, on somewhat higher ground to the east of the San Antonio, is largely inhabited by Germans. The total population of the city was in 1870 12,256 (1957 colored) and 20,550 (3036) in 1880. Newspapers are published in English, German, and Spanish. Flour, beer, meat-extract, ice, candles, and soap are the local manufactures.

On the site of Chihuahua a fort, San Fernando, was erected by the Spaniards in 1714, and four years later the mission of the Alamo (poplar tree) was established in its vicinity. Both fort and mission were afterwards transferred to the other side of the San Pedro,—the fort taking the name of the mission, which was thus destined to become famous in the Texan war, when in 1836 a garrison attacked by a superior Mexican force perished rather than surrender. German immigration began about 1845.

SANCHEZ. Three persons of this name once enjoyed considerable literary celebrity: (1) Francisco Sanchez (Sanctius) (1523–1601), successively professor of Greek and of rhetoric at Salamanca, whose *Minerva*, first printed at that town in 1587, was long the standard work on Latin grammar; (2) Francisco Sanchez, a Portuguese physician of Jewish parentage, professor of philosophy and physic at Toulouse, where he died at the age of seventy in 1632, whose ingenious but sophistical writings (*Quod nihil scitur*, 1581) mark the high-water of reaction against the dogmatism of the traditional schools of his time; (3) Thomas Sanchez of Cordova (1551–1610), Jesuit and casuist, whose treatise *De Matrimonio* (Genoa, 1592) is more notorious for its repulsive features than celebrated for its real learning and ability.

SANCHO I. (1154–1211) and SANCHO II. (1208[1]–1248), kings of Portugal from 1185 and 1223 respectively. See Portugal, vol. xix. p. 557–6.

SANCHUNIATHON, (that is, סכנית, "the god Sakkun hath given") is the name of the pretended author of the Phœnician writings said to have been used by Philo Byblius (*q.v.*). See also Phœnicia, vol. xviii. p. 815.

SAN CRISTOBAL DE LOS LLANOS, otherwise known as Ciudad Real, chief town of the Mexican state of Chiapas, stands in a fertile valley on the eastern slope of the central mountain range 450 miles east-southeast from the city of Mexico. It was founded in 1528 under the name of Villa Real, and received its present name in 1829. Its inhabitants, variously estimated as numbering from 8000 to 12,000, are chiefly employed in rearing cattle. Coarse woollen and cotton stuffs, and also common earthenware, are manufactured.

SANCROFT, William (1616–1693), archbishop of Canterbury, was born at Fressingfield in Suffolk 30th January, 1616, and entered Emmanuel College, Cambridge, in July, 1634. He became M.A. in 1641 and fellow in 1642, but was ejected in 1649 for refusing to accept the "Engagement." He then remained abroad till the Restoration, after which he was chosen one of the university preachers, and in 1663 he was nominated to the deanery of York. In 1664 he was installed dean of St. Paul's. In this situation he set himself with unwearied diligence to repair the cathedral, till the fire of London in 1666 necessitated the rebuilding of it, towards which he gave £1400 [$6,804]. He also rebuilt the deanery, and improved its revenue. In 1668 he was admitted archdeacon of Canterbury upon the king's presentation, but he resigned the post in 1670. In 1677, being now prolocutor of the Convocation, he was unexpectedly advanced to the archbishopric of Canterbury. He attended Charles II. upon his deathbed, and "made to him a very weighty exhortation, in which he used a good degree of freedom." He wrote with his own hand the petition presented in 1687 against the reading of the Declaration of Indulgence, which was signed by himself and six of his suffragans. For this they were all committed to the Tower, but after a trial for misdemeanor they were acquitted. Upon the withdrawal of James II. he concurred with the Lords in a declaration to the prince of Orange for a free parliament, and due indulgence to the Protestant dissenters. But, when that prince and his consort were declared king and queen, he refused to take the oath to them, and was accordingly suspended and deprived. From 5th August, 1691, till his death on November 24, 1693, he lived a very retired life in his native place. He was buried in the churchyard of Fressingfield, where there is a Latin epitaph to his memory.

He published *Fur Prædestinatus* 1651), *Modern Politics* (1652), and *Three Sermons* (1694). *Nineteen Familiar Letters to Mr. North* (afterwards Sir Henry North) appeared in 1757. He is characterized by Macaulay as "an honest, pious, narrow-minded man."

SANCTUARY is the Christian representative of the classical Asylum (*q.v.*), and was no doubt sug-

[1] [Vol. xix. p. 557 says Sancho II. was only 13 in 1223.—Am. Ed.]

gested in the first instance by the cities of refuge of the Levitical law. Originally every church or churchyard was a sanctuary for criminals. In England about thirty churches, from a real or pretended antiquity of the privilege, acquired special reputation as sanctuaries, *e.g.*, Westminster Abbey and Beverley Minster. "The precincts of the Abbey," says Dean Stanley, "were a vast cave of Adullam for all the distressed and discontented in the metropolis who desired, according to the phrase of the time, to take Westminster." The sanctuary seats at Hexham and Beverley and the sanctuary knocker at Durham are still in existence. The protection afforded by a sanctuary at common law was this: a person accused of felony might fly for the safeguard of his life to sanctuary, and there before the coroner, within forty days, confess the felony and take an oath of abjuration entailing perpetual banishment into a foreign Christian country. The sanctuary being the privilege of the church, it is not surprising to find that it did not extend to the crime of sacrilege, nor was it held to extend to high or petit treason. The law of abjuration and sanctuary was regulated by numerous and intricate statutes. A list of them will be found in Coke, *Institutes*, vol. iii. p. 115. Finally it was enacted by 21 Jac. I. c. 28, § 7, that no sanctuary or privilege of sanctuary should be admitted or allowed in any case. The privilege of sanctuary as protecting from civil process extended to certain places, parts or supposed parts of royal palaces, such as White Friars or Alsatia, the Savoy, and the Mint. The privilege of these places was abolished by 8 and 9 Will. III. c. 27, and 9 Geo. I. c. 28. (See Stephen, *Hist. of the Crim. Law*, vol. i., c. xiii.)

In Scotland religions sanctuaries were abolished at the Reformation. But the debtor still finds sanctuary from diligence in Holyrood House and its precincts. The sanctuary does not protect criminals, or even all debtors, *e.g.*, not crown debtors or fraudulent bankrupts; and a *meditatio fugæ* warrant may be executed within the sanctuary. After twenty-four hours' residence the debtor must enter his name in the record of the Abbey Court in order to entitle him to further protection. Under the Act 1696, c. 5, insolvency concurring with retreat to the sanctuary constitutes notour bankruptcy (see Bell, *Commentaries*, vol. ii. p. 461).

SAND, George. See Dudevant.

SANDALWOOD, a fragrant wood obtained from various trees of the natural order *Santalaceæ* and from the genera *Santalum* and *Fusanus*. The principal commercial source of sandalwood is *Santalum album*, L., a native of India, but it is also yielded by *S. Freycinetianum*, Gaud., and *S. pyrularium*, A. Gray, in the Hawaiian Islands, *S. Homei*, Seem., and *S. austrocaledonicum*, Viell., in New Caledonia, and *S. insulare*, Bert., in Tahiti. The wood of *S. latifolium*, Benth., and also that of *Fusanus spicatus*, R. Br., have been exported from southwest Australia, and that of *Eremophila Mitchelli*, of the natural order *Myoporineæ*, from Queensland, but these have little odor and are chiefly used for cabinet work. Sandalwood is also said to be produced in Nossi-Bé, and has been imported into London from Zanzibar, and into Germany from Venezuela, but of the botanical source of these varieties little is at present known. The use of sandalwood dates as far back at least as the 5th century, B.C., for the wood is mentioned under its Sanskrit name "chandana" in the *Nirukta*, the earliest extant Vedic commentary. It is still extensively used in India and China, wherever Buddhism prevails, being employed in funeral rites and religious ceremonies; comparatively poor people often spend as much as 50 rupees on sandalwood for a single cremation. Until the middle of the 18th century India was the only source of sandalwood. The discovery of a sandalwood in the islands of the Pacific led to a considerable trade of a somewhat piratical nature, resulting in difficulties with the natives, often ending in bloodshed, the celebrated missionary John Williams, amongst others, having fallen a victim to an indiscriminate retaliation by the natives on white men visiting the islands. The loss of life in this trade was at one time even greater than in that of whaling, with which it ranked as one of the most adventurous of callings. About the year 1810 as much as 400,000 dollars is said to have been received annually for sandalwood by Kamehameha, king of Hawaii. The trees consequently have become almost extinct in all the well-known islands, except New Caledonia, where the wood is now cultivated. Sandalwood of inferior quality derived from *Fusanus acuminatus* was exported from southwest Australia in 1884 to the extent of 2620 tons, valued at an average of about £8 [$38.88] per ton, genuine sandalwood being worth in China from £12 [$58.32] to £40 [$194.40] per ton.

In India sandalwood is largely used in the manufacture of boxes, fans, and other ornamental articles of inlaid work, and to a limited extent in medicine as a domestic remedy for all kinds of pains and aches. The oil is largely used as a perfume, few native Indian attars or essential oils being free from admixture with it. In the form of powder or paste the wood is employed in the pigments used by the Brahmans for their distinguishing caste-marks.

During the last few years oil of sandalwood has largely replaced copaiba, both in the United Kingdom and on the Continent, in the treatment of various diseases of the mucous membrane. Three varieties are distinguished in trade—East-Indian, Macassar, and West-Indian. The first-named is derived from *S. album*, the second probably from another species of *Santalum*, and the third from a wood imported from Puerto Cabello in Venezuela. *Bucida capitata*, a Combretaceous plant, is known in the West Indies as sandalwood; but the odor of the wood as well as of the oil, which is quite distinct from that of the true sandalwood, has more resemblance to that of a *Myroxylon*. Inferior qualities of the oil are said to be adulterated in Germany with the oil of red cedar wood (*Juniperus virginiana*).

In India sandalwood is produced in the dry tracts of country in Mysore and Coimbatore, north and northwest of the Nilgiri Hills, also farther eastward in the districts of Salem and North Arcot, where the tree grows from the sea-level up to an elevation of 3000 feet. In the first-named district the wood is a Government monopoly and can only be felled by the proper officers, this privilege having been retained since 1770, when it was conferred by treaty with Hyder Ali on the East India Company. The Mysore sandalwood is shipped from Mangalore to the extent of about 700 tons annually, valued at £27,000 [$131,220]. In the Madras Presidency—although there is now no monopoly—sandalwood, by the careful management of the forest department, has been made to yield an increasing revenue to the Government, as much as 547½ tons having been furnished by the reserved forests in 1872–3. The tree is propagated by seeds, which, however, must be placed where they are intended to grow, since the seedlings will not bear transplantation, probably on account of deriving their nourishment parasitically by means of tuberous swellings attached to the roots of other plants. The trees are cut down when between eighteen and twenty-five years old, at which period they have attained their maturity, the trunks being then about one foot in diameter. The felling takes place at the end of the year, and the trunk is allowed to remain on the ground for several months, during which time the white ants eat away the valueless sapwood but leave the fragrant heartwood untouched. The heartwood is then sawn into billets about 2 or 2½ feet long. These are afterwards more carefully trimmed at the forest depôts, and left to dry slowly in a close warehouse for some weeks, by which the odor is improved and the tendency of the wood to split obviated. An annual auction of the wood takes place, at which merchants from all parts of India congregate. The largest pieces are chiefly exported to China, the small pieces to Arabia; and those of medium size are retained for use in India. China imported into the treaty ports 66,237 piculs (of 133⅓ lb) of sandalwood in 1872. As much as 700 tons are annually imported into Bombay from the Malabar coast, of which about 450 tons are again exported. The oil, which is distilled chiefly at Mangalore from the roots and chips, is also imported into Bombay to the extent of 12,000 lb annually.

Red Sandalwood, known also as *Red Sanders Wood*, is the product of a small Leguminous tree, *Pterocarpus santalinus*, native of Southern India, Ceylon, and the Philippine Islands. The wood is obtained principally from Madras, in certain parts of which province it is regularly cultivated, coming into the market in the form of irregular billets of heartwood, 3 or 4 feet in length. A fresh surface of the wood has a rich deep red color, which on exposure, however, assumes a dark brownish tint. Under the influence of alkaline solutions, alcohol, or strong acetic acid, red sandalwood yields up to 16 per cent. of a resinoid body, santalin or santalic acid $C_{15}H_{14}O_5$ (?), which substance is the tinctorial principle of the wood. Santalin is quite insoluble in cold water; it neutralizes alkalics, and with them forms uncrystallizable salts. In its pure condition santalin forms minute prismatic crystals of a beautiful ruby color. The wood also contains small proportions of colorless crystalline principles—santal, $C_8H_6O_3$, and pterocarpin, $C_{17}H_{16}O_5$—and of an amorphous body having the formula $C_{17}H_{16}O_6$. In mediæval times red sandalwood possessed a high reputation in medicine, and it was valued as a coloring ingredient in many dishes. Now it is little used as a coloring agent in pharmacy, its principal application being in wool-dyeing and calico-printing. Several other species of *Pterocarpus*, notably *P. indicus*, contain the same dyeing principle and can be used as substitutes for red sandalwood. The barwood and camwood of the Guinea Coast of Africa, presumably the produce of one tree, *Baphia nitida* (*Pterocarpus angolensis* of De Candolle), called santal rouge d'Afrique by the French, are also in all respects closely allied to the red sandalwood of Oriental countries.

See Seemann, *Flora Vitiensis*, pp. 210–215; *Pharm. Journ.* and *Trans.*, 1885-86; *Pharmacographia*, 2d ed., p. 599; Dymock, *Materia Medica of Western India*, p. 617; *Jour. Soc. Arts*, 1875, p. 641; Seemann, *Voyage of the "Herald,"* 1853, p. 83; Seemann, *Jour. Botany*, 1864, p. 218; Erskine, *Islands of the W. Pacific*, 1853, pp. 143, 326, 390, and Appendix, pp. 478, 486; Martin, *Natives of the Tonga Islands*, 1817, pp. 319–333; Birdwood, *Bombay Products*, p. 306; *Madras Jury Reports*, 1857; Hawkes, *Report on Oils of India*, p. 38.

SANDARACH is a resinous body obtained from the small Coniferous tree *Callitris quadrivalvis*, native of the northwest regions of Africa, and especially characteristic of the Atlas Mountains. The resin, which is procured as a natural exudation on the stems, and also obtained by making incisions in the bark of the trees, comes into commerce in the form of small round balls or elongated tears, transparent, and having a delicate yellow tinge. It is a little harder than mastic, for which it is sometimes substituted, and does not soften in the mouth like that resin; but, being very brittle, it breaks with a clean, glassy fracture. Sandarach has a faintly bitter resinous taste, and a pleasant balsamic odor. It consists of a mixture of three distinct resins, the first readily soluble in alcohol, constituting 67 per cent. of the mass, while the second dissolves with more difficulty, and the third is soluble only in hot alcohol. Sandarach is imported chiefly from Mogador, and is an important ingredient in spirit varnishes. It is also used as incense, and by the Arabs medicinally as a remedy for diarrhœa. An analogous resin is procured in China from *Callitris sinensis*, and in South Australia, under the name of pine gum, from *C. Reissii*.

SANDBACH, a town and urban sanitary district of Cheshire, is situated on the Trent and Mersey Canal, and on the London and Northwestern Railway, at the junction for Northwich, 25 miles east-southeast of Chester and 5 northeast of Crewe. In the market-place are two ancient obelisks, dating, according to some, from the 7th century. The principal public buildings are the parish church of St. Mary, in the Perpendicular style, with a tower rebuilt 1847–9, the grammar school, the public reading rooms, and the town-hall. Anciently the town was celebrated for its ale. The principal industry was formerly silk throwsting, but this is now discontinued, and the inhabitants are chiefly employed in the salt-works and alkali-works. The population of the urban sanitary district (area 2694 acres) in 1871 was 5259, and in 1881 it was 5493.

SAND-BLAST. The erosive influence of driven sand is turned to useful account for several industrial purposes by means of an apparatus devised, about 1870, by Mr. B. C. Tilghman of Philadelphia. Tilghman's sand-blast consists of a contrivance for impelling, with graduated degrees of velocity, a jet or column of sand, by means of compressed air or steam, against the object or surface to be acted on. The apparatus is principally adapted for obscuring, engraving, and ornamenting glass, but according to the velocity with which the sand is impelled it may be used to carve deep patterns in granite, marble, and other hard stones, to bite into steel, etc., and even to cut and perforate holes through these and other most refractory materials. Sheets of glass 4 feet wide are obscured at the rate of 3 feet per minute, with a blast of air having a pressure of 1 lb per inch. With the aid of tough elastic stencils, patterns and letters are engraved on flashed glass, globes for lamps and gaslights are ornamented, druggists' bottles are lettered, etc.[1] Driven with moderate velocity against a metal surface, the sand produces by its impact a fine uniform pitted appearance without removing the metal; and in this way it is used for "frosting" plated goods. A strong blast is largely used for sharpening files, which, as they leave the cutter, have always a slight backward curve or "burr" on their cutting edges which blunts their biting effect. By directing a blast of very fine sand, mixed with water into a thin mud, with steam pressure of 70 lbs., at an angle against the back of the teeth, this burr is ground off, the shape of the teeth is improved, and the file is rendered very keen. While the use of steam for impelling the sand-blast is most simple and economical, many practical difficulties have hitherto been found in the way of its employment, and consequently for obtaining high pressure of air costly apparatus was required, thus limiting the applications of the agency. In 1884 Mr. Mathewson patented an apparatus in which, by an ingenious exhaust arrangement, the impelling steam is swept away, leaving only cool, dry sand to strike against the object acted on; and the success of this device has already opened up a wider field for the employment of the sand-blast.

SANDBY, Paul (1725–1809),[2] founder of the English school of water-color painting, was descended from a branch of the Sandbys of Babworth, and was born at Nottingham in 1725. After commencing his artistic studies in London, in 1746 he was appointed by the duke of Cumberland draughtsman to the survey of the Highlands. In 1752 he quitted this post, and retired to Windsor, where he occupied himself with the production of water-color drawings of scenery and picturesque architecture, which brought him under the notice of Sir Joseph Banks, who gave him his patronage, and subsequently commissioned him to bring out in aquatinta (a method of engraving then peculiar to Sandby) forty-eight plates drawn during a tour in Wales. Sandby displayed considerable power as a caricaturist in his attempt to ridicule the opposition of Hogarth to the plan for creating a public academy for the arts. He was chosen a foundation-member of the Royal Academy in 1768, and the same year was appointed chief drawing-master to the Royal Military Academy at Woolwich. He held this situation till 1799, and during that time he trained many artists who afterwards gained a name in their profession. Sandby will be best remembered, however, by his water-color paintings. They are topographical in character, and, while they want the richness and brilliancy of modern water-color, he nevertheless impressed upon them the originality of his mind. In his later pieces, in particular, decided progress is observable in richness and in harmony of tinting, and they also show

[1] In 1875 inscriptions were cut by means of the blast on 150,000 tombstones of soldiers killed in the American Civil War. Cast-iron letters were fastened by shellac on the marble, the sand was driven by steam-pressure of 90 lb, and the stone was cut, in four minutes, to a depth of a quarter of an inch, leaving the letters in relief.

[2] [Koehler's *Etching* (London, 1885) gives 1732 as birth-date, as do most of the older authorities.—Am. Ed.]

a measure of poetic feeling, due, in great part, to the influence of Cozens. His etchings, such as the *Cries of London* and the illustrations to Ramsay's *Gentle Shepherd*, and his plates, such as those to Tasso's *Jerusalem Delivered*, are both numerous and carefully executed. He died in London on the 9th November, 1809.

SANDEAU, Léonard Sylvain Jules (1811–1882), a French novelist of much grace and not a little power, was born at Aubusson (Creuse) on February 9, 1811. He made acquaintance as an art student with Madame Dudevant (George Sand), who had just taken to an unrestrained literary life at Paris. The intimacy did not last long, but it produced *Rose et Blanche* (1831), a novel written in common, and from it George Sand took the idea of the famous *nom de guerre* by which she is and always will be known. Sandeau's subsequent work showed that he could run alone, and for nearly fifty years he continued to produce novels and to collaborate in plays. His best works are *Marianna* (1839), *Le Docteur Herbeau* (1841), *Cathérine* (1845), *Mademoiselle de la Seiglière* and *Madeleine* (1848), *La Chasse au Roman* (1849), *Sacs et Parchemins* (1851), *La Maison de Penarvan* (1858), *La Roche aux Mouettes* (1871). The famous play of *Le Gendre de M. Poirier* is only one of several which he wrote with Émile Augier,—the novelist usually contributing the story and the dramatist the theatrical working up. Meanwhile Sandeau, who had accepted the Empire, but who never took any active part in politics, had been made conservateur of the Mazarin library in 1853, elected to the Academy in 1858, and next year appointed librarian of St. Cloud. At the suppression of this latter office, after the fall of the Empire, he was pensioned. He died on the 24th of April, 1882. He was never a very popular novelist, judging by the sale of his works; and the peculiar quiet grace of his style, as well as his abstinence from sensational incident, and his refusal to pander to the French taste in fictitious morals, may be thought to have disqualified him for popularity. But his literary ability has always been recognized by competent judges. His skill in construction was very great; his character-drawing, though pure, is eminently free from feebleness and commonplace; and of one particular situation —the tragical clashing of aristocratic feeling with modern tendencies—he had an extraordinary mastery, which he showed without any mere repetition, but in many different studies.

SANDEC. See Neu-Sandec.

SAND-EEL or Sand-Launce. The fishes known under these names form a small isolated group (*Ammodytina*), distantly related to the cod-fishes. Their body is of an elongate-cylindrical shape, with the head terminating in a long conical snout, the projecting lower jaw forming the pointed end. A low long dorsal fin, in which no distinction between spines and rays can be observed, occupies nearly the whole length of the back, and a long anal, composed of similar short and delicate rays, commences immediately behind the vent, which is placed about midway between the head and caudal fin. The caudal is forked and the pectorals are short. The total absence of ventral fins indicates the burrowing habits of these fishes. The scales, when present, are very small; but generally the development of scales has only proceeded to the formation of oblique folds of the integuments. The eyes are lateral and of moderate size; the dentition is quite rudimentary.

Sand-eels are small littoral marine fishes, only one species attaining a length of 18 inches (*Ammodytes lancolatus*). They live in shoals at various depths on a sandy bottom, and bury themselves in the sand on the slightest alarm. They are able to do this with the greatest ease and rapidity whilst the bottom is covered with water. Many of those which live close inshore are left by the receding tide buried in the sand, and are then frequently dug out from a depth of one or two feet. Other shoals live in deeper water; when they are surprised by fish of prey or porpoises, they are frequently driven to the surface in such dense masses that numbers of them can be scooped out of the water with a bucket or hand-net. In fact, this used to be, in the Channel Islands, the common practice of the fishermen to provide themselves with bait. Some species descend to a depth of 100 fathoms and more; and the greater sand-eel is not rarely taken on the mackerel line far out at sea near the surface. Sand-eels are very rapacious, destroying a great quantity of fry and other small creatures, such as the lanceolet (*Branchiostoma*), which lives in similar localities. They are excellent eating, and are much sought after for bait.

Sand-eels are common in all suitable localities of the North Atlantic; a species scarcely distinct from the European common sand-launce occurs on the Pacific side of North America, another on the east coast of South Africa. On the British coasts three species are found: the Greater Sand-Eel (*Ammodytes lanceolatus*), distinguished by a tooth-like bicuspid prominence on the vomer; the Common Sand-Launce (*A. tobianus*), from five to seven inches long, with unarmed vomer, even dorsal fin, and with the integuments folded; and the Southern Sand-Launce (*A. siculus*), with unarmed vomer, smooth skin, and with the margins of the dorsal and anal fins undulated. The last species is common in the Mediterranean, but local farther northwards. It has been found near the Shetlands at depths from 80 to 100 fathoms, and is generally distinguished from the common species by the fishermen of the Channel Islands, who have a tradition that it appeared suddenly on their coasts some fifty years ago.

SANDEMANIANS. See Glas, vol. x., p. 567–8.

SANDERSON, Robert (1587–1663), bishop of Lincoln, and one of the worthies celebrated by Izaak Walton, was born at Rotherham, Yorkshire, in 1587. He was educated at the grammar school of his native town and at Lincoln College, Oxford, took orders in 1611, and was promoted successively to several benefices. On the recommendation of Laud he was appointed one of the royal chaplains in 1631, and as a preacher was a great favorite with the king. In 1642 Charles created him regius professor of divinity at Oxford, with a canonry of Christ Church annexed. But the civil war prevented him until 1646 from entering on the office; and in 1648 he was ejected by the visitors whom the parliament had commissioned. He recovered these preferments at the Restoration, and was promoted to the bishopric of Lincoln, but lived only two years to enjoy his new dignities, dying in his seventy-sixth year in 1663. His most celebrated work is his *Cases of Conscience*, deliberate judgments upon points of morality submitted to him. Some of these cases, notably that of Sabbath observance, and that of signing the "Engagement" to the Commonwealth, were printed surreptitiously during his lifetime, though drawn up in answer to private spiritual clients; and a collection, gradually enlarged in successive editions, was published after his death. They are extremely interesting specimens of English casuistry, distinguished not less by moral integrity than good sense, learning, and close, comprehensive, and subtle reasoning. His practice as a college lecturer in logic is better evidenced by these "cases" than by his *Compendium of Logic* published in 1615. A complete edition of Sanderson's works was edited by Dr. Jacobson in 1854 (Oxford Press). To this the reader may be referred for his sermons and his occasional tracts on public affairs during the troubled period of his middle life and old age.

SAND-GROUSE, the name[1] by which are commonly known the members of a small but remarkable group of birds frequenting sandy tracts, and having their feet more or less clothed with feathers after the fashion of Grouse (vol. xi. p. 197), to which they were originally thought to be closely allied, and the species first described were by the earlier systematists

[1] It seems to have been first used by Latham in 1783 (*Synopsis*, iv., p. 751) as the direct translation of the name *Tetrao arenarius* given by Pallas.

invariably referred to the genus *Tetrao*. Their separation therefrom is due to Temminck, who made for them a distinct genus which he called *Pterocles*,[1] and his view, as Lesson tells us (*Traité*, p. 515), was subsequently corroborated by De Blainville; while in 1831 Bonaparte (*Saggio*, p. 54) recognized the group as a good Family, *Pediophili* or *Pteroclidæ*. Further investigation of the osteology and pterylosis of the Sand-Grouse revealed still greater divergence from the normal *Gallinæ* (to which the true Grouse belong), as well as several curious resemblances to the Pigeons; and in the Zoological Society's *Proceedings* for 1868 (p. 303) Prof. Huxley proposed to regard them, under the name of *Pteroclomorphæ*, as forming a group equivalent to the *Alectoromorphæ* and *Peristeromorphæ*, for reasons already briefly stated (Ornithology, vol. xviii. p. 50).[2] The *Pteroclidæ* consist of two genera—*Pterocles*, with about fifteen species, and *Syrrhaptes*, with two. Of the former, two species inhabit Europe, *P. arenarius*, the Sand-Grouse proper, and that which is usually called *P. alchata*, the Pin-tailed Sand-Grouse. The European range of the first is practically limited to Portugal, Spain, and the southern parts of Russia, while the second inhabits also the south of France, where it is generally known by its Catalan name of "*Ganga*," or locally as "*Grandaulo*," or, strange to say, "*Perdrix d'Angleterre*." Both species are also abundant in Barbary, and have been believed to extend eastwards through Asia to India, in most parts of which country they seem to be only winter visitants; but in 1880 Herr Bogdanow pointed out to the Academy of St. Petersburg (*Bulletin*, xxvii. p. 164) a slight difference of coloration between eastern and western examples of what had hitherto passed as *P. alchata;* and the difference, if found to be constant, may require the specific recognition of each, while analogy would suggest that a similar difference might be found in examples of *P. arenarius*. India, moreover, possesses five other species of *Pterocles*, of which however only one, *P. fasciatus*, is peculiar to Asia, while the others inhabit Africa as well, and all the remaining species belong to the Ethiopian region—one, *P. personatus*, being peculiar to Madagascar, and four occurring in or on the borders of the Cape Colony.

The genus *Syrrhaptes*, though in general appearance resembling *Pterocles*, has a conformation of foot quite unique among birds, the three anterior toes being encased in a common "podotheca," which is clothed to the claws with hairy feathers, so as to look much like a fingerless glove. The hind toe is wanting. The two species of *Syrrhaptes* are *S. tibetanus*—the largest Sand-Grouse known—inhabiting the country whence its trivial name is derived, and *S. paradoxus*, ranging from Northern China across Central Asia to the confines of Europe, which it occasionally, and in a marvellous manner, invades, as has been already briefly described (Birds, vol. iii., p. 667).[3] Though its attempts at colonization in the extreme west have failed, it would seem to have established itself of late years in the neighborhood of Astrakhan (*Ibis*, 1882, p. 220). It appears to be the "Barguerlac" of Marco Polo (ed. Yule, i., p. 239); and the "Loung-Kio" or "Dragon's Foot," so unscientifically described by the Abbé Huc (*Souvenirs d'un Voyage dans la Tartarie*, i., p. 244), can scarcely be anything else than this bird.

Externally all Sand-Grouse present an appearance so distinctive that nobody who has seen one of them can be in doubt as to any of the rest. Their plumage assimilates in general color to that of the ground they frequent, being above of a dull ochreous hue, more or less barred or mottled by darker shades, while beneath it is frequently varied by belts of deep brown intensifying into black. Lighter tints are, however, exhibited by some species,—the drab merging into a pale gray, the buff brightening into a lively orange, and streaks or edgings of an almost pure white relieve the prevailing sandy or fawn-colored hues that especially characterize the group. The sexes seem always to differ in plumage, that of the male being the brightest and most diversified. The expression is decidedly Dove-like, and so is the form of the body, the long wings contributing also to that effect, so that among Anglo-Indians these birds are commonly known as "Rock-Pigeons." The long wings, the outermost primary of which in *Syrrhaptes* has its shaft produced into an attenuated filament, are in all the species worked by exceedingly powerful muscles, and in several forms the middle rectrices are likewise protracted and pointed, so as to give to their wearers the name of Pin-tailed Sand-Grouse.[4] The nest is a shallow hole in the sand. Three seems to be the regular complement of eggs laid in each nest, but there are writers who declare (most likely in error) that the full number in some species is four. These eggs are of peculiar shape, being almost cylindrical in the middle and nearly alike at each end, and are of a pale earthy color, spotted, blotched, or marbled with darker shades, the markings being of two kinds, one superficial and the other more deeply seated in the shell. The young are hatched fully clothed in down (*P. Z. S.* 1866, pl. ix. Fig. 2), and though not very active would appear to be capable of locomotion soon after birth. Morphologically generalized as the Sand-Grouse undoubtedly are, no one can contest the extreme specialization of many of their features, and thus they form one of the most instructive groups of birds with which ornithologists are acquainted. The remains of an extinct species of *Pterocles*, *P. sepultus*, intermediate apparently between *P. alchata* and *P. gutturalis*, have been recognized in the Miocene caves of the Allier by Prof. A. Milne-Edwards (*Ois foss. de la France*, p. 294, pl. clxi. Figs. 1–9); and, in addition to the other authorities on this very interesting group of birds already cited, reference may be made to Mr. Elliot's "Study" of the Family (*P. Z. S.*, 1878, pp. 233–264) and Dr. Gadow, "On certain points in the Anatomy of *Pterocles*" (*op. cit.*, 1882, pp. 312–332). (A. N.)

SANDHURST, a city of Victoria, Australia, in the county of Bendigo, is situated in 36° 46′ S. lat. and 144° 17′ E. long., at a height of 758 feet above the sea, on Bendigo Creek (a sub-tributary of the Murray), 100¾ miles north-northwest of Melbourne by the railway to Echuca. Built on an exhausted part of old gold-fields of Bendigo (1851), and long better known by that name, Sandhurst, which became a municipality in 1855, a borough in 1863, and a city in 1871, has been gradually working itself clear of the irregularity and disorder characteristic of abandoned mines and quartz-crushing enterprises. Pall Mall, the principal street, consists of good houses of two and three stories; and, besides banks, insurance offices, hotels, and churches (many of which are substantial buildings), there are in Sandhurst Government and municipal offices, a hospital, a benevolent asylum, a mechanics' institute and school of mines, a theatre, and several halls. Rosalind Park, opposite Pall Mall, the Camp Reserve, and the Botanical Gardens are the principal pleasure grounds. A good supply of water has been secured by the construction of five large reservoirs capable of storing in the aggregate upwards of 622,600,000 gallons. Besides gold-mining, which in the Sandhurst district employs 6800 miners, the local industries are brewing, iron-casting, coach-building, the working of bricks and tiles and earthenware, and tanning. The population of the city (which is divided into three wards—Sutton, Darling, and Barkly) was

[1] He states that he published this name in 1809; but hitherto research has failed to find it used until 1815.

[2] Some more recent writers, recognizing the group as a distinct Order, have applied to it the name "*Pterocletes*," while another calls it *Heteroclitæ*. The former of these words is based on a grammatical misconception, while the use of the latter has long since been otherwise preoccupied in zoology. If there be need to set aside Prof. Huxley's term, Bonaparte's *Pediophili* (as above mentioned) may be accepted, and indeed has priority of all others.

[3] Some slight additions to and corrections of that account may here be given. A sixth example is stated (*Ibis*, 1871, p. 223) to have been killed in Europe in 1859, namely, at Perpignan in France. One is believed to have been obtained at or near Archangel (*Ibis*, 1873, p. 66); but the report of one in Sicily proves to have been a mistake, and Rimini, on the Adriatic, remains the most southern Italian locality reached in 1863. Since 1872 a male obtained near Modena in May, 1876 (*Ibis*, 1881, p. 206), and a pair, one of which was shown to the writer, in the county of Kildare in Ireland, the following October (*Zoologist*, 1877, p. 24), are all that are known to have occurred in Western Europe.

[4] These were separated by Bonaparte (*Comptes Rendus*, xlii. p. 880) as a distinct genus, *Pteroclurus*, which later authors have justly seen no reason to adopt.

28,662 in 1881. The value of ratable property is £1,663,910 [$8,086,602.60].

SAN DIEGO, a city and port of entry of the United States, chief town of San Diego county, California, 15 miles north of the Mexican frontier. It has a land-locked harbor 5½ miles long and next to San Francisco the best on the Pacific coast of the States, is the selected terminus of the Texas and Pacific Railroad, and has recently become a fashionable winter resort owing to the remarkable steadiness of its winter climate (mean annual temperature 62°). San Diego was founded by Roman Catholic missionaries in 1769. In 1880 it had only 2637 inhabitants, but they have since increased to upwards of 5000. In the county is a lake of boiling mud half a mile long by 500 yards wide.

SAN DOMINGO, or SANTO DOMINGO. See HAYTI.

SANDOMIR, or SĘDOMIERZ, a town of Russian Poland, in the province of Radom, is one of the oldest towns of Poland, being mentioned in annals as early as 1079; from 1139 to 1332 it was the chief town of the principality. Under Cassimir III. it received extensive privileges and reached a high degree of prosperity and strength. In 1429 it was the seat of a congress for the establishment of peace with Lithuania, and in 1570 the well-known "Consensus Sandomiriensis" was formed there for uniting the Lutherans, Calvinists, and Moravian Brethren. Subsequent wars, and especially the Swedish, ruined the town still more than numerous conflagrations, and in the second part of the 18th century it had only 2060 inhabitants. It is now a quite unimportant place, but contains a few remarkable monuments of its past. The beautiful cathedral, rising on a high hill above the Vistula, and facing the plains of Galicia, was built between 1120 and 1191; it was rebuilt in stone in 1360, and is thus one of the oldest monuments of old Polish architecture. The churches of St. Paul and St. James are fine relics of the 13th century. In 1881 the population was 6265, or, including the suburbs, 14,710.

SANDOWAY, a district in the south of the Arakan division of British Burmah, ceded to the British by treaty in 1826, embracing an area of 3667 square miles, and bounded on the north by the Ma-i river, on the west by the Bay of Bengal, on the east by the Arakan Mountains, and on the south by the Khwa river. The whole face of the country is mountainous, the Arakan range sending out spurs which reach down to the coast. Some of the peaks in the north attain an elevation of over 4000 feet. Not more than one-eighteenth part of the surface can be called plain; and, except there, where rice cultivation is carried on, and on the hill-sides, where clearings are made for *toungya* or nomadic cultivation, the country is covered with dense forest. There is nothing in the district that can be called a river, the streams draining it being but mountain torrents to within a few miles of the coast; the mouth of the Khwa forms a good anchorage for vessels of from 9 to 10 feet draught. So far as is known of the geology of the district, the rocks in the Yoma range and its spurs are metamorphic, and comprise clay, slates, ironstone, and indurated sandstone; towards the south, ironstone, trap, and rocks of basaltic character are common; veins of steatite and white fibrous quartz are also found in the district.

Only 135 square miles of the total area are cultivable, and of these but 75 are cultivated. The chief crops are rice, sesamum, tobacco, cotton, sugar-cane, *dhani* palms, and yams. The revenue in 1883–84 was £13,978 [$67,933.08], the land tax realizing £6749 [$32,800.14] of that amount. This mountainous and forest-clad country, with such a small cultivable area, is sparsely inhabited, the population as returned by the census of 1881 being only 64,010 (males 32,706, females 31,304); of this number 56,458 were Buddhists. There are no towns with a population exceeding 2000. Sandoway, the chief town and headquarters, on the river of the same name, in 18° 27″ 35′ N. lat. and 94° 24′ 36″ E. long., is a very ancient town, and is said to have been at one time the capital of a kingdom, or more probably of a petty chieftainship.

SANDPIPER (Ger. *Sandpfeifer*), according to Willughby in 1676 the name given by Yorkshiremen to the bird now most popularly known in England as the "Summer-Snipe,"—the *Tringa hypoleucos* of Linnæus and the *Totanus*, *Actitis* or *Tringoides hypoleucus* of later writers,—but probably even in Willughby's time of much wider signification, as for more than a century it has certainly been applied to nearly all the smaller kinds of the group termed by modern ornithologists *Limicolæ* which are not PLOVERS (vol. xix. p. 240), or SNIPES (*q.v.*), but may be said to be intermediate between them. Placed by most systematists in the family *Scolopacidæ*, the birds commonly called Sandpipers seem to form three sections, which have been often regarded as Subfamilies—*Totaninæ*, *Tringinæ*, and *Phalaropodinæ*, the last indeed in some classifications taking the higher rank of a Family—*Phalaropodidæ*. This section comprehends three species only known as Phalaropes or swimming Sandpipers, which are at once distinguished by the membranes that fringe their toes, in two of the species forming marginal lobes,[1] and by the character of their lower plumage, which is as close as that of a Duck, and is obviously connected with their natatory habits. The distinctions between *Totaninæ* and *Tringinæ* though believed to be real, are not so easily drawn, and space is wanting here to describe them minutely. The most obvious may be said to lie in the acute or blunt form of the tip of the bill (with which is associated a less or greater development of the sensitive nerves running almost if not quite to its extremity, and therefore greatly influencing the mode of feeding) and in the style of plumage—the *Tringinæ*, with blunt and flexible bills, mostly assuming a summer-dress in which some tint of chestnut or reddish-brown is very prevalent, while the *Totaninæ*, with acute and stiffer bills, display no such lively colors. Furthermore the *Tringinæ*, except when actually breeding, frequent the seashore much more than do the *Totaninæ*.[2] To the latter belong the GREENSHANK (vol. xi. p. 155) and REDSHANK (vol. xx. p. 330), as well as the Common Sandpiper of English books, the "Summer-Snipe" above-mentioned, a bird hardly exceeding a Skylark in size, and of very general distribution throughout the British Islands, but chiefly frequenting clear streams, especially those with a gravelly or rocky bottom, and most generally breeding on the beds of sand or shingle on their banks. It usually makes its appearance in May, and from thence during the summer-months may be seen in pairs skimming gracefully over the water from one bend of the stream to another, uttering occasionally a shrill but plaintive whistle, or running nimbly along the margin, the mouse-colored plumage of its back and wings making indeed but little show, though the pure white of its lower part often renders it conspicuous. The nest, in which four eggs are laid with their pointed ends meeting in its centre (as is usual among Limicoline birds), is seldom far from the water's edge, and the eggs, as well as the newly-hatched and down-covered young, so closely resemble the surrounding pebbles that it takes a sharp eye to discriminate them. Later in the season family-parties may be seen about the larger waters, whence, as autumn advances, they depart for their winter-quarters. The Common Sandpiper is found over the greater part of the Old World. In summer it is the most abundant

[1] These are *Phalaropus fulicarius* and *P.* (or *Lobipes*) *hyperboreus*, and on that account were thought by some of the older writers to be allied to the COOTS (vol. vi. p. 303). The third species is *P.* (or *Steganopus*) *wilsoni*. All are natives of the higher part of the northern hemisphere, and the last is especially American, though perhaps a straggler to Europe.

[2] There are unfortunately no English words adequate to express these two sections. By some British writers the *Tringinæ* have been indicated as "Stints," a term cognate with Stunt and wholly inapplicable to many of them, while recent American writers restrict to them the name of "Sandpiper," and call the *Totaninæ*, to which that name is especially appropriate, "Willets."

bird of its kind in the extreme north of Europe, and it extends across Asia to Japan. In winter it makes its way to India, Australia, and the Cape of Good Hope. In America its place is taken by a closely kindred species, which is said to have also occurred in England—*T. macularius*, the "Peetweet," or Spotted Sandpiper, so called from its usual cry, or from the almost circular marks which spot its lower plumage. In habits it is very similar to its congener of the Old World, and in winter it migrates to the Antilles and to Central and South America. Of other *Totaninæ*, one of the most remarkable is that to which the inappropriate name of Green Sandpiper has been assigned, the *Totanus* or *Helodromas ochropus* of ornithologists, which most curiously differs (so far as is known) from all others of the group both in its osteology[1] and mode of nidification, the hen laying her eggs in the deserted nests of other birds,—Jays, Thrushes, or Pigeons,—but nearly always at some height (from 3 to 30 feet) from the ground (*Proc. Zool. Society*, 1863, pp. 529–532). This species occurs in England the whole year round, and is presumed to have bred here, though the fact has never been satisfactorily proved, and our knowledge of its erratic habits comes from naturalists in Pomerania and Sweden; yet in the breeding-season, even in England, the cock-bird has been seen to rise high in air and perform a variety of evolutions on the wing, all the while piping what, without any violence of language, may be called a song. This Sandpiper is characterized by its dark upper plumage, which contrasts strongly with the white of the lower part of the back and gives the bird as it flies away from its disturber much the look of a very large House-Martin. The so-called Wood-Sandpiper, *T. glareola*, which, though much less common, is known to have bred in England, has a considerable resemblance to the species last mentioned, but can at once be distinguished, and often as it flies, by the feathers of the axillary plume being white barred with grayish-black, while in the Green Sandpiper they are grayish-black barred with white. It is an abundant bird in most parts of northern Europe, migrating in winter very far to the southward.

Of the section *Tringinæ* the best known are the KNOT (vol. xiv. p. 130) and the Dunlin, *T. alpina*. The latter, often also called Ox-bird, Plover's-Page, Purre, and Stint,—names which it shares with some other species,—not only breeds commonly on many of the elevated moors of Britain, but in autumn resorts in countless flocks to the shores, where indeed a few may be seen at almost any time of year. In seasonable diversity of plumage it is scarcely excelled by any bird of its kind, being in winter of a nearly uniform ash-gray above and white beneath, while in summer the feathers of the back are black, with deep rust-colored edges, and a broad black belt occupies the breast. The Dunlin varies considerably in size, and to some extent according to locality, examples from North America being almost always recognizable from their greater bulk, while in Europe, besides the ordinary form, there appears to be a smaller race which has received the name of *T. schinzi*, but no other difference is perceptible. In the breeding-season, while performing the amatory flights in which like all Sandpipers he indulges, the male Dunlin utters a most peculiar and far-sounding whistle, quite impossible to syllable, and somewhat resembling the continued ringing of a high-toned but yet musical bell. Next to the Dunlin and Knot the commonest British *Tringinæ* are the Sanderling, *Calidris arenaria* (to be distinguished from every other bird of the group by wanting a hind toe), the Purple Sandpiper, *T. striata* or *maritima*, the Curlew-Sandpiper, *T. subarquata*, and the Little and Temminck's Stints, *T. minuta* and *T. temminckii*, but want of space forbids more than the record of their names; and for the same reason no notice can here be taken of the many other species, chiefly American,[2] belonging to this group. Two other birds, however, must be mentioned. These are the Broad-billed Sandpiper, *T. platyrhyncha*, of the Old World, which seems to be more Snipe-like than any that are usually kept in this section, and the marvellous Spoon-billed Sandpiper, *Eurinorhynchus pygmæus*, whose true home has still to be discovered, according to the experience of Baron Nordenskjöld in the memorable voyage of the "Vega." (A. N.)

SANDROCOTTUS (CHANDRAGUPTA), founder of the Maurya kingdom in India. See INDIA, vol. xii. pp. 826–7, and PERSIA, vol. xviii. pp. 597–8.

SANDUSKY, a city of the United States, the capital of Erie county, Ohio, lies at the mouth of Sandusky river, 210 miles by rail northeast of Cincinnati, and is handsomely built of limestone from the subjacent strata on ground rising gradually from the shore of Lake Erie. The court-house and the high school are both of considerable architectural note. Besides being the centre of a great vine-growing district, Sandusky has the largest freshwater fish market in the United States, is the seat of the State fish-hatchery (which annually puts about 3,000,000 young whitefish into the lake), and has attained a reputation for the manufacture of such wooden articles as handles, spokes, "bent work" for carriages, carpenters' tools, etc. The city is coextensive with Portland township. Its population was 13,000 in 1870 and 15,838 in 1880.

SANDWICH, an English borough, market-town, and Cinque Port, is situated in the east of Kent, opposite the Downs, on a branch of the South-Eastern Railway, and on the Stour, 2 miles from the sea, 12 miles east of Canterbury, and 4 northwest of Deal. The streets are narrow and the houses irregularly built. The old line of the walls on the land side is marked by a public walk. The Fishers' Gate and a gateway called the Barbican are interesting; but the four principal gates were pulled down in the last century. St. Clement's church has a fine Norman central tower, and St. Peter's, said to date from the reign of King John, has interesting mediæval monuments. The grammar school founded by Sir Roger Manwood in 1564 is now in abeyance. There are three ancient hospitals; St. Bartholomew's has a fine Early English chapel of the 12th century. Until the beginning of the 16th century Sandwich was of considerable importance as a port, but after the filling up of the habor with sand about the beginning of the 16th century it fell into decay. The principal industries of the town are market-gardening, tanning, wool-sorting, and brewing. Coal, timber, and iron are imported. Sandwich returned two members to parliament till 1880, and was merged in the St. Augustine's division of the county in 1885. The parliamentary borough, which included Deal and Walmer (area 2684 acres), had in 1881 a population of 15,655, while that of the municipal borough (area 706 acres) was 2846.

In the Norman survey Sandwich is described as a borough. It rose into importance on the decline of the *Portus Rutupensis*, its name denoting the situation on the sands. The Danes frequently attacked it in the 10th and 11th centuries; and it was repeatedly plundered by the French in the 15th century. It was fortified by Edward VI. Sandwich was incorporated by Edward the Confessor, and received its last charter from Charles II.

[1] It possesses only a single pair of posterior "emarginations" on its sternum, in this respect resembling the RUFF (*supra*, p. 60). Among the PLOVERS (vol. xix. p. 239) and SNIPES (*q.v.*) other similarly exceptional cases may be found.

[2] A "Monograph of the *Tringeæ* of North America" by Prof. Coues was published in the *Proceedings* of the Philadelphia Academy for 1861 (pp. 190–205), but is of course now out of date. Schlegel's list of "*Scolopaces*" in the *Muséum des Pays-Bas* is the best general description we have, but that is only a few years later (1864), and requires much modification to be put on a level with the knowledge of the present day. The very rare *Tringa leucoptera* of the older systematists, figured by Latham (*Synopsis*, pl. 82), the type of the genus *Prosobonia* of Bonaparte, seems to be really a Ralline form (*Comptes Rendus*, xxxi. p. 562 and xliii. p. 598).

SANDWICH, Edward Montagu, Earl of (1625–1672), general and admiral, was the son of Sir Sidney Montagu, youngest brother of Edward Lord Montagu of Broughton, and was born 27th July, 1625. In August, 1643, he raised a regiment in the service of the Parliament, with which he specially distinguished himself at Marston Moor, Naseby, and the siege of Bristol. He was a member of the "Little Parliament" (1653), and one of the committee for regulating the customs. In November he was elected to the council of state. In the first Protectorate parliament he sat for Huntingdonshire. In January, 1656, he succeeded Penn as admiral, and he was associated with Blake in his expedition to the Mediterranean in the same year. After the treaty with France against Spain in 1657 he held command of the fleet sent to prevent the relief of the three coast towns—Gravelines, Mardike, and Dunkirk—besieged by the French, and was successful in defeating an attempt by a great Spanish force to retake Mardike. After the death of Cromwell he was sent with a fleet to the North Sea to enter into negotiations with the Northern powers, but, communications having been opened with him on behalf of Charles II., he returned to England only to find that the conspiracy of Sir George Booth had miscarried, whereupon, after a lame explanation, he was dismissed from his command. At the Restoration, having commanded the fleet which conveyed the king to England, he was made Knight of the Garter, and soon afterwards elevated to the peerage as Baron Montagu of St. Neots, Viscount Hinchinbroke, and Earl of Sandwich. During the war with the Dutch in 1664–65 he commanded the Blue squadron under the duke of York, and specially distinguished himself in the great battle of 3d June, 1665. After his return to England he was sent to negotiate a peace between Spain and Portugal, and also a treaty of commerce with Spain. On a renewal of the war in 1672 he again commanded the Blue squadron under the duke of York, and during the fight in Southwold Bay, on the 28th May, his ship, the Royal James, was set on fire by the Dutch, when he leaped overboard and was drowned. His body was found a fortnight afterwards, and was interred in Henry VII.'s Chapel, Westminster Abbey.

Lord Sandwich's translation of a Spanish work on the *Art of Metals* by Alvaro Alonso Barba (1640) appeared in 1674. Several of his letters during the Spanish negotiations have been published in Arlington's *Letters*, and various letters to him by Cromwell will be found in Carlyle's *Cromwell*. See also *Original Letters and Negotiations of Sir Richard Fanshawe, the Earl of Sandwich, the Earl of Sunderland, and Sir William Godolphin, wherein Diverse Matters between the Three Crowns of England, Spain, and Portugal from* 1603 *to* 1678 *are set in a clear light.*

SANDWICH, John Montagu, Fourth Earl of (1718–1792), was born 3d November, 1718, and succeeded his grandfather in the earldom, 20th October, 1729. He was educated at Eton and at Trinity College, Cambridge, which he entered in 1735. After a voyage round the Mediterranean, he returned to England and began to take an active interest in politics as a supporter of Sir Robert Walpole. A clear and lucid rather than a brilliant debater, his style of address always won the attention of his audience, and his accurate knowledge secured their respect. The high opinion the Government entertained of his judgment and his diplomatic abilities was evidenced by his appointment in 1746 as plenipotentiary to the congress at Breda, which was continued till peace was negotiated at Aix-la-Chapelle in 1748. On his return he became first lord of the admiralty, retaining the post until June, 1751. He held the same office from 1763 to 1765, and again from 1771 till the dissolution of Lord North's administration in 1782. He died 30th April, 1792. His *Voyage Round the Mediterranean* was published posthumously in 1799, accompanied with a memoir.

SANDWICH ISLANDS. See Hawaiian Islands.

SANDYS, George (1577–1644), famous in the reigns of James I. and Charles I. as a traveller and a metrical translator. He was born in 1577, the youngest son of an archbishop of York, studied at St. Mary Hall, Oxford, and afterwards probably at Corpus Christi, and began his travels in 1610. The record of them was a substantial contribution to geography and ethnology, written in a style always interesting and often eloquent, interspersed with versified scraps of quotations from classical authors. He travelled from Venice to Constantinople, thence to Egypt, thence by way of Mount Sinai to Palestine, and back to Venice by way of Cyprus, Sicily, Naples, and Rome. Later on in his life he published translations of Ovid's *Metamorphoses*, the first book of the *Æneid*, and various books of Scripture. His verse was praised by Dryden, and deservedly so, for it has vitality as well as a clearly marked rhythm. He died in 1644. Selections from his poetry were published by the Rev. H. J. Todd in 1839.

SAN FERNANDO, formerly Isla de Leon, a fortified city of Spain, in the province of Cadiz, near the head of the inner bay, and 9¼ miles by rail from the city of Cadiz (see vol. iv. pp. 557–8), is a modern town with straight and level streets, two churches, two hospitals, several barracks, and a school of navigation, with an observatory. It has considerable trade in the salt produced in the neighboring "salinas." The population within the municipal limits (which include the "poblacion" of San Carlos and the naval arsenal of La Carraca) was returned as 26,346 in 1877.

SAN FRANCISCO, a city of the United States, the largest commercial city of California and of the Pacific coast, is situated in 37° 47′ 22.55″ N. lat. and 122° 25′ 40.76″ W. long., on the end of a peninsula which has the Pacific Ocean on one side and the Bay of San Francisco on the other. The width of this tongue of land within the city limits is about 6 miles, and its whole length about 26. The original site of San Francisco was so uninviting that many of the pioneers doubted if a place of much importance could ever spring up there. The hills (Russian Hill, 360 feet; Telegraph Hill, 294 feet; and a number of others, ranging from 75 to 120 feet) were barren and precipitous, and the interspaces, especially on the westerly side, were made up largely of shifting sand-dunes; on the east side, however, the land sloped gently towards the bay, and there was the further advantage of a small cove extending inland nearly to the present line of Montgomery Street. This cove has since been filled up and built over. After an attempt to found the commercial metropolis at Benicia, 30 miles north on the Straits of Carquinez, it was evident that no other place within easy distance from the ocean possessed so many advantages for the site of a city as this barren peninsula. The Bay of San Francisco is reached from the ocean through the Golden Gate, a strait about 5 miles long and averaging 1 mile in width, with a depth of 30 feet on the bar at the entrance and from 60 to 100 feet within. The bay, which extends past the city in a south-southeast direction for about 40 miles, is about seven miles wide in front of the city, while its greatest width is 12. Connected with the Bay of San Francisco on the north by a strait 3 miles wide is San Pablo Bay, about 10 miles in length and the same in breadth, having at its extreme northerly end Mare Island, the site of the navy yard. This bay, again, is connected by the Straits of Carquinez with Suisun Bay, 8 miles long and 4 wide. The total length of these bays and connecting straits is 65 miles. This great inland water, sheltered and for the most part navigable by the largest craft, receives the two great rivers of California, the Sacramento and the San Joaquin. In the Bay of San Francisco are Alcatraz Island (30 acres), strongly fortified; Angel

Island (800 acres), fortified; and Yerba Buena, or Goat Island (about 300 acres).

The presidio or fortified settlement of San Francisco was founded on 17th September, 1776, and the mission (San Francisco de los Dolores) in the following October. In 1830 the population of the presidio consisted

Environs of San Francisco.

of about fifty Spanish soldiers and officers; these added to the number at the mission made an aggregate population of about 200. Beechy, who visited the harbor and presidio in 1826, has left the following description:

"The governor's abode was in a corner of the presidio, and formed one end of a row of which the other was occupied by a chapel; the opposite side was broken down, and little better than a heap of rubbish and boues, on which jackals, dogs, and vultures were constantly preying. The other two sides of the quadrangle contained stone houses, artificers' shops, and the jail, all built in the humblest style with badly burned bricks and roofed with tiles. The chapel and the Government house were distinguished by being whitewashed."

The presidio enclosure was about 300 yards square. In 1834, when it was secularized and began to be known by the secular name of Yerba Buena, the mission Dolores had a population of 500. In the summer of 1846 an American man-of-war took possession of the place. In the early part of 1849 the inhabitants numbered about 2000, and the embryo city had already come to be known by its future name of San Francisco. In consequence of the discovery of gold in California a strong drift of population set in towards the placer mines, and at the end of 1849 there were 20,000 people in the city. The first legislature of California granted a charter to San Francisco on 1st May, 1850. Prior to that date the government of the pueblo had been administered by an alcalde. The pueblo grant originally made by the king of Spain contained four square (Spanish) leagues of land; this grant was subsequently confirmed to San Francisco by an Act of Congress. The jurisdiction of the municipality extends over the islands in the bay. The area included in the limits of the city exceeds the original four square leagues considerably, including what were originally denominated "swamp and overflowed lands" (see Dwinelle's *Colonial History*).

In the first stages of its history the buildings of the city were chiefly of wood,—in many cases the frames and coverings having been brought from the Atlantic States round Cape Horn in sailing vessels. Within a few months of the establishment of municipal government the city suffered severely on more than one occasion from fire. The fire of 4th May, 1850, destroyed property to the value of about $3,000,000; another in the following month was still more destructive ($4,000,000); and the damage resulting from a third in September was estimated at $500,000. These occurrences naturally led to the employment of more substantial building material in some cases, granite being imported from China for some buildings, and iron and brick being used to a considerable extent on others; but to this day nearly all the private dwellings of the city are of wood. Since 1850, however, the damage from fire in the portion of the city occupied by private houses has been remarkably small,—partly because of the use of redwood instead of pine. In the business houses erected recently the increase of solidity and costliness has been very marked.

Throughout a considerable part of the city the streets are laid out in rectangular form, and nowhere with any reference to the natural elevations. The most important business thoroughfare is Market Street, extending from the water front at the ferry landings to the hills on the west, a distance of 3 miles or more. The more important streets are paved for the most part with cobble stones and basalt blocks; but asphalt on a stone or concrete foundation has begun to be used. Among the public buildings and institutions of San Francisco are the mint, appraisers' stores, sub-treasury, custom-house, merchants' exchange, stock exchange, city-hall, industrial school, house of correction, almshouse, Masonic Temple, new Oddfellows' building, safe deposit, and seven theatres and opera-houses. The Palace Hotel cost $3,250,000, and can accommodate 1200 guests. The city has eleven public squares. Its greatest attraction is the Golden Gate Park of 1050 acres, 3 miles long and half a mile wide, having the ocean for its extreme westerly boundary. The greater part of this area was formerly a shifting sand-dune. An extensive glass-house in a central position is filled with the rarest tropical and semi-tropical plants and shrubs; a large part of the area is planted with forest trees, or is laid down in grass; the walks and drives are well planned and well kept.

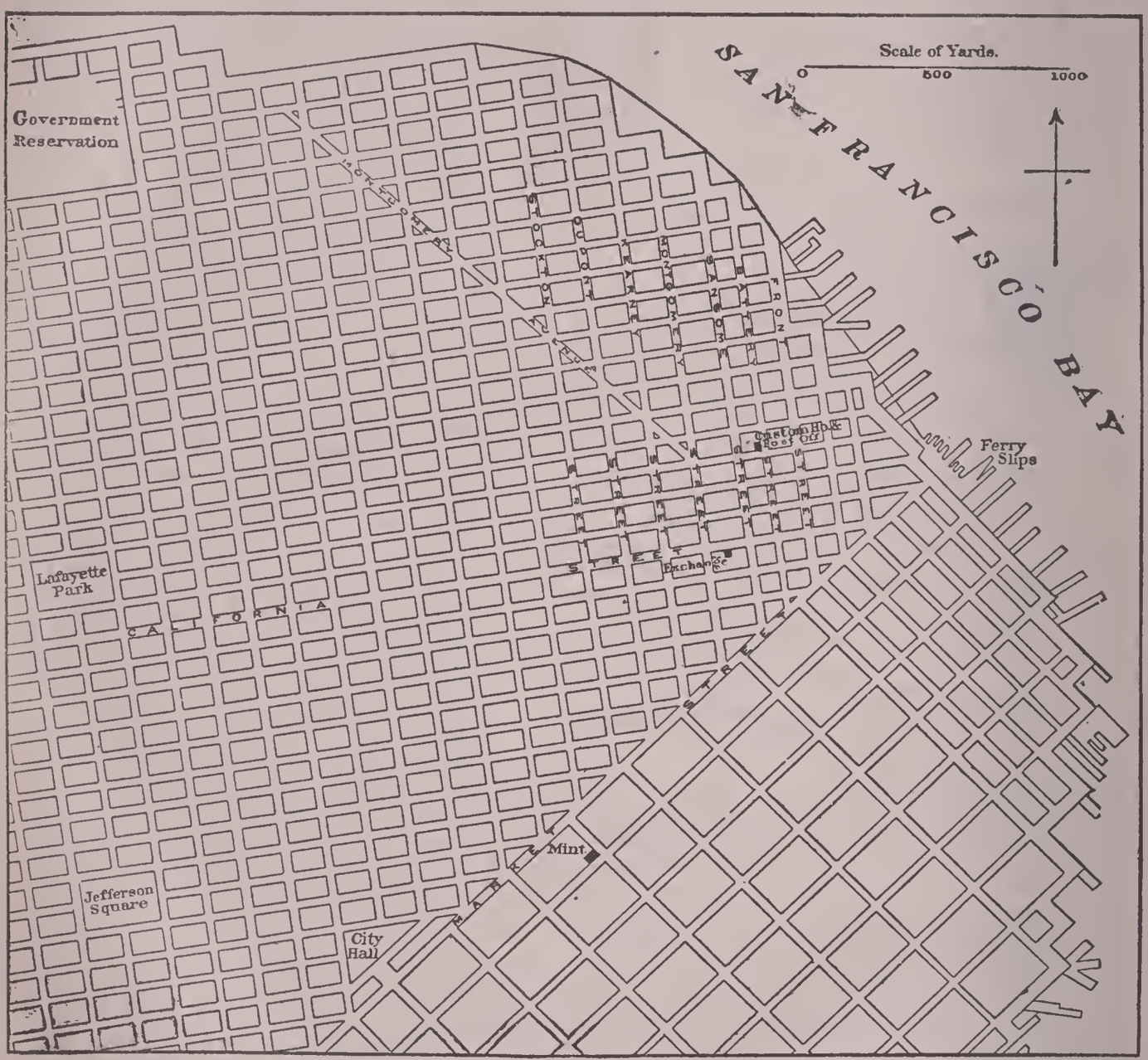
San Francisco is traversed in various directions by horse railroads, which extend from the water front to the suburbs. There are also 50 miles of wire cable roads, which are yearly increasing. These cable tramways extend 2 miles on Clay Street, overcoming an elevation of 120 feet. The cost of their construction and equipment has ranged from $100,000 to $125,000 per mile. The speed is usually about 5 miles an hour. San Francisco is the terminus of two continental railways, viz., the Union and Central Pacific and the Southern Pacific; while a third, the Atlantic and Pacific, enters the city over a leased line from Mohave. Two narrow-gauge lines and one broad-gauge, each less than a hundred miles long, to important points in

the State, are connected with the city by means of ferries.

The population of San Francisco, as shown by the census returns, was 34,000 in 1850; in 1860, 56,802; in 1870, 149,473; and in 1880, 233,959 (132,608 males, 101,351 females); in 1885 it was estimated, on the basis of the school census, at 275,000 (Chinese, 30,000). At the last presidential election (1884) the total vote cast in the city was 50,167, the total foreign vote being 25,254; of these 12,837 were British (10,206 of them Irish) and 7052 Germans. Of the 90,468 children in the city under seventeen reported for the fiscal year 1884–85, 50,973 had foreign-born parents, and 15,460 more had one parent of foreign origin. In social customs, trades, usages, amusements and religious observances, the large foreign population of San Francisco contributes materially to the formation of its liberal and cosmopolitan character.

Administration, etc.—In July, 1856, the city and county, which until then had maintained separate governments, were consolidated in one organization. The government is administered by a mayor and a board of twelve supervisors, with the usual officers common to municipal and county organizations. There is also a superior court having twelve departments, with one judge for each, a police court, and justices' courts. The supreme court of the State holds a number of terms each year in San Francisco. The U. S. district and circuit courts also hold regular terms in the city. There is a well-organized and efficient police force of 400 men. On 1st July, 1884, the fire department had 315 men. The city is supplied with gas by two companies. Water is supplied by the Spring Valley Company, principally from San Mateo county. The water is brought in three lines of wrought-iron pipe; the largest, which connects the Crystal Springs reservoir with the city, is 44 inches in diameter and 23 miles in length. The daily consumption of water is about 18,000,000 gallons. The company is able to supply 25,000,000 gallons daily.

Finance.—The assessment roll of personal property in 1885 showed a value of $56,634,860,—that of real estate and improvements being returned at $171,433,126. The actual value is not less than $350,000,000. The debt of the municipality is 3½ million dollars. There are twelve incorporated commercial or discount banks, with an aggregate paid-up capital of $21,047,965, and a surplus (1st July, 1885) of $8,945,647.



San Francisco (northeastern part).

The total assets are set down at $50,894,972. There are also a number of private banks. There are eight savings banks, all but one of these having some paid-up capital, the aggregate of which is $1,651,200. These banks on the 1st of July, 1885, held deposits to the amount of $52,577,746; they had also a surplus beyond the paid-up capital of $2,067,209. The banks having a subscribed and paid-up capital pay regular dividends on the entire amount of nominal capital and about 4½ per cent. per annum to depositors.

Commerce.—The exports by water for the fiscal year 1884–85 amounted to $37,170,800, and the imports to $37,171,100; the items of import and export by rail bring the total up to $80,000,000. The duties collected on imports were $6,610,400. The treasure shipped amounted to $17,540,000; and the exports of quicksilver were 14,900 flasks, valued at $438,800. The receipts of treasure from all productive sources west of the Missouri, including Mexico, reached a total of $40,253,635, and the coinage at the mint in San

Francisco was of the value of $23,750,000, with an addition of $1,500,000 on foreign account. The sailing ships entering the port numbered 619 (604,200 tons); the steamers were 225. Among the imports were—coffee, 19,505,800 lb; sugar, 152,374,870 lb; coal, 900,000 tons; lumber, 297,234,000 feet (92,754,000 feet redwood, 177,305,000 feet pine, the remainder miscellaneous). The exports of wheat were 1,001,900 tons, valued at $26,791,500; this quantity was exported in 366 ships, the freights to Europe ranging from 25s. [$6.07] to 48s. 6d. [$11.78] per ton. British iron sailing vessels have the preference for wheat exportation, and obtain the highest rates. A much larger class of vessels is employed in this trade than formerly, the cargoes now averaging about 3000 tons. There are regular steamship lines connecting San Francisco with Mexican, Central American, Australian, Hawaiian, Japanese and Chinese ports, and with the chief port of British Columbia. The Pacific Whaling Company owns five or six ships, principally steamers, employed in the Arctic whale fishery. The same company has also extensive works for refining the oil in San Francisco. There is one stone dry-dock admitting vessels of 6000 tons, and two or more floating-docks which can take on vessels from 500 to 800 tons burden. A sea-wall is in process of construction by State authority round the deep-water front to prevent the shoaling of the water in the slips resulting in part from the gradual washing down of débris from the hills and steep slopes of the city.

Manufactures.—For many years manufactures made slow progress. The city was remote from the great centres of population, and labor was very costly. But these disadvantages have been gradually overcome. In 1875 there were 18,000 persons employed in manufacturing establishments, and the value produced was $40,000,000. In 1885 38,919 persons were so employed, and the estimated value for the business year ending 1st July was $86,417,200. Subjoined are some of the leading manufactures, with the number of persons employed and the annual value of their production: bags, 300, $1,500,000; boots and shoes, 3500, $5,300,000; cigar-boxes, 260, $5,000,000; wooden boxes, 350, $1,000,000; brass-foundries, 350, $535,000; breweries, 450, $2,450,000; cigars, 8000, $4,850,000; clothing, 1900, $3,750,000; coffee and spices, $900,000; cordage and ropes, 150, $600,000; crackers, 150, $620,000; dry-docks (stone), 6, $675,000; flour, 175, $2,230,000; foundries, 2000, $5,500,000; furs, 170, $500,000; furniture, 1000, $2,000,000; gas-works, 460, $12,000,000; harness, 440, $1,150,000; jewellery, 165, $600,000; linseed oil, 55, $600,000; pickles and fruits, 2000, $1,700,000; provision packing, 250, $1,900,000; rolling-mills, 550, $1,880,000; sashes, doors, etc., 1550, $5,010,000; shipyards, 200, $503,000; shirts, 2550, $1,000,000; soap, 190, $715,100; sugar-refineries, 360, $8,700,000; tanneries, 335, $1,700,000; tinwares, 180, $525,000; woollen-mills, 1500, 1,900,000. In the laundries, it may be added, 935 whites and 1300 Chinese were employed.

Churches and Charities.—There are 70 Protestant churches in the city, representing nearly all the denominations of the country. Besides these there are 19 Roman Catholic churches and a number of chapels connected with the various hospitals and schools. There are 7 synagogues and 1 Greek church (Russian). Including the chapels, the total number of places of worship may be set down at 100. With few exceptions, the church edifices are not imposing. In consequence of the rapid growth of the city, wood has been employed in a majority of cases, but this is now being discarded for stone. The asylums and benevolent associations are numerous and well-supported. The more prominent of these institutions are the Protestant Orphan Asylum (214 children), Catholic Orphan Asylum, Pacific Hebrew Orphan Asylum, Magdalen Asylum, Old People's Home, Ladies' Protection and Relief Society, Little Sisters' Infant Shelter, Seamen's Friends Society, San Francisco Benevolent Society, Ladies' United Hebrew Benevolent Society, San Francisco Fruit and Flower Mission, Young Men's Christian Association, Pacific Homœopathic Dispensary, Lying-in Hospital. Besides these there are a great number of associations which care for their members, and in some instances provide the best medical attendance in private hospitals. Nearly all classes of foreign nativity have established benevolent associations; British, French, and German institutions have large resources, and are managed with great efficiency. Nearly all the secret orders (Masonic, Oddfellows, etc.) devoted in whole or in part to works of benevolence are strongly represented.

Public Schools.—The first public school was established in April, 1849. There are now sixty-one free schools, with 43,265 pupils and an average daily attendance of 32,183. The number of children in the city between the ages of five and seventeen years according to the census report of 1880, was 69,000. The number of teachers, male and female, employed in the public school department was 734, the number of schoolhouses 65, and the expenditure for the fiscal year $817,168. The public schools are graded, the highest grades being two high schools for boys and girls respectively. Besides the day schools a number of evening schools are provided. There are upwards of 25,000 children who are to a large extent provided with instruction in public and private schools other than those belonging to the free-school department. There are about 100 schools in the city of all grades, which are supported wholly by fees and voluntary contributions. Of these the Roman Catholics have the greatest number, the latter including two colleges and a number of convent schools. The Protestant denominations also have a number of classical and secondary schools of great excellence. The public-school system of the State culminates in the university of California, which has an aggregate endowment equal to about $3,000,000. The institution is situated in the beautiful suburban town of Berkeley, on the opposite side of the bay (named in honor of Bishop Berkeley). Instruction is furnished free to all pupils who comply with the terms of admission. There are also a number of professional schools in the city, chief among which are the law, medical and dental departments of the university, the Cooper Medical College, the Hahnemann Medical College, the San Francisco Theological Seminary, and an art school with an average attendance of about 75 students. The late James Lick left a bequest of $540,000 for the endowment of a School of Mechanic Arts, and among other bequests a large one for the Academy of Sciences, founded in the early period of the city. The public school department of San Francisco is under the immediate supervision of a superintendent and twelve school directors, one for each ward of the city. There are eighteen public libraries, including the free library with 52,970 volumes. The Mercantile Library Association has 52,000 volumes, the Mechanics' Institute 33,000, the Oddfellows' Library Association 39,000, and the Law Library 23,355. There is also a rich and extensive State mineralogical collection. (W. C. B.)

SANGALLO, the surname of a Florentine family, several members of which became distinguished in the fine arts.

I. Giuliano di Sangallo (1443–1517) was a distinguished Florentine architect, sculptor, tarsiatore, and military engineer. His father, Francesco di Paolo Giamberti, was also an able architect, much employed by Cosimo de' Medici. During the early part of his life Giuliano worked chiefly for Lorenzo the Magnificent, for whom he built a fine palace at Poggio-a-Cajano, between Florence and Pistoia, and strengthened the fortifications of Florence, Castellana, and other places. Lorenzo also employed him to build a monastery of Austin Friars outside the Florentine gate of San Gallo, a nobly designed structure, which was destroyed during the siege of Florence in 1530. It was from this building that Giuliano received the name of Sangallo, which was afterwards used by so many Italian architects. While still in the pay of Lorenzo, Giuliano visited Naples, and worked there for the king, who highly appreciated his services and sent him back to Florence with many handsome presents of money, plate, and antique sculpture, the last of which Giuliano presented to his patron Lorenzo, who was an enthusiastic collector of works of classic art. After Lorenzo's death in 1492, Giuliano visited Loreto, and with great constructive skill built the dome of the church of the Madonna, in spite of serious difficulties arising from its defective piers, which were already built. In order to gain strength by means of a strong cement, Giuliano built his dome with pozzolana brought from Rome. Soon after this, at the invitation of Pope Alexander VI., Giuliano went to Rome, and designed the fine panelled ceiling of S. Maria Maggiore. He was also largely employed by Julius II., both for fortification walls round the Castle of S. Angelo, and also to build a palace adjoining the church of S. Pietro in Vincoli, of which Julius had been titular cardinal. Giuliano was much disappointed that Bramante was preferred to himself as architect for the new basilica of St. Peter, and this led to his returning to Florence, where he was warmly received by the gonfaloniere Pier Soderini, and did much service to his native state by his able help as a military engineer and builder of

fortresses during the war between Florence and Pisa. Soon after this Giuliano was recalled to Rome by Julius II., who had much need for his military talents both in Rome itself and also during his attack upon Bologna. For about eighteen months in 1514–1515 Giuliano acted as joint architect to St. Peter's together with Raphael, but owing to age and ill-health he resigned this office about two years before his death in 1517. But little remains to enable one to judge of Giuliano's talents in the artistic side of his profession; the greater part of his life was spent on military works, in which he evidently showed great skill and practical knowledge of construction.

II. Antonio di Sangallo (1448?–1534[1]) was the younger brother of Giuliano, and took from him the name of Sangallo. To a great extent he worked in partnership with his brother, but he also executed a number of independent works. As a military engineer he was as skilful as Giuliano, and carried out important works of walling and building fortresses at Arezzo, Montefiascone, Florence, and Rome. His finest existing work as an architect is the church of S. Biagio at Montepulciano, in plan a Greek cross with central dome and two towers, much resembling, on a small scale, Bramante's design for St. Peter's. He also built a palace in the same city, various churches and palaces at Monte Sansavino, and at Florence a range of monastic buildings for the Servite monks. Antonio retired early from the practice of his profession, and spent his latter years in farming.

III. Francesco di Sangallo (1493–1570), the son of Giuliano di Sangallo, was a pupil of Andrea Sansovino, and worked chiefly as a sculptor. His works have for the most part but little merit,—the finest being his noble effigy of Bishop Leonardo Bonafede, which lies on the pavement of the church of the Certosa, near Florence. It is simply treated, with many traces of the better taste of the 15th century. His other chief existing work is the group of the Virgin and Child and St. Anne, executed in 1526 for the altar of Or San Michele, where it still stands.

IV. Bastiano di Sangallo (1481–1551), Florentine sculptor and painter, was a nephew of Giuliano and Antonio. He is usually known as Aristotile, a nickname he received from his air of sententious gravity. He was at first a pupil of Perugino, but afterwards became a follower of Michelangelo. His life is given at great length by Vasari, in spite of his being an artist of very mediocre powers.

V. Antonio di Sangallo,[2] the younger (?–1546), another nephew of Giuliano, went while very young to Rome, and became a pupil of Bramante, of whose style he was afterwards a close follower. He lived and worked in Rome during the greater part of his life, and was much employed by several of the popes. His most perfect existing work is the brick and travertine church of S. Maria di Loreto, close by Trajan's column, a building remarkable for the great beauty of its proportions, and its noble effect produced with much simplicity. The lower order is square in plan, the next octagonal; and the whole is surmounted by a fine dome and lofty lantern. The lantern is, however, a later addition. The interior is very impressive, considering its very moderate size. Antonio also carried out the lofty and well-designed church of S. Giovanni dei Fiorentini, which had been begun by Jacobo Sansovino. The east end of this church rises in a very stately way out of the bed of the Tiber, near the bridge of S. Angelo; the west end has been ruined by the addition of a later façade, but the interior is a noble example of a somewhat dull style. Great skill has been shown in successfully building this large church, partly on the solid ground of the bank and partly on the shifting sand of the river bed. Antonio also built the Cappella Paolina and other parts of the Vatican, together with additions to the walls and forts of the Leonine City. His most ornate work is the lower part of the cortile of the Farnese palace, afterwards completed by Michelangelo, a very rich and well-proportioned specimen of the then favorite design, a series of arches between engaged columns supporting an entablature, an arrangement taken from the outside of the Colosseum. A palace in the Via Giulia built for himself still exists under the name of the Palazzo Sacchetti, but is much injured by alterations. Antonio also constructed the very deep and ingenious rock-cut well at Orvieto, formed with a double spiral staircase, like the well of Saladin in the citadel of Cairo.

[1] [Symonds, *Renaissance in Italy, Fine Arts*, p. 529 (1882), makes the birth date 1455, and the year of death doubtful.—Am. Ed.]

[2] [In 1536 he succeeded Peruzzi as chief architect of St. Peter's, Rome, which place he retained until his death. He also constructed the Palma palace at Rome. See James Fergusson's *History of Architecture*, vol. iii., London, 1862, pp. 56, 105. The same writer gives 1470 as the year of his birth.—Am. Ed.]

For other architects called Sangallo who lived during the 16th century see Ravioli, *Notizie sui lavori . . . . . dei nove Da San Gallo*, Rome, 1860. (J. H. M.)

SANGERHAUSEN, an ancient town of Prussian Saxony, is situated on the Gonna, near the south base of the Harz Mountains, and 30 miles to the west of Halle. In 1880 it contained 9136 inhabitants, chiefly occupied in the manufacture of beetroot sugar, machinery, buttons, etc., in agriculture, and in the coal and copper mines of the neighborhood. Sangerhausen is one of the oldest towns in Thuringia, being mentioned in a document of the 10th century. The Romanesque church of St. Ulrich is said to have been founded by Louis the "Springer," margrave of Thuringia, in 1079.

SANHEDRIN. See Synedrium.

SANITATION. See Hygiene and Sewage.

SAN JOSÉ, the capital of Costa Rica, Central America, stands, 3900 feet above the sea, in a beautiful valley surrounded by mountains, on the west side of the main range about 15 miles northwest of Cartago (the ancient capital), with which it is connected by a railway (1884). Since 1870 the cathedral has been restored, a handsome market-place with offices for the municipality erected, the barracks rebuilt and fortified, and several of the streets macadamized. San José is the seat of the national bank (founded in 1873) and of a university, to which a medical school and a museum are attached. The population is estimated at from 20,000 to 25,000. As a city it dates from the latter half of the 18th century; it became the capital after the destruction of Cartago by earthquake in 1841.

SAN JOSÉ, a city of the United States, capital of Santa Clara county, California, lies 40 miles southeast of San Francisco and 8 miles from the southern end of San Francisco Bay, in the heart of the beautiful Santa Clara Valley. It is at this point that the railways from the two sides of the bay meet. The main part of the city occupies a gently rising plateau between the Coyote and Guadalupe rivers. Among the principal buildings are a fine court-house, a theatre, a city hall, two markets, a music hall, the State normal school, the Methodist "university of the Pacific," and a number of large colleges and schools. Besides three public parks in the city San José possesses a tract of 400 acres in Penitencia Cañon, 7 miles east, reserved for a similar purpose. The Lick Observatory (founded in 1884 on the top of Mount Hamilton) is 12 miles distant, and the Almaden quicksilver mines about 14 miles. The population of the city was 9089 in 1870, and 12,567 (township 18,103) in 1880.

Founded by the Spanish missionaries in 1777, San José remained a small village of adobe huts till the annexation of the country to the United States. The first session of the legislature of California was held in the town in 1849-50.

SAN JUAN BAUTISTA. See Porto Rico.

SAN JUAN DE LA FRONTERA, the capital of a province of the Argentine Republic, is situated 2310 feet above the sea in a great bend of the Rio de San Juan, 95 miles north of Mendoza and 730 miles

from Buenos Ayres, with which it is about to be connected by rail (1886). It is mostly built of sun-dried bricks, has a cathedral, several churches and schools, two banks and a botanical garden, and carries on a considerable trade with Chili by the Patos and Uspallata passes. Population estimated at 20,000 (1881).

San Juan was founded in 1561 by Captain Castillo on a site 4 miles to the north, which had to be abandoned owing to inundations and is now called Pueblo Viejo. From 1776 to 1820 the city was in the government of Mendoza. President Sarmiento bestowed special attention on this his native town and gave his name to its principal school, famous throughout the republic for its excellent equipment.

SAN JUAN DEL NORTE. See GREYTOWN.

SAN JUAN (or HARO) ISLANDS, an archipelago (San Juan, Orcas, Shaw, Lopez, Blakely, Cypress, etc.) lying between Vancouver Island and the mainland of North America, which were for many years the subject of dispute between the British and the United States Governments, and were finally assigned to the latter country by the arbitration of the emperor of Germany (21st October, 1872). Geographically the cluster certainly belongs to the mainland, from which it is separated by Rosario Channel, generally much under 50 fathoms in depth, while Haro Strait separating it from Vancouver Island, has depths ranging from 100 to 190 fathoms. In 1873 the islands, formerly considered part of Whatcom county, Washington Territory, were made the separate county of San Juan. Of the total area of 200 square miles, about 60 are in San Juan, 60 in Orcas, and 30 in Lopez. The population was 554 in 1870 and 948 in 1880.

See *Papers relating to the Treaty of Washington*, vol. v., 1872, and the map in Petermann's *Mittheilungen*, 1873.

SANKT JOHANN. See SAARBRÜCKEN.

SANKT PÖLTEN, a small town, and the seat of a bishop, in Lower Austria, is situated on the Treisen,[1] a tributary of the Danube, 61 miles west of Vienna by rail. It contains an interesting old abbey church, founded in 1030 and restored in 1266 and again at the beginning of the 18th century. There are several religious educational institutions in the town, and a military academy for engineers. The inhabitants, 10,015 in number, carry on some trade, and the manufacture of iron wire, paper, weapons, etc. The name is said to be a corruption of Traisma ad S. Hippolytum, from a convent that formerly stood here. The history of the bishopric has been written in two volumes by Kerschbaumer (Vienna, 1875–6).

SAN LUCAR DE BARRAMEDA, a town of Spain, in the province of Cadiz, and 27 miles by sea from that city, in a bare, sandy, and undulating country, on the left bank of the Guadalquivir, not far from its mouth. It stands partly on the flat bank of the river and partly on the rising ground behind, the summit of which is crowned by an old Moorish castle. There is an old parish church dating from the 14th century. The other buildings have no special interest, and the place as a whole is dull and lifeless, having lost much of the commercial importance it formerly possessed. It is now chiefly dependent on the trade in its wines, which is still considerable. Many of the inhabitants are employed in agriculture and fishing. The population within the municipal boundaries was 21,918 in 1877.

SAN LUIS POTOSI, a city of Mexico, capital of the state of the same name, is situated at a height of 6200 feet on the eastern edge of the great plain of Anahuac, in a valley running north and south, 160 miles northwest of Queretaro. It is a great centre for the "diligence" traffic, and in 1885 was connected by rail with Tampico, a promising harbor on the Gulf of Mexico. The city proper, which has a rather imposing Oriental appearance, is laid out with great regularity; the streets are well-paved, and the houses, usually two stories in height, are frequently fine specimens of old Spanish architecture. But suburbs of wretched hovels spread over a considerable area. Among the conspicuous buildings are the cathedral, the Government house, with a front in rose-colored stone, the city hall, the mint, the churches of El Carmen, San Francisco, etc., and the recently erected "American" hotel, which, with tramways, telephones, and electric lights is a symptom of the Occidentalizing that is rapidly taking place in the inland cities of Mexico. The Instituto Cientifico is a kind of university for the teaching of law, medicine, and the exact sciences. Plaza Hidalgo takes its name from the statue to the martyr of Mexican independence. A considerable trade is carried on in cattle, hides, and tallow. The population is stated at 30,000, or with the suburbs 60,000.

Founded in 1586, San Luis Potosi has played an important part in the Mexican civil wars. In 1863 it was the seat of the national government under Juarez, and after being occupied by Bazaine was recovered by Juarez in 1867.

SAN MARINO, the smallest independent republic in Europe, has an area of 33 square miles (Strelbitsky), lies between the provinces of Forlì and Pesaro-Urbino, and consists of part of the eastern spurs of the Apennines. Monte Titano, the central and culminating summit, has three peaks (M. Guaita, Cucco, and Gista), the three *Penne* of San Marino—a name evidently identical with the Celtic Penn or Benn, but translated by the canting heraldry of the republic's coat of arms as three "feathers." The two streams (Marecchia and Ausa) which pass through Rimini to the sea have their head-waters partly in the north and west of San Marino, while its southeastern valleys are drained by the sources of the Marano. Farming and stock-raising occupy the bulk of the population (total, 5700 in 1850, 7816 in 1874), and their wines and oxen are both highly prized. The city of San Marino (1600 inhabitants), formerly reached only by a mule track but since 1875 by a good carriage road, is a quaint little place, with steep and narrow streets and picturesque but gloomy houses of undressed stone, and containing five churches, a council hall, an audience chamber, a law court, a little theatre, a museum, and a library. In the centre of the principal square (Pianello) stands a white marble statue of Liberty, presented by the duchess of Acquaviva. At the foot of the city-hill lies the Borgo di San Marino (the commercial centre of the republic); and other municipal villages are Serravalle, Faetano, and Montegiardino, each with remains of its castle and fortifications.

The republic is governed by a great council (*Generale-Consiglio-Principe*) of 60 members (20 nobles, 20 burgesses, 20 rural land-owners) named for life by the council itself. From this body is elected the Council of Twelve, which, with the assistance of a legal adviser, decides in the third and last resort. Two captains-regent elected every six months (one from the nobles, one from the other two classes) represent the state, which also has its home secretary, its minister of foreign affairs, its chancellor of the exchequer, an army of 950 men, and a regular budget. By treaty with Italy (1872) San Marino, instead of maintaining a customs line of its own, receives a certain proportion of the Italian customs revenue, and, agreeing not to grow tobacco, is allowed to purchase foreign tobacco duty free. To avoid any difficulty about copyright there is no printing press in the republic.

San Marino derives its name from a certain Dalmatian mason who, along with a comrade immortalized by the neighboring castle and cathedral of San Leo, settled in this region in the 3d century. The bones of Marinus are said to have been removed to Pavia by the Lombard king Astolphus and restored to the little city on Mount Titanus by Pippin; but the first authentic document proving the existence of the community dates from 885. Situated as a bulwark between the hostile houses of Montefeltro and Malatesta, San Marino fortunately attached itself to the stronger party, which in the 15th century placed its representative on the ducal throne of Urbino. The assistance which it rendered Duke Federigo and his allies, the king

[1] [Stieler's Atlas gives the town as on the Traisen river, 35 miles west of Vienna.—AM. ED.]

of Naples and the pope, against Sigismondo Malatesta was rewarded in 1463 with the castles and territories of Serravalle, Faetano, and Montegiardino. On the annexation of Urbino to the States of the Church (1631), the independence of San Marino was acknowledged; and the unauthorized assertion of papal jurisdiction by Alberoni in 1739 was disallowed by Clement XII. on February 5, 1740. In 1797 Napoleon I. decided to preserve this "échantillon de république;" and in 1854 it was protected from the designs of Pius IX. by the interference of Napoleon III. At the unification of Italy, Cibrario, a citizen in the service of the house of Savoy, helped to secure excellent terms for San Marino.

See Melchiorre Delfico, *Memorie storiche . . . di San Marino;* Marino Fattori, *Ricordi storici . . .* 1869; Count Bruc, *St. Marin,* Paris, 1876; Bent, *A Freak of Freedom,* 1879; Casati, *La repubblica di San Marino,* Milan, 1881.

SAN MARTIN DE JOSÉ (1778-1850), Chilian general, was born at Yapeyú, on the Uruguay river, February 25, 1778. In his eighth or ninth year he accompanied his own family to Spain for his education, and being intended for the military profession was admitted into the college of nobles at Madrid. He saw active service and gained distinction in the war of independence, and had risen to the rank of lieutenant-colonel when in 1811 he returned to La Plata. Entering the service of the insurgents there he was entrusted with raising a troop of cavalry, and afterwards was appointed to the chief command of the army acting in Upper Peru against the forces of the viceroy of Lima. After reëstablishing his health at Cordova in 1814, he proceeded in 1815 to take command of Cuyo, where he organized an expedition for the liberation of Chili (see vol. v. p. 537). He crossed the mountains early in 1817, and, after gaining a brilliant victory at Chacabuco on 12th February, was pressed by the people of Chili to take the supreme command, and gained a still more brilliant victory at Maypú, 5th April, 1818. After organizing the government of Chili he sailed with the squadron under Lord Cochrane for Peru, 21st August, 1820, and, capturing Lima, drove the Spaniards from the coast and assumed the title of "Protector" of Peru in 1821, but resigned it a year afterwards, and, sailing secretly for Europe, spent the remainder of his life in absolute seclusion near Paris. He died at Boulogne, 17th August, 1850.

See *Biographical Sketch* of General San Martin attached to *Peruvian Pamphlet, being an exposition of the Administrative Labors of the Peruvian Government,* 1823.

SANMICHELE, Michele (1484-1559),[1] one of the ablest architects of his time, learnt the elements of his profession from his father Giovanni and his uncle Bartolommeo, who both practiced as architects at Verona with much success. Like almost all the enthusiastic students of that time he went at an early age to Rome to study classic sculpture and architecture. His great talents soon became known, and he designed and carried out a very large number of works at Verona, Venice, and other places. Among his earliest are the duomo of Montefiascone (an octagonal building surmounted with a cupola), the church of San Domenico at Orvieto, and several palaces at both places. He also executed a fine tomb in S. Domenico.[2] He was no less distinguished as a military architect, and was much employed by the signoria of Venice, not only at home, but also in strengthening the fortifications of Corfu, Cyprus, and Candia.[3] One of Sanmichele's most graceful designs is the Cappella de' Peregrini in the church of S. Bernardino at Verona—square outside and circular within, of the Corinthian order.[4] He built a great number of fine palaces at Verona, five of which still exist, as well as the graceful Ponte Nuovo. His last work, begun in 1559, was the round church of the Madonna di Campagna, a mile and a half from Verona on the road to Venice. Like most other distinguished architects of his time he wrote a work on classic architecture, *Li Cinque Ordini dell' Architettura,* printed at Verona in 1735. Sanmichele to some extent followed the earlier style of Brunelleschi; his work is always refined and his detail delicate. His chief pupil was his nephew Bernardino.

See Ronzani and Luciolli, *Fabbriche . . . . . di M. Sanmichele,* Venice, 1832; and Selva, *Elogio di Sanmichele,* Rome, 1814.

SAN MIGUEL (S. Salvador), or St. Michael's. See Azores, vol. iii. p. 148–9.

SANNAZARO, Jacopo (1458-1530), one of the poets of the Renaissance in Italy, was born in 1458 at Naples of a noble family, said to have been of Spanish origin, which had its seat at San Nazaro near Pavia. His father died during the boyhood of Jacopo, who was accordingly brought up in a very plain way at Nocera Inferiore. He afterwards studied at Naples under Pontanus, when, according to the fashion of the time, he assumed the name Actius Syncerus, by which he is occasionally referred to. After the death of his mother he went abroad,—driven, we are told, by the pangs of despised love for a certain Carmosina, whom he has celebrated in his verse under various names; but of the details of his travels nothing is recorded. On his return he speedily achieved fame as a poet and place as a courtier, receiving from Frederick III. as a country residence the Villa Mergillina near Naples. When his patron was compelled to take refuge in France in 1501 he was accompanied by Sannazaro, who did not return to Italy till after his death (1504). The later years of the poet seem to have been spent at Naples without interruption or memorable incident. He died on April 27, 1530.

The *Arcadia* of Sannazaro, begun in early life and published in 1504, is a somewhat affected and insipid Italian pastoral, in which in alternate prose and verse the scenes and occupations of pastoral life are described. His now seldom read Latin poem *De Partu Virginis,* which gained for him the name of the "Christian Virgil," appeared in 1526, and his collected *Sonetti e Canzoni* in 1530.

SAN REMO, a town and seaport of northern Italy, at the head of a circondario in the province of Porto Maurizio on the Western Riviera, 16¾ miles by rail east of Mentone and 84¼ southwest of Genoa. Climbing the slope of a steep hill, it looks south over a small bay of the Gulf of Genoa, and, protected towards the north by hills raising gradually from 500 to 8000 feet, has the reputation of being in climate one of the most favored places on the whole coast. The narrow stair-like streets of the old town, with their lofty houses, arched gateways, and flying buttresses, form a fine contrast to the modern districts of villas and hotels which have sprung up since about 1860. Besides the Gothic cathedral of San Siro, the buildings of most interest are the Madonna della Costa, crowning the highest part of the old town, the town-house, and the hospital for cutaneous diseases founded by Charles Albert. The port, formed by two moles, both lengthened since 1880, was at one time much more important, its annual movement having sunk from about 1000 in 1866 to 388 small vessels in 1884. The population of the commune (10,012 in 1861) was 16,055 in 1881,—12,285 in the city proper, and 1717 in the suburbs Poggio and Verezzo.

San Remo, identified by Girolamo Rossi, (*Storia della Città*) with a Greek Leucothea and a Roman Matistra, was Christianized by St. Ormisdas and his pupil St. Sirus. Rebuilt after the expulsion of the Saracens from Liguria, it took the name of San Romolo from its 6th-century bishop whose death-day, 13th October, is still a local fête. In what way Romulus was supplanted by Remus is not clearly ascertained. In 1544 the town was attacked by Barbarossa, and in 1625 by the French and Savoyards. The Genoese, against whose encroachments it had long defended its independence, subjugated it in 1753; and in 1797 it was

1 [Fergusson following the older authorities gives 1549 as the date of death. Michele's nephew, Gian Girolamo, who was his distinguished assistant, is said to have died in 1549, at the age of 45. The dates of the text are after J. A. Symonds.—Am. Ed.]
2 See Della Valle, *Storia del Duomo di Orvieto,* Rome, 1791.
3 See Bartoldi, *Sanmichele al servizio della repubblica Veneta.*
4 See Giuliari, *Cap. de' Peregrini,* Verona, 1816.

incorporated in the district of Palms of the Ligurian republic.

SAN SALVADOR, or SALVADOR (*República del Salvador*), the smallest but most densely peopled of the republics of Central America, has a coast-line of 160 miles along the Pacific from the mouth of Rio de la Paz to that of the Goascoran in the Gulf of Fonseca, and is bounded inland by Guatemala on the west and Honduras on the north and east. Its length from east to west is 140 miles, and its average breadth about 60 miles. Its area is estimated at 7225 square miles, and in 1883 it contained 613,273 inhabitants (290,870 males, 322,403 females). With the exception of a comparatively narrow seaboard of low alluvial plains, the country consists mainly of a plateau about 2000 feet above the sea, broken by a large number of volcanic cones, geologically of more recent origin than the main chain of the Cordillera which lies farther to the north. The principal river of the republic is the Rio Lempa, which, rising near Esquipulas in Guatemala and crossing a corner of Honduras, enters Salvador north of Citalá. After receiving from the right the surplus waters of the Laguna de Cuija, a vast lake belonging partly to Guatemala and partly to Salvador, it flows for nearly a degree of longitude eastward through a magnificent and luxuriant valley between the plateau and the Cordillera, and then, turning somewhat abruptly south, skirts the base of the volcano of Siguatepeque and reaches the Pacific in 88° 40′ W. long. Among its numerous tributaries are the Rio Santa Ana, rising near the city of that name, the Asalguate, which passes the capital San Salvador, the Sumpul, which forces its way like the Lempa itself athwart the mountains from Honduras, and the Torola, draining the northeastern corner of Salvador and part of Honduras. The Lempa is even in the dry season a considerable river with a rapid current, and for two-thirds of its course it could easily be made navigable for steamers. The Rio San Miguel drains the country between the Gulf of Fonseca and the basin of the Lempa. The volcanic mountains do not form a chain but a series of clusters : the Izalco group in the west—including Izalco (formed in 1770), Marcelino, Santa Ana, Naranjos, Aguila, San Juan de Dios, Apaneca, Tamajaso, and Lagunita ; the San Salvador group, about 30 miles to the east ; Cojutepeque to the northeast and the San Vicente group to the east of the great volcanic lake of Ilopango ; the Siguatepeque summits to the northeast of San Vicente ; and the great southeastern or San Miguel group—San Miguel, Chinameca, Buenapa, Usulatan, Tecapa, Tabuete. Cacaguateque and Sociedad volcanoes in the northeast belong to the inland Cordillera.

See vol. xi. Plate III.

The volcanic forces in Salvador have not as yet spent themselves. The Izalco vent still acts as a safety valve, and the neighborhood of the capital is so subject to tremblings and rockings of the earth as to have acquired the name of the swinging mat or hammock. The city itself has been destroyed by earthquake in 1594, 1658, in 1719, and in 1854. San Miguel is described as one of the most treacherous burning mountains in America, sometimes several years in complete repose and then all at once bursting out with terrific fury (Scherzer). In 1879–1880 the Lake of Ilopango was the scene of a remarkable series of phenomena. With a length of 5½ miles and a breadth of 4½, it forms a rough parallelogram with deeply indented sides, and is surrounded in all directions by steep mountains except at the points where the villages of Asino and Apulo occupy little patches of level ground. Between 31st December, 1879, and 11th January, 1880, the lake rose four feet above its level. The Jiboa, which flows out at the southeast corner, became, instead of a very shallow stream 20 feet broad, a raging torrent which soon scooped out for itself in the volcanic rocks a channel 30 to 35 feet deep. A rapid subsidence of the lake was thus produced, and by the 6th of March the level was 34⅝ feet below its maximum. Towards the centre of the lake a volcanic centre about 500 feet in diameter rose 150 feet above the water, surrounded by a number of small islands. A number of villages were ruined by the accompanying earthquakes. The lake, originally stocked by the early Spanish settlers, had become the great fish-pond of the republic. On the outbreak of the volcanic forces, the fish fled towards the sides, and on the receding of the waters their dead bodies were left behind in such quantities that at Asino several hundred men were employed for days burying them to avoid a pestilence.

It is less to these natural catastrophes than to political instability that the comparative backwardness of Salvador to develop its resources of soil and minerals must be ascribed ; and considerable progress has in many respects been made since the middle of the century. Coffee is now the principal export (to the value of $1,056,000 in 1873, $3,416,104 in 1883). Indigo, for a long time the staple of the country and exported to the annual value of $20,000,000, is still extensively cultivated (exports in 1883 $1,812,594). As this indigo is generally quoted in the market as Guatemalan, so another valuable product of Salvador is always designated Balsam of Peru (see vol. iii. p. 252), though the tree from which it is obtained grows naturally nowhere else in the world except in a limited part of the Salvadorian seaboard known as the Balsam coast. It was exported in 1883 to the value of $53,612. Other productions of less importance are tobacco, sarsaparilla, india-rubber, and sugar. The silver mines have been and may again be of some account ; and coal has been discovered inland. On the whole the trade of the country has greatly increased : the imports and exports, $1,306,378 and $1,991,650 respectively in 1859, were $2,401,463 and $5,861,053 in 1883. At the time of Dr. Scherzer's visit, there was not a bridge in the country ; there are now a considerable number of good iron bridges on the new roads between the principal cities. The first railway, that from Acajutla to Sonsonate (15 miles) was opened in 1882, and has since been continued in the direction of Santa Ana, the chief commercial town. Telegraphic communication has been established between the more important towns, and in July, 1882, the Central and North American Company landed its cable at La Libertad. Acajutla, La Libertad, and La Union or San Carlos de la Union (in the Gulf of Fonseca) are the principal harbors. Besides the capital San Salvador, with 14,059 inhabitants, there were in 1878 according to the census, 68 places in the republic with over 2000 each—Santa Ana (29,908), Nahuizalco (9988), San Vicente (9957), San Miguel (9842), Metapan (9782), Chalchuapa (8171), Ahuachapan (7930), Nuevo San Salvador (7337), etc. There are three universities—San Salvador, Santa Ana, and San Miguel, with funds partly provided by a quarter of the customs,—a girls' college at Santa Ana, and a fair number of secondary and primary schools. Salvador received this name from Pedro Alvaredo, who, when he conquered it for Spain in 1525–26, found it a rich and populous country. Its independence of the Spanish crown dates from 1842 ; in 1853 it obtained the constitution under which (in a modified form) it now exists as a sovereign state. General Barrios, having in 1858 obliged the president Santin del Castillo to abdicate, secured his own permanent appointment to the office in 1860 ; but in 1863–4 he failed in his endeavor to defend his capital against the Guatemalans, and when he returned in 1864 to attack Dueñas, the Guatemalan protégé, he was defeated and put to death. "Pronunciamientos" have since been the two general preliminaries of presidential elections ; but there has been no serious war, and the finances of the republic have usually a balance on the right side.

See Scherzer, *Travels in Central America* (1857) ; Sonnenstern, *Descripcion del estado del Salvador* (New York, 1859, with a good map reproduced in Berlin *Zeitsch. für Geographie*, 1860) : Dollfus and Montserrat, *Voy. géologique dans les républiques de Guatémala et de Salvador* (1868) ; Blairet, *Le Salvador* (1872) ; Frantzius's translation of De Palacio, *San Salvador and Honduras in* 1576 (1873); Guzman, *Apuntamientos sobre la geogr. fisica de la rep. del Salvador*, 1883.

SANSANDING, or SANSANDIG, a town in the interior of Western Africa, on the north bank of the Niger, in 13° 40′ N. lat. and 6° 25′ W. long., and included in the "empire" of Segu. It was visited by Mungo Park in 1796, and in 1865 by Mage and Quintin, who witnessed the stand it made against a siege by Ahmedu, sultan of Segu, from whom it had revolted. The population is estimated at 30,000 to 40,000.

SAN SEBASTIAN, a seaport of Spain, capital of the province of Guipuzcoa, 42 miles north-northwest of Pamplona, and 402 miles by rail from Madrid. It occupies a narrow isthmus, terminated towards the north by a lofty conical rock called Urgull or Orgullo, and flanked on its eastern side by the river Urumea, here crossed by a bridge, and on the other by a bay

(La Concha), which forms the harbor. The summit of the hill is crowned by a fort (Castillo de la Mota), and the landward side of the town was formerly defended by solid ramparts. The houses are almost all modern, built uniformly in straight streets and regular squares, so as to present an appearance quite unlike most Spanish towns. There are two large churches, a court-house, a theatre, hospitals, barracks, etc. The manufactures of the place are insignificant; and the harbor is small, and not easily accessible, though well protected by a mole and small island. There is a considerable trade in English and French goods,—corn and other articles being exported. During summer the town is much frequented, especially by the wealthier inhabitants of Madrid, for sea-bathing, and tent-like huts are set up for the purpose on the shore of the bay. From its position and strength San Sebastian has been long a place of much importance, and has sustained several sieges. The most memorable of these was in August, 1813, when the British, under Wellington, took it by storm. The population within the municipal boundaries was 21,355 in 1877.

SAN SEVERO, a city of Italy, in the province of Foggia, and at one time the chief town of the Capitanata, lies at the foot of the spurs of Monte Gargano, and has a station on the railway to Brindisi, 36 miles southeast of Termoli and 17 north of Foggia. It is the see of a bishop (since 1580), and has a handsome cathedral and some remains of its old fortifications. In 1880 the population was 19,756 (20,382 in commune).

San Severo dates from the Middle Ages. It was laid in ruins by Frederick II., and in 1053 was the scene of a victory by Robert Guiscard over the papal troops under Leo IX. The overlordship was held in succession by the Benedictines of Torre Maggiore abbey, the Knights Templars, the crown of Naples, and the Sangro family (commendatories of Torre Maggiore). In 1627, and again in 1828 and 1851, the town suffered from earthquakes.

SANSKRIT LANGUAGE AND LITERATURE.

PART I.—SANSKRIT LANGUAGE.

SANSKRIT is the name applied by Hindu scholars to the ancient literary language of India. The word *saṃskṛita* is the past participle of the verb *kar*, "to make" (cognate with Latin *creo*), with the preposition *sam*, "together" (cog. *ἁμα*, *ὁμός*, Eng. "same"), and has probably to be taken here in the sense of "completely formed" or "accurately made, polished," —some noun meaning "speech" (esp. *bhâshâ*) being either expressed or understood with it. The term was, doubtless, originally adopted by native grammarians to distinguish the literary language of the educated classes from the uncultivated popular dialects—the forerunners of the modern vernaculars of northern India—which had, from an early period, developed side by side with it, and which were called (from the same root *kar*, but with different prepositions) *Prâkṛita*, *i.e.* either "derived" or "natural, common" forms of speech. But this designation of the literary idiom, being evidently intended to imply a language regulated by conventional rules, also involves a distinction between the grammatically fixed language of Brâhmanical India and an earlier, less settled, phase of the same language exhibited in the Vedic writings. For greater convenience the Vedic language is, however, usually included in the term, and scholars generally distinguish between the Vedic and the classical Sanskrit. The Sanskrit language, with its old and modern descendants, represents the easternmost branch of the great Indo-Germanic, or Aryan, stock of speech. Philological research has clearly established the fact that the Indo-Aryans must originally have immigrated into India from the northwest. In the oldest literary documents handed down by them their gradual advance can indeed be traced from the slopes of eastern Kubalistan down to the land of the five rivers (Punjab), and thence to the plains of the Yamunâ (Jumna) and Gangâ (Ganges). Numerous special coincidences, both of language and mythology, between the Vedic Aryans and the peoples of Iran also show that these two members of the Indo-Germanic family must have remained in close connection for some considerable period after the others had separated from them.

The origin of comparative philology dates from the time when European scholars became accurately acquainted with the ancient language of India. Before that time classical scholars had been unable, through centuries of learned research, to determine the true relations between the then known languages of our stock. This fact alone shows the importance of Sanskrit for comparative research. Though its value in this respect has perhaps at times been overrated, it may still be considered as the eldest daughter of the old mother-tongue. Indeed, so far as direct documentary evidence goes, it may rather be said to be the only surviving daughter; for none of the other six principal members of the family have left any literary monuments, and their original features have to be reproduced, as best they can, from the materials supplied by their own daughter languages; such is the case as regards the Iranic, Hellenic, Italic, Celtic, Teutonic, and Letto-Slavic languages. To the Sanskrit the antiquity and extent of its literary documents, the transparency of its grammatical structure, the comparatively primitive state of its accent system, and the thorough grammatical treatment it has early received at the hand of native scholars must ever secure the foremost place in the comparative study of Indo-Germanic speech.

Alphabet.

The Sanskrit alphabet consists of the following sounds:

(*a*) Fourteen vowels, viz.:
Ten simple vowels: *a â, i î, u û, ṛ ṝ, ḷ* (*ḹ*); and
Four diphthongs: *ê âi, ô âu.*

(*b*) Thirty-three consonants, viz.:
Five series of mutes and nasals:
guttural: *k kh g gh ṅ*
palatal: *c ch j jh ñ*
lingual: *ṭ ṭh ḍ ḍh ṇ*
dental: *t th d dh n*
labial: *p ph b bh m;*
Four semivowels: *y r l v* (*w*);
Three sibilants: palatal *ś*, lingual *ṣh*, dental *s;* and
A soft aspirate: *h.*

(*c*) Three unoriginal sounds, viz.:
visarga (*ḥ*), a hard aspirate, standing mostly for original *s* or *r;* and two nasal sounds of less close contact than the mute-nasals, viz., *anusvâra* (*ṃ*) and *anunâsika* (*m̐*).

Vowels.

As regards the vowels, a prominent feature of the language is the prevalence of *a*-sounds, these being about twice as frequent as all the others, including diphthongs, taken together (Whitney).

The absence of the short vowels *ĕ* and *ŏ* from the Sanskrit alphabet, and the fact that Sanskrit shows the *a*-vowel where other vowels appear in other languages,—*e.g.*, *bharantam* = *φέροντα, ferentem; janas* = *γένος, genus*,—were formerly considered as strong evidence in favor of the more primitive state of the Sanskrit vowel system as compared with that of the sister languages. Recent research has, however, shown pretty conclusively from certain indications in the Sanskrit language itself that the latter must at one time have possessed the same, or very nearly the same, three vowel-sounds, and that the differentiation of the original

a-sound must, therefore, have taken place before the separation of the languages.

The vowels *é* and *ó*, though apparently simple sounds, are classed as diphthongs, being contracted from original *ăi* and *ău* respectively, and liable to be treated as such in the phonetic modifications they have to undergo before any vowel except *ă*.

Consonants.

As regards the consonants, two of the five series of mutes, the palatal and lingual series, are of secondary (the one of Indo-Iranian, the other of purely Indian) growth.

The palatals are, as a rule, derived from original gutturals, the modification being generally due to the influence of a neighboring palatal sound *i* or *y*, or *ĕ* (*ă*): *e.g.*, *carati* = Lat. *currit*; *jânu* = *γόνυ*, *genu*, knee. The surd aspirate *ch*, in words of Indo-Germanic origin, almost invariably goes back to original *sk*: *e.g.*, *chid-* (*chind-*) = *scindo*, *σχίζω*; *châyâ* = *σκιά*.

The palatal sibilant *ś* (pronounced *sh*) likewise originated from a guttural mute *k*, but one of somewhat different phonetic value from that represented by Sanskrit *k* or *c*. The latter, usually designated by k^2 (or *q*), is frequently liable to labialization (or dentalization) in Greek, probably owing to an original pronunciation *kw* (*qu*): *e.g.*, *katara* = *πότερος*, *uter*; while the former (k^1) shows invariably *κ* in Greek, and a sibilant in the Letto-Slavic and the Indo-Iranian languages: *e.g.*, *śvan* (*śun*) = *κύων* (*κυν*), *canis*, Germ. *hund*; *daśan* = *δέκα*, *decem*, Goth. *taihun*.

The non-original nature of the palatals betrays itself even in Sanskrit by their inability to occur at the end of a word, —*e.g.*, acc. *vâcam* = Lat. *vocem*, but nom. *vâk* = *vox*,—and by otherwise frequently reverting to the guttural state.

The linguals differ in pronunciation from the dentals in their being uttered with the tip of the tongue turned up to the dome of the palate, while in the utterance of the dentals it is pressed against the upper teeth, not against the upper gums as is done in the English dentals, which to Hindus sound more like their own lingnals. The latter, when occurring in words of Aryan origin, are, as a rule, modifications of original dentals, usually accompanied by the loss of an *r* or other adjoining consonant; but more commonly they occur in words of foreign, probably non-Aryan, origin. Of regular occurrence in the language, however, is the change of dental *n* into lingnal *ṇ*, and of dental *s* into lingual *ṣh*, when preceded in the same word by certain other letters.

The sonant aspirate *h* is likewise non-original, being usually derived from original sonant aspirated mutes, especially *gh*: *e.g.*, *haṃsa* = *χήν* (for *χανς*), *anser*, Germ. *gans*; *aham* = *ἐγών*, *ego*, Goth. *ik*.

Phonetic changes.

The contact of final and initial letters of words in the same sentence is often attended in Sanskrit with considerable euphonic modifications; and we have no means of knowing how far the practice of the vernacular language may have corresponded to these phonetic theories. There can be no doubt, however, that a good deal in this respect has to be placed to the account of grammatical reflection; and the very facilities which the primitive structure of the language offered for grammatical analysis and an insight into the principles of internal modification may have given the first impulse to external modifications of a similar kind.

None of the cognate languages exhibits in so transparent a manner as the Sanskrit the cardinal principle of Indo-Germanic word-formation by the addition of inflectional endings — either case-endings or personal terminations (themselves probably original roots)—to stems obtained, mainly by means of suffixes, from monosyllabic roots, with or without internal modifications.

Declension.

There are in Sanskrit declension three numbers and seven cases, not counting the vocative, viz., nominative, accusative, instrumental, dative, ablative, genitive, and locative. As a matter of fact, all these seven cases appear, however, only in the singular of *a*-stems and of the pronominal declension. Other noun-stems have only one case-form for the ablative and genitive singular. In the plural, the ablative everywhere shares its form with the dative (except in the personal pronoun, where it has the same ending as in the singular), whilst the dual shows only three different case-forms—one for the nominative and accusative, another for the instrumental, dative, and ablative, and a third for the genitive and locative.

The declension of *a*-stems, corresponding to the first and second Latin declensions, is of especial interest, not so much on account of its being predominant from the earliest time, and becoming more and more so with the development of the language, but because it presents the greatest number of alternative forms, which supply a kind of test for determining the age of literary productions, a test which indeed has already been applied to some extent by Professor Lanman, in his excellent *Statistical Account of Noun Inflexion in the Veda*. These alternative case-forms are:

(1) *âsas* and *âs* for the nominative plural masc. and fem.: *e.g.*, *aśvâsas* and *aśvâs* = *equi* (*equæ*). The forms in *âsas*,—explained by Bopp as the sign of the plural *as* applied twice, and by Schleicher as the sign of the plural *as* added to the nominative singular,—occur to those in *âs* (*i.e.*, the ordinary plural sign *as* added to the *a*-stem) in the Ṛigveda in the proportion of 1 to 2, and in the peculiar parts of the Atharvaveda in that of 1 to 25, whilst the ending *âs* alone remains in the later language.

(2) *â* and *âni* for the nominative and accusative plural of neuters: as *yugâ*, *yugâni* = *ζυγά*, *juga*. The proportion of the former ending to the latter in the Ṛik is 11 to 7, in the Atharvan 2 to 3, whilst the classical Sanskrit knows only the second form.

(3) *êbhis* and *âis* for the instrumental plural masc. and neuter: *e.g.*, *devêbhis*, *devâis*. In the Ṛik the former forms are to the latter in the proportion of 5 to 6, in the Atharvan of 1 to 5, while in the later language only the contracted form is used. The same contraction is found in other languages; but it is doubtful whether it did not originate independently in them.

(4) *â* and *âu* for the nominative and accusative dual masc.: *e.g.*, *ubhâ*, *ubhâu* = *ἄμφω*. In the Ṛik forms in *â* outnumber those in *âu* more than eight times; whilst in the Atharvan, on the contrary, those in *âu* (the only ending used in the classical language) occur five times as often as those in *â*.

(5) *â* and *ena* (*enâ*) for the instrumental singular masc. and neut.: as *dânâ*, *dânena* = *dono*. The ending *ena* is the one invariably used in the later language. It is likewise the usual form in the Veda; but in a number of cases it shows a final long vowel which, though it may be entirely due to metrical requirements, is more probably a relic of the normal instrumental ending *â*, preserved for prosodic reasons. For the simple ending *â*, as compared with that in *ena*, Prof. Lanman makes out a proportion of about 1 to 9 in the Ṛigveda (altogether 114 cases); while in the peculiar parts of the Atharvan he finds only 11 cases.

(6) *âm* and *ânâm* for the genitive plural: *e.g.* (*aśvâm*), *aśvânâm* = *ἵππων*, *equum* (*equorum*). The form with inserted nasal (doubtless for *anâm*, as in Zend *aśpanâm*), which is exclusively used in the later language, is also the prevailing one in the Ṛik. There are, however, a few genitives of *a*-stems in original *âm* (for *a-âm*), which also appear in Zend, Prof. Lanman enumerating a dozen instances, some of which are, however, doubtful, while others are merely conjectural.

Verb system.

The Sanskrit verb system resembles that of the Greek in variety and completeness. While the Greek excels in nicety and definiteness of modal distinction, the Sanskrit surpasses it in primitiveness and transparency of formation. In this part of the grammatical system there is, however, an even greater difference than in the noun inflection between the Vedic and the classical Sanskrit. While the former shows, upon the whole, the full complement of modal forms exhibited by the Greek, the later language has practically discarded the subjunctive mood. The Indo-Aryans never succeeded in working out a clear formative distinction between the subjunctive and indicative moods; and, their syntactic requirements becoming more and more limited, they at last contented themselves, for modal expression, with a present optative and imperative, in addition to the indicative tense-forms, and a little-used aorist optative with a special "precative" or "benedictive" meaning attached to it.

Another part of the verb in which the later language differs widely from Vedic usage is the infinitive. The language of the old hymns shows a considerable variety of case-forms of verbal abstract nouns with the function of infinitives, a certain number of which can still be traced back to the parent language, as, for instance, such dative forms as *jîv-áse* = viv-ere; *sáh-adhyâi* = *ἔχεσθαι*; *dâ'-mane* = *δόμεναι*; *dâ'-vane* = *δοῦναι*. Further, *ji-shé*, "to conquer," for *ji-sé*, apparently an aorist infinitive with the dative ending (parallel to the radical forms, such as *yudh-é*, "to fight," *dṛiś-é*, "to see"), thus corresponding to the Greek aorist infinitive *λτσαι* (but *cf.* also Latin *da-re*, for *dase*, *es-se*, etc.). The classical Sanskrit, on the other hand, practically uses only one infinitive form, viz., the accusative of a verbal noun in *tu*, *e.g.*, *sthâtum*, *etum*, corresponding to the Latin supinum *datum*, *itum*. But, as in Latin another case, the ablative (*datū*), of the same abstract noun is utilized for a similar purpose, so the Vedic language makes two other cases do duty as infinitives, viz., the dative in *tave* (*e.g.*, *dâtave*, and the anomalous *étavâi*), and the gen.-abl. in *tos* (*dâtos*). A prominent feature of the later Sanskrit syntax is the so-called gerund or indeclinable participle in *tvâ*, apparently the instrumental of a stem in *tva* (probably a derivative from that in *tu*), as well as the gerund in *ya* (or *tya* after a final short radical vowel) made from com-

pound verbs. The old language knows not only such gerunds in *tvá*, using them, however, very sparingly, but also corresponding dative forms in *tváya* (*yuktváya*), and the curious contracted forms in *tví'* (*kṛitví*, "to do"). And, besides those in *ya* and *tya*, it frequently uses forms with a final long vowel, as *bhid-yá*, *i-tyá*, thus showing the former to be shortened instrumentals of abstract nouns in *i* and *ti*.

The Sanskrit verb, like the Greek, has two voices, active and middle, called, after their primary functions, *parasmái-pada*, "word for another," and *átmane-pada*, "word for one's self." While in Greek the middle forms have to do duty also for the passive in all tenses except the aorist and future, the Sanskrit, on the other hand, has developed for the passive a special present-stem in *ya*, the other tenses being supplied by the corresponding middle forms, with the exception of the third person singular aorist, for which a special form in *i* is usually assigned to the passive.

The present-stem system is by far the most important part of the whole verb system, both on account of frequency of actual occurrence and of its excellent state of preservation. It is with regard to the different ways of present-stem formation that the entire stock of assumed roots has been grouped by the native grammarians under ten different classes. These classes again naturally fall under two divisions or "conjugations," with this characteristic difference that the one (the second) retains the same stem (ending in *a*) throughout the present and imperfect, only lengthening the final vowel before terminations beginning with *v* or *m* (not final); while the other shows two different forms of the stem, a strong and a weak form, according as the accent falls on the stem-syllable or on the personal ending: *e.g.*, 3 sing. *bhára-ti*, *φέρει*—2 pl. *bhára-tha*, *φέρετε*; but *é-ti*, *εἶσι*—*i-thá*, *ἴτε* (for *ἰτέ*); 1 sing. *stṛṇó-mi*, *στόρνῡμι*—1 pl. *stṛṇu-más* (*στόρνυμες*).

As several of the personal endings show a decided similarity to personal or demonstrative pronouns, it is highly probable that, as might indeed be *a priori* expected, all or most of them are of pronominal origin,—though, owing to their exposed position and consequent decay, their original form and identity cannot now be determined with certainty. The active singular terminations, with the exception of the second person of the imperative, are unaccented and of comparatively light appearance; while those of the dual and plural, as well as the middle terminations, have the accent, being apparently too heavy to be supported by the stem-accent, either because, as Schleicher supposed, they are composed of two different pronominal elements, or otherwise. The treatment of the personal endings in the first, and presumably older, conjugation may thus be said somewhat to resemble that of enclitics in Greek.

In the imperfect, the present-stem is increased by the augment, consisting of a prefixed *ă*. Here, as in the other tenses in which it appears, it has invariably the accent, as being the distinctive element (originally probably an independent demonstrative adverb "then") for the expression of past time. This shifting of the word-accent seems to have contributed to the further reduction of the personal endings, and thus caused the formation of a new, or secondary, set of terminations which came to be appropriated for secondary tenses and moods generally. As in Greek poetry, the augment is frequently omitted in Sanskrit.

The mood-sign of the subjunctive is *ă*, added to (the strong form of) the tense-stem. If the stem ends already in *ă*, the latter becomes lengthened. As regard the personal terminations, some persons take the primary, others the secondary forms, while others again may take either the one or the other. The first singular active, however, takes *ni* instead of *mi*, to distinguish it from the indicative. But besides these forms, showing the mood-sign *ă*, the subjunctive (both present and aorist) may take another form, without any distinctive modal sign, and with the secondary endings, being thus identical with the augmentless form of the preterite.

The optative invariably takes the secondary endings, with some peculiar variations. In the active of the first conjugation, its mood-sign is *yá*, affixed to the weak form of the stem: *e.g.*, root *as*,—*syâm* = Lat. *siem*, *sīm*; while in the second conjugation and throughout the middle it is *í*, probably a contraction of *yá*: *e.g.*, *bháres* = *φέροις*.

Besides the ordinary perfect, made from a reduplicated stem, with distinction between strong (active singular) and weak forms, and a partly peculiar set of endings, the later language makes large use of a periphrastic perfect, consisting of the accusative of a feminine abstract noun in *á* (*-ám*) with the reduplicated perfect forms of the auxiliary verbs *kar*, "to do," or *as* (and occasionally *bhû*), "to be." Though more particularly resorted to for the derivative forms of conjugation—viz., the causative (including the so-called tenth conjugational class), the desiderative, intensive, and denominative—this perfect-form is also commonly used with roots beginning with prosodically long vowels, as well as with a few other isolated roots. In the Ṛigveda this formation is quite unknown, and the Atharvan offers a single instance of it, from a causative verb, with the auxiliary *kar*. In the Vedic prose, on the other hand, it is rather frequent,[1] and it is quite common in the later language.

In addition to the ordinary participles, active and middle, of the reduplicated perfect,—*e.g.*, *jajan-vân*, *γεγον-ώς*; *bubudh-âná*, *πεπυσ-μένο*,—there is a secondary participial formation, obtained by affixing the possessive suffix *vat* (*vant*) to the passive past participle: *e.g.*, *kṛita-vant*, lit. "having (that which is) done." A secondary participle of this kind occurs once in the Atharvaveda, and it is occasionally met with in the Brâhmaṇas. In the later language, however, it not only is of rather frequent occurrence, but has assumed quite a new function, viz., that of a finite perfect-form; thus *kṛitavón*, *kṛitavantas*, without any auxiliary verb, mean, not "having done," but "he has done," "they have done."

The original Indo-Germanic future-stem formation in *sya*, with primary endings,—*e.g.*, *dásyáti* = *δώσει* (for *δώσετι*),—is the ordinary tense-form both in Vedic and classical Sanskrit,—a preterite of it, with a conditional force attached to it (*ádásyat*), being also common to all periods of the language.

Side by side with this future, however, an analytic tense-form makes its appearance in the Brâhmaṇas, obtaining wider currency in the later language. This periphrastic future is made by means of the nominative singular of a *nomen agentis* in *tar* (*dâtar*, nom. *dátâ* = Lat. *dator*), followed by the corresponding present forms of *as*, "to be" (*dátá-'smi*, as it were, *daturus sum*), with the exception of the third persons, which need no auxiliary, but take the respective nominative of the noun.

The aorist system is somewhat complicated, including as it does augment-preterites of various formations, viz., a radical aorist, sometimes with reduplicated stem,—*e.g.*, *ásthâm* = *ἔστην*; *srudhí* = *κλῦθι*; *ádudrot*; an *a*-aorist (or thematic aorist) with or without reduplication,—*e.g.*, *áricas* = *ἔλιπες*; *ápaptam*, *cf.* *ἔπεφνον*; and several different forms of a sibilant-aorist. In the older Vedic language the radical aorist is far more common than the *a*-aorist, which becomes more frequently used later on. Of the different kinds of sibilant-aorists, the most common is the one which makes its stem by the addition of *s* to the root, either with or without a connecting vowel *i* in different roots: *e.g.*, root *ji* —1 sing. *ájáisham*, 1 pl. *ájáishma*; *ákramisham*, *ákramishma*. A limited number of roots take a double aorist-sign with inserted connecting vowel (*sish* for *sis*)—*e.g.*, *áyásisham* (*cf.* *scrip-sis-ti*); whilst others—very rarely in the older but more numerously in the later language—make their aorist-stem by the addition of *sa*,—*e.g.*, *ádikshas* = *ἔδειξας*.

As regards the syntactic functions of the three preterites,—the imperfect, perfect, and aorist,—the classical writers make virtually no distinction between them, but use them quite indiscriminately. In the older language, on the other hand, the imperfect is chiefly used as a narrative tense, while the other two generally refer to a past action which is now complete,—the aorist, however, more frequently to that which is only just done or completed. The perfect, owing doubtless to its reduplicative form, has also not infrequently the force of an iterative, or intensive, present.

Word formation.

The Sanskrit, like the Greek, shows at all times a considerable power and facility of noun-composition. But, while in the older language, as well as in the earlier literary products of the classical period, such combinations rarely exceed the limits compatible with the general economy of inflectional speech, during the later, artificial period of the language they gradually become more and more excessive, both in size and frequency of use, till at last they absorb almost the entire range of syntactic construction.

One of the most striking features of Sanskrit word-formation is that regular interchange of light and strong vowel-sounds, usually designated by the native terms of *guṇa* (quality) and *vṛiddhi* (increase). The phonetic process implied in these terms consists in the raising, under certain conditions, of a radical or thematic light vowel *i*, *u*, *ṛ*, *ḷ*, by means of an inserted *a*-sound, to the diphthongal (guṇa) sounds *ăi* (Sanskr. *ê*), *ău* (Sanskr. *ó*), and the combination *ar* and *al* respectively, and, by a repetition of the same process, to the (vṛiddhi) sounds, *âi*, *âu*, *âr*, and *âl* respectively. Thus from root *vid*, "to know," we have *véda*, "knowledge," and therefrom *váidika*; from *yug*, *yóga* *yóûgika*. While the interchange of the former kind, due mainly to accentual causes, was undoubtedly a common

[1] It also shows occasionally other tense-forms than the perfect of the same periphrastic formation with *kar*.

feature of Indo-Germanic speech, the latter, or vṛiddhi-change, which chiefly occurs in secondary stems, is probably a later development. Moreover, there can be no doubt that the vṛiddhi-vowels are really due to what the term implies, viz., to a process of "increment," or vowel-raising. The same was universally assumed by comparative philologists till a few years ago, as regards the relation between the guna-sounds *ăi* (*ê*) and *ău* (*ô*) and the respective simple *i*- and *u*-sounds. According to a recent theory, however, which has already received a considerable amount of acceptance, we are henceforth to look upon the heavier vowels as the original, and upon the lighter vowels as the later sounds, produced through the absence of stress and pitch. The grounds on which this theory is recommended are those of logical consistency. In the analogous cases of interchange between *r̥* and *ar*, as well as *l̥* and *al*, most scholars have indeed been wont to regard the syllabic *r̥* and *l̥* as weakened from original *ar* and *al*, while the native grammarians represent the latter as produced from the former by increment. Similarly the verb *as* (*ĕs*), "to be," loses its vowel wherever the radical syllable is unaccented: *e.g.*, *ásti*, Lat. *est—smás*, *s(u)mus*; opt. *syám*, Lat. *siĕm* (*sīm*). For other analogous cases of vowel-change, see PHILOLOGY, vol. xviii. p. 796 *sq.* On the strength of these analogous cases of vowel-modification we are, therefore, to accept some such equation as this:

ásmi : *smás* = δέρκομαι : ἔδρ(α)κον = λείπω : λιπεῖν
= *émi* (εἶμι) : *imás* (ἴμεν for ἰμέν)
= φεύγω : φυγεῖν
= *dóhmi* (I milk) : *duhmás*.

Acquiesceuce iu this equation would seem to involve at least one important admission, viz., that original root-syllables contained no simple *i*- and *u*-vowels, except as the second element of the diphthongs, *ai*, *ei*, *oi*; *au*, *eu*, *ou*. We ought no longer to speak of the roots, *vid*, "to know," *dik*, "to show, to bid," *dhugh*, "to milk," *yug*, "to join," but of *veid*, *deik*, *dhaugh* or *dheugh*, *yeug*, etc. Nay, as the same law would apply with equal force to suffixal vowels, the suffix *nu* would have to be called *nau* or *neu*; and, in explaining, for instance, the irregularly formed δείκνῡμι, δείκνῡμεν, we might say that, by the affixion of *νευ* to the root δεικ, the present-stem δικνεῦ was obtained (δικνεῦμι), which, as the stress was shifted forward, became 1 plur. δικνυμέσ(ι),—the subsequent modifications in the radical and formative syllables being due to the effects of "analogy" (*cf.* G. Meyer, *Griech. Gramm.*, § 487). Now, if there be any truth in the "agglutination" theory, according to which the radical and formative elements of Indo-Germanic speech were at one time independent words, we would have to be prepared for a pretty liberal allowance, to the parent language, of diphthongal monosyllables such as *deík neú*, while simple combinations such as *dik nu* could only spring up after separate syllable-words had become united by the force of a common acceut. But, whether the agglutinationists be right or wrong, a theory involving the priority of the diphthongal over the simple sounds can hardly be said to be one of great *prima facie* probability; and one may well ask whether the requirements of logical consistency might not be satisfied in some other, less improbable, way.

Now, the analogous cases which have called forth this theory turn upon the loss of a radical or suffixal *a* (*ĕ*), occasioned by the shifting of the word-accent to some other syllable; *e.g.*, acc. *mâtáram*, instr. *mâtrá*; πέτομαι, ἐπτόμην; δέρκομαι, ἔδρ(α)κον; *ásmi*, *smás*. Might we not then assume that at an early stage of noun and verb inflection, through the giving way, under certain conditions, of the stem *a* (*ĕ*), the habit of stem-gradation, as an element of inflection, came to establish itself and ultimately to extend its sphere over stems with *i*- and *u*-vowels, but that, on meeting here with more resistance[1] than in the *a* (*ĕ*)-vowel, the stem-gradation then took the shape of a raising of the simple vowel, in the "strong" cases and verb-forms, by that same *a*-element which constituted the distinctive element of those cases in the other variable stems? In this way the above equation would still hold good, and the corresponding vowel-grades, though of somewhat different genesis, would yet be strictly analogous.

Accentuation.

The accent of Sanskrit words is marked only in the more important Vedic texts, different systems of notation being used in different works. Our knowledge of the later accentuation of words is entirely derived from the statements of grammarians. As in Greek, there are three accents, the *udâtta* ("raised," *i.e.*, acute), the *anudâtta* ("not raised," *i.e.*, grave), and the *svarita* ("sounded, modulated," *i.e.*, circumflex). The last is a combination of the two others, its proper use being confined almost entirely to a vowel preceded by a semivowel *y* or *v*, representing an original acuted vowel. Hindu scholars, however, also include in this term the accent of a grave syllable preceded by an acuted syllable, and itself followed by a grave.

The Sanskrit and Greek accentuations present numerous coincidences. Although the Greek rule, confining the accent within the last three syllables, has frequently obliterated the original likeness, the old features may often be traced through the later forms. Thus, though augmented verb-forms in Greek cannot always have the accent on the augment as in Sanskrit, they have it invariably as little removed from it as the accentual restrictions will allow: *e.g.*, *ábharam*, ἔφερον; *ábharâma*, ἐφέρομεν; *ábharâmahi*, ἐφερόμεθα.

The most striking coincidence in noun declension is the accentual distinction made by both languages between the "strong" and "weak" cases of monosyllabic nouns,—the only difference in this respect being that in Sanskrit the accusative plural, as a rule, has the accent on the case-ending, and consequently shows the weak form of the stem: *e.g.*, stem *pad*, ποδ; *pádam*, πόδα; *padás*, ποδός; *padí*, ποδί; *pâdas*, πόδες; *padás*, πόδας; *padâm*, ποδῶν; *patsú*, ποσί. In Sanskrit a few other classes of stems (especially present participles in *ant*, *at*), accented on the last syllable, are apt to yield their accent to heavy vowel (not consonantal) terminations. Compare the analogous accentuation of Sanskrit and Greek stems in *tár*: *pitáram*, πατέρα; *pitré*, πατρός; *pitáras*, πατέρες; *pitr̥shu*, πατρ(ά)σι.

The vocative, when heading a sentence (or verse-division), has invariably the accent on the first syllable; otherwise it is not accented.

Finite verb-forms also, as a rule, lose their accent, except when standing at the beginning of a sentence or verse-division (a vocative uot being taken into account), or in dependent (mostly relative) clauses, or in conjunction with certain particles. Of two or more coördinate verb-forms, however, only the first is unaccented.

Written characters.

In writing Sanskrit the natives, in different parts of India, generally employ the particular character used for writing their own vernacular. The character, however, most widely understood and employed by Hindu scholars, and used invariably in European editions of Sanskrit works (unless printed in Roman letters) is the so-called *Devanágarí*, or *nágarí* ("town"-script) of the gods.

The origin of the Indian alphabets is still enveloped in doubt. The oldest hitherto known specimens of Indian writing are five rock-inscriptions, containing religious edicts in Pâli (the Prâkrit used in the Buddhist scriptures), issued by the emperor Aśoka (Piyadasi) of the Maurya dynasty, in 253–251 B.C., and scattered over the area of northern India from the vicinity of Peshawar, on the northwest frontier, and Girnar in Guzerat, to Jaugada and Dhauli in Katak, on the eastern coast. The most western of these inscriptions—called, from villages near it, the Kapurdagarhi or Shâhbâz-garhi inscription—is executed in a different alphabet from the others. It reads from right to left, and is usually called the Arian Pâli alphabet, it being also used on the coins of the Greek and Indo-Scythian princes of Ariana; while the other, which reads from left to right, is called the Indian Pâli alphabet. The former, which is manifestly derived from a Semitic (probably Aramæan) source, has left no traces on the subsequent development of Indian writing. The Indo-Pâli alphabet, on the other hand, from which the modern Indian alphabets are derived, is of uncertain origin. The similarity, however, which several of its letters present to those of the old Phœniciau alphabet (itself probably derived from the Egyptian hieroglyphics) suggests for this alphabet also—or at least for the germ of it—the probability of a Semitic origin, though, already at Aśoka's time, the Indians had worked it up to a high degree of perfection and wonderfully adapted it to their peculiar scientific ends. As to the probable time and channel of its introduction, no satisfactory theory has yet been proposed. Considering, however, the high state of perfection it exhibits in the Maurya and Andhra inscriptions, as well as the wide area over which these are scattered, it can hardly be doubted that the art of writing must have been known to and practiced by the Indians for various purposes long before the time of Aśoka. The fact that no reference to it is found in the contemporary literature has probably to be accounted for by a strong reluctance on the part of the Brâhmans to commit their sacred works to writing. A useful résumé of the various theories proposed on this subject will be found in a paper contributed by Mr. R. Cust to the *Journal of the Royal Asiatic Society*, new series, vol. xvi.

[1] We might compare the different treatment in Sanskrit of *an* and *in* bases (*mûrdhâni-mûrdhnâ*; *vâdíni-vâdínâ*); for, though the latter are doubtless of later origin, their inflection might have been influenced by that of the former. Also a comparison of such forms as (*devá*) *devánâm*, (*agní*) *agnînâm*, and (*dhenú*) *dhenûnâm*, tells in favor of the *i*- and *u*-vowels, as regards power of resistance, inasmuch as it does not require the accent in order to remain intact.

The invention of the numeral figures, which used to be generally ascribed to the Indians, has also been rendered doubtful by more recent research.

An exeellent Sanskrit grammar, dealing with the language historically, has been published by Prof. W. D. Whitney. Of other English grammars, dealing almost exclusively with the classical Sanskrit, those of Profs. Max Müller, Monier Williams, and F. Kielhorn are now most widely used.

The best dietionary is the great Sanskrit-German *Wörterbuch*, published at St. Petersburg, in 7 vols., by Profs. Böhtlingk and Roth. Largely based on this great thesaurus are the Sanskrit English dictionaries by Prof. M. Williams and the late Prof. Th. Benfey.

PART II.—SANSKRIT LITERATURE.

The history of Sanskrit literature labors under the same disadvantage as the political history of ancient India, from the total want of anything like a fixed chronology. As there are extremely few well-ascertained political facts until comparatively recent times, so in that whole vast range of literary development there is scarcely a work of importance the date of which scholars have succeeded in fixing with absolute certainty. The original composition of most Sanskrit works can indeed be confidently assigned to certain general periods of literature, but as to many of them, and these among the most important, scholars have but too much reason to doubt whether they have come down to us in their original shape, or whether they have not rather, in course of time, undergone alterations and additions so serious as to make it impossible to regard them as genuine witnesses of any one phase of the development of the Indian mind. Nor can we expect many important chronological data from the new materials which will doubtless yet be brought to light in India. Though by such discoveries a few isolated spots may indeed be lighted up here and there, the real task of clearing away the mist which at present obscures our view, if ever it can be cleared away, will have to be performed by patient research—by a more minute critical examination of the multitudinous writings which have been handed down from the remote past. In the following sketch it is intended to take a rapid view of the more important works and writers in the several departments of literature.

In accordance with the two great phases of linguistic development above referred to, the history of Sanskrit literature readily divides itself into two principal periods, the Vedic and the classical. It should, however, be noted that these periods partly overlap each other, and that some of the later Vedic works are included in that period on account of the subjects with which they deal, and for their archaic style, rather than for any just claim to a higher antiquity than may have to be assigned to the oldest works of the classical Sanskrit.

I. The Vedic Period.[1]

The term *veda*—*i. e.*, "knowledge," (sacred) "lore"—embraces a body of writings the origin of which is ascribed to divine revelation (*śruti*, literally "hearing"), and which forms the foundation of the Brâhmanical system of religious belief. This sacred canon is divided into three or (according to a later scheme) four coördinate collections, likewise called Veda: (1) the *Ṛig-veda*, or lore of praise (or hymns); (2) the *Sâma-veda*, or lore of tunes (or chants): (3) the *Yajur-veda*, or lore of prayer; and (4) the *Atharva-veda*, or lore of the Atharvans. Each of these four Vedas consists primarily of a collection (*saṃhitâ*) of sacred, mostly poetical, texts of a devotional nature, called *mantra*. This entire body of texts (and particularly the first three collections) is also frequently referred to as the *trayî vidyâ*, or threefold wisdom, of hymn (*ṛich*[2]), tune or chant (*sâman*), and prayer (*yajus*),—the fourth Veda, if at all included, being in that case classed together with the Ṛik.

Saṃhitâs.

The Brâhmanical religion finds its practical expression chiefly in sacrificial performances. The Vedic sacrifice requires for its proper performance the attendance of four officiating priests, each of whom is assisted by one or more (usually three) subordinate priests, viz.: (1) the *Hotar* (*i. e.*, either "sacrificer," or "invoker"), whose chief business is to invoke the gods, either in short prayers pronounced over the several oblations, or in liturgical recitations (*śastra*), made up of various hymns and detached verses; (2) the *Udgâtar*, or chorister, who has to perform chants (*stotra*) in connection with the hotar's recitations; (3) the *Adhvaryu*, or offering priest *par excellence*, who performs all the material duties of the sacrifice, such as the kindling of the fires, the preparation of the sacrificial ground and the offerings, the making of oblations, etc.; (4) the *Brahman*, or chief "priest," who has to superintend the performance and to rectify any mistakes that may be committed. Now, the first three of these priests stand in special relation to three of the Vedic Saṃhitâs in this way, that the Saṃhitâs of the Sâmaveda and Yajurveda form special song and prayer books, arranged for the practical use of the udgâtar and adhvaryu respectively; whilst the Ṛik-saṃhitâ, though not arranged for any such practical purpose, contains the entire body of sacred lyrics whence the hotar draws the material for his recitations. The brahman, on the other hand, had no special text-book assigned to him, but was expected to be familiar with all the Saṃhitâs as well as with the practical details of the sacrificial performance. In point of fact, however, the brahmans, though their attendance at Vedic sacrifices was required, can scarcely be said to have formed a separate class of priests: their office was probably one which might be held by any priest of the three other classes who had acquired the necessary qualification by additional study of the other Saṃhitâs and manuals of rituals. In later times, when the votaries of the fourth Veda pressed for recognition of their Saṃhitâ as part of the sacred canon, the brahman priest was claimed by them as specially connected with the Atharvaveda. It is perhaps for this reason that the latter is also called the *Brahmaveda*,—though this designation may also be taken to mean the Veda of spells or secret doctrines (*brahman*). It sometimes happens that verses not found in our version of the Ṛik-saṃhitâ, but in the Atharvaveda-saṃhitâ, are used by the hotar; but such texts, if they did not actually form part of some other version of the Ṛik,—as Sâyaṇa in the introduction to his commentary on the Ṛik-saṃhitâ assures us that they did,—were probably inserted in the liturgy subsequent to the recognition of the fourth Veda.

Classes of priests.

The several Saṃhitâs have attached to them certain theological prose works, called *Brâhmaṇa*, which, though subordinate in authority to the Mantras or Saṃhitâs, are like them held to be divinely revealed and to form part of the canon. The chief works of this class are of an exegetic nature,—their purport being to supply a dogmatic exposition of the sacrificial ceremonial in so far as the particular class of priests for whose enlightenment the Brâhmaṇa is intended is concerned in it. Notwithstanding the uninteresting character of no small part of their contents, the Brâhmaṇas are of considerable importance, both as regards the history of Indian institutions and as "the oldest body of Indo-European prose, of a generally free, vigorous, simple form, affording valuable glimpses backward at the primitive condition of unfettered Indo-European talk" (Whitney).

Brahmâṇas.

More or less closely connected with the Brâhmaṇas

[1] J. Muir's *Original Sanskrit Texts*, 5 vols., 2d ed., forms the most complete general survey of the results of Vedic researeh.

[2] The combination *ch*, used (in conformity with the usual English practice) in this sketeh of the literature, corresponds to the simple *c* in the scheme of the alphabet, p. 282.

(and in a few exceptional cases with Saṃhitâs) are two classes of treatises, called *Âraṇyaka* and *Upanishad*. The Âraṇyakas, *i. e.*, works "relating to the forest," being intended to be read by those who have retired from the world and lead the life of anchorites, do not greatly differ in character and style from the Brâhmaṇas, but like them are chiefly ritualistic, treating of special ceremonies not dealt with, or dealt with only imperfectly, in the latter works, to which they thus stand in the relation of supplements. The Upanishads, on the other hand, are of a purely speculative nature, and must be looked upon as the first attempts at a systematic treatment of metaphysical questions. The number of Upanishads hitherto known is very considerable (about 170); but, though they nearly all profess to belong to the Atharvaveda, they have to be assigned to very different periods of Sanskrit literature,—some of them being evidently quite modern productions. The oldest treatises of this kind are doubtless those which form part of Vedic Saṃhitâs, Brâhmaṇas, and Âraṇyakas, though not a few others which have no such special connection have to be classed with the later products of the Vedic age.

Âraṇyakas and Upanishads.

As the sacred texts were not committed to writing till a much later period, but were handed down orally in the Brâhmanical schools, it was inevitable that local differences of reading should spring up, which in course of time gave rise to a number of independent versions, more or less differing from one another. Such different text-recensions, called *śâkhâ* (*i.e.*, branch), were at one time very numerous, but only a limited number of them have survived. As regards the Saṃhitâs, the poetical form of the hymns, as well as the concise style of the sacrificial formulas, would render these texts less liable to change, and the discrepancies of different versions would chiefly consist in various readings of single words or in the different arrangement of the textual matter. The diffuse ritualistic discussions and loosely connected legendary illustrations of the Brâhmaṇas, on the other hand, offered scope for very considerable modifications in the traditional matter, either through the ordinary processes of oral transmission or through the special influence of individual teachers.

Different recensions.

An original Brâhmaṇa, then, may be characterized as a series of theoretic discourses, composed by recognized authorities on ritualistic matters, such as might be delivered or referred to in connection with practical instruction in the sacrificial art. The growing intricacy of the ceremonial, however, could not fail, in course of time, to create a demand for treatises of a more practical tendency, setting forth, in concise and methodical form, the duties of the several priests in the sacrificial performances. But, besides the purely ceremonial matter, the Brâhmaṇas also contained a considerable amount of matter bearing on the correct interpretation of the Vedic texts; and, indeed, the sacred obligation incumbent on the Brâhmans of handing down correctly the letter and sense of those texts necessarily involved a good deal of serious grammatical and etymological study in the Brâhmanical schools. These literary pursuits could not but result in the accumulation of much learned material, which it would become more and more desirable to throw into a systematic form, serving at the same time as a guide for future research. These practical requirements were met by a class of treatises, grouped under six different heads or subjects, called *Vedângas*, *i.e.*, members, or limbs, of the (body of the) Veda. None of the works, however, which have come down to us under this designation can lay any just claim to being considered as the original treatises on their several subjects; but they evidently represent a more or less advanced stage of scientific development. Though a few of them are composed in metrical form—especially in the ordinary epic couplet, the *anushṭubh śloka*, consisting of two lines of sixteen syllables, or of two octosyllabic pâdas, each—the majority of them belong to a class of writings called *sûtra*, *i. e.*, "string," consisting as they do of strings of rules in the shape of tersely expressed aphorisms, intended to be committed to memory. The Sûtras form a connecting link between the Vedic and the classical periods of literature. But, although these treatises, so far as they deal with Vedic subjects, are included by the native authorities among the Vedic writings, and in point of language may, generally speaking, be considered as the latest products of the Vedic age, they have no share in the sacred title of *śruti* or revelation. They are of human, not of divine, origin. And yet, as the production of men of the highest standing, and profoundly versed in Vedic lore, the Sûtras are naturally regarded as works of great authority, second only to that of the revealed scriptures themselves; and their relation to the latter is expressed in the generic title of *Smṛiti*, or Tradition, usually applied to them.

Vedângas.

Sûtras.

The six branches of Vedic science, included under the term Vedânga, are as follows:

(1) *Śikshâ*, or Phonetics. The privileged position of representing this subject is assigned to a small treatise ascribed to the great grammarian Pâṇini, viz., the *Pâṇinîyâ śikshâ*, extant in two different (Ṛik and Yajus) recensions. But neither this treatise nor any other of the numerous śikshâs which have recently come to light can lay claim to any very high age. Scholars, however, usually include under this head certain works, called *Prâtiśâkhya*, *i.e.*, "belonging to a certain *śâkhâ* or recension," which deal minutely with the phonetic peculiarities of the several Saṃhitâs, and are of great importance for the textual criticism of the Vedic Saṃhitâs.

Phonetics.

(2) *Chhandas*, or Metre. Tradition makes the *Chhandaḥ-sûtra* of Piṅgala the starting-point of prosody. The Vedic metres, however, occupy but a small part of this treatise, and they are evidently dealt with in a more original manner in the Nidâna-sûtra of the Sâmaveda, and in a chapter of the Ṛik-prâtiśâkhya. For profane prosody, on the other hand, Piṅgala's treatise is rather valuable, no less than 160 metres being described by him.

Metre.

(3) *Vyâkaraṇa*, or Grammar. Pâṇini's famous grammar is said to be *the* Vedânga; but it marks the culminating point of grammatical research rather than the beginning, and besides treats chiefly of the post-Vedic language.

Grammar.

(4) *Nirukta*, or Etymology. Yâska's *Nirukta* is the traditional representative of this subject, and this important work certainly deals entirely with Vedic etymology or explanation. It consists, in the first place, of strings of words in three chapters: (1) synonymous words; (2) such as are purely or chiefly Vedic; and (3) names of deities. These lists are followed by Yâska's commentary, interspersed with numerous illustrations. Yâska, again, quotes several predecessors in the same branch of science; and it is probable that the original works on this subject consisted merely of lists of words similar to those handed down by him.

Etymology.

(5) *Jyotisha*, or Astronomy. Although astronomical calculations are frequently referred to in older works in connection with the performance of sacrifices, the metrical treatise which has come down to us in two different recensions under the title of Jyotisha, ascribed to one Lagadha, or Lagata, seems indeed to be the oldest existing systematic treatise on astronomical subjects. With the exception of some apparently spurious verses of one of the recensions, it betrays no sign of the Greek influence which shows itself in Hindu astronomical works from about the third century of our era; and its date may therefore be set down as probably not later than the early centuries after Christ.

Astronomy.

(6) *Kalpa*, or Ceremonial. Tradition does not single out any special work as the Vedânga in this branch of Vedic science; but the sacrificial practice gave

rise to a large number of systematic sûtra-manuals for the several classes of priests. The most important of these works have come down to us, and they occupy by far the most prominent place among the literary productions of the sûtra-period. The Kalpa-sûtras, or rules of ceremonial, are of two kinds: (1) the *Śrauta-sûtras*, which are based on the śruti, and teach the performance of the great sacrifices, requiring three sacrificial fires; and (2) the *Smârta-sûtras*, or rules based on the smriti or tradition. The latter class again includes two kinds of treatises: (1) the *Grihya-sûtras*, or domestic rules, treating of ordinary family rites, such as marriage, birth, name-giving, etc., connected with simple offerings in the domestic fire; and (2) the *Sâmayâchârika-* (or *Dharma-*) *sûtras*, which treat of customs and temporal duties, and are supposed to have formed the chief sources of the later law-books. Besides, the Śrauta-sûtras of the Yajurveda have usually attached to them a set of so-called *Śulva-sûtras*, *i.e.*, "rules of the cord," which treat of the measurement by means of cords, and the construction of different kinds of altars required for sacrifices. These treatises (the study of which has been successfully taken up by Prof. Thibaut of Benares) are of considerable interest as supplying important information regarding the earliest geometrical operations in India. Along with the Sûtras may be classed a large number of supplementary treatises, usually called *Pariśishṭa* (παραλιπόμενα), on various subjects connected with the sacred texts and Vedic religion generally.

Ceremonial.

After this brief characterization of the various branches of Vedic literature, we proceed to take a rapid survey of the several Vedic collections.

A. Ṛigveda.[1]—The *Ṛigveda-saṃhitâ* has come down to us in the recension of the Śâkala school. Mention is made of several other versions; and regarding one of them, that of the Bâshkalas, we have some further information, according to which it seems, however, to have differed but little from the Śâkala text. The latter consists of 1028 hymns, including eleven so-called *Vâlakhilyas*, which were probably introduced into the collection subsequently to its completion. The hymns are composed in a great variety of metres, and consist, on an average, of rather more than 10 verses each, or about 10,600 verses altogether. This body of sacred lyrics has been subdivided by ancient authorities in a twofold way, viz., either from a purely artificial point of view, into eight *aṣhṭakas* of about equal length, or, on a more natural principle, based on the origin of the hymns, and invariably adopted by European scholars, into ten books, or *maṇḍalas*, of unequal length. Tradition (not, however, always trustworthy in this respect) has handed down the names of the reputed authors, or rather inspired "seers" (*ṛishi*), of most hymns. These indications have enabled scholars to form some idea as to the probable way in which the Ṛik-saṃhitâ originated, though much still remains to be cleared up by future research.

Ṛigveda-saṃhitâ.

In the first place, maṇḍalas ii.–vii. are evidently arranged on a uniform plan. Each of them is ascribed to a different family of ṛishis, whence they are usually called the six "family books": ii., the Gṛitsamadas; iii., the Viśvâmitras or Kuśikas; iv., the Vâmadevyas; v., the Atris; vi., the Bharadvâjas; and vii., the Vasishṭhas. Further, each of these books begins with the hymns addressed to Agni, the god of fire, which are followed by those to Indra, the Jupiter Pluvius, whereupon follow those addressed to minor deities—the Viśve Devâḥ ("all-gods"), the Maruts (storm-gods), etc. Again, the hymns addressed to each deity are arranged (as Prof. Delbrück has shown) in a descending order, according to the number of verses of which they consist.

The first maṇḍala, the longest in the whole Saṃhitâ, contains 191 hymns, ascribed, with the exception of a few isolated ones, to sixteen poets of different families. Here again the hymns of each author are arranged on precisely the same principle as the "family-books." The eighth and ninth books, on the other hand, have a special character of their own. To the Sâmaveda-saṃhitâ, which, as we shall see, consists almost entirely of verses chosen from the Ṛik for chanting purposes, these two maṇḍalas have contributed a much larger proportion of verses than any of the others. Now, the hymns of the eighth book are ascribed to a number of different ṛishis, mostly belonging to the Kâṇva family. The productions of each poet are usually, though not always, grouped together, but no other principle of arrangement has yet been discovered. The chief peculiarity of this maṇḍala, however, consists in its metres. Many of the hymns are composed in the form of stanzas, called *pragâtha* (from *gâ*, "to sing"), consisting of two verses in the *bṛihatî* and *satobṛihatî* metres; whence this book is usually known under the designation of Pragâthâḥ. The other metres met with in this book are likewise such as were evidently considered peculiarly adapted for singing, viz., the *gâyatrî* (from *gâ*, "to sing") and other chiefly octosyllabic metres. It is not yet clear how to account for these peculiarities; but further research may perhaps show that either the Kâṇvas were a family of udgâtars, or chanters, or that, before the establishment of a common system of worship for the Brâhmanical community, they were accustomed to carry on their liturgical service exclusively by means of chants, instead of using the later form of mixed recitation and chant. One of the ṛishis of this family is called Pragâtha Kâṇva; possibly this surname "pragâtha" may be an old, or local synonym of udgâtar, or perhaps of the chief chanter, the so-called *Prastotar*, or precentor. The ninth maṇḍala, on the other hand, consists entirely of hymns (114) addressed to *Soma*, the deified juice of the so-called "moon-plant" (*Sarcostemma viminale*, or *Asclepias acida*), and ascribed to poets of different families. They are called *pavamânî*, "purificational," because they were to be recited by the hotar while the juice expressed from the soma plants was clarifying. The first sixty of these hymns are arranged strictly according to their length, ranging from ten down to four verses; but as to the remaining hymns no such principle of arrangement is observable, except perhaps in smaller groups of hymns. One might, therefore, feel inclined to look upon that first section as the body of soma hymns set apart, at the time of the first redaction of the Saṃhitâ, for the special purpose of being used as *pavamânyaḥ*,—the remaining hymns having been added at subsequent redactions. It would not, however, by any means follow that all, or even any, of the latter hymns were actually later productions, as they might previously have formed part of the family collections, or might have been overlooked when the hymns were first collected. Other maṇḍalas (viz., i., viii., and x.) still contain four entire hymns addressed to Soma, consisting together of 58 verses, of which only a single one (x. 25, 1) is found in the Sâmaveda-saṃhitâ, as also some 28 isolated verses to Soma, and four hymns addressed to Soma in conjunction with some other deity, which are entirely unrepresented in that collection.

The tenth maṇḍala contains the same number of hymns (191) as the first, which it nearly equals in actual length. The hymns are ascribed to many ṛishis, of various families, some of whom appear already in the preceding maṇḍalas. The traditional record is, however, less to be depended upon as regards this book, many names of gods and fictitious personages appearing in the list of its ṛishis. In the latter half of the book the hymns are clearly arranged according to the number of verses, in decreasing order,—occasional exceptions to this rule being easily adjusted by the removal of a few additional verses. A similar arrangement seems also to suggest itself in other portions of the book. This maṇḍala stands somewhat apart from the preceding books, both its language and the general character of many of its hymns betraying a comparatively modern origin. In this respect it stands about on a level with the Atharvaveda-saṃhitâ, with which it is otherwise closely connected. Of some 1350 Ṛik-verses found in the Atharvan, about 550, or rather more than 40 per cent., occur in the tenth maṇḍala. In the latter we meet with the same tendencies as in the Atharvan to metaphysical speculation and abstract conceptions of the deity on the one hand, and to superstitious practices on the other. But, although in its general appearance the tenth maṇḍala is decidedly more modern than the other books, it contains not a few hymns which are little, if at all, inferior, both in respect of age and poetic quality, to the generality of Vedic hymns.

It has become the custom, after Roth's example, to call the Ṛik-saṃhitâ (as well as the Atharvan) an historical

[1] The Ṛigveda has been edited, together with the commentary of Sâyaṇa (of the 14th century), by Max Müller, 6 vols., London, 1849–74. The same scholar has published an edition of the hymns, both in the connected (*saṃhitâ*) and the disjoined (*pada*) texts, 1873. An edition in Roman transliteration was published by Th. Anfrecht, Berlin, 1861–3 (2d ed. 1877). Part of an English translation (chiefly based on Sâyaṇa's interpretation) was brought out by the late Prof. H. H. Wilson (vols. i.–iii., 1850-1857) and continued by Prof. E. B. Cowell (vol. iv., 1866, bringing up the work to maṇḍala viii., hymn 20). We have also the first volume of a translation, with a running commentary, by M. Müller, containing the hymns of the Maruts or storm-gods. Complete German translations have been published by H. Grassmann (1876–7) and A. Ludwig (1876).

collection, as compared with the Saṃhitâs put together for purely ritualistic purposes. And indeed, though the several family collections which make up the earlier maṇḍalas may originally have served ritual ends, as the hymnals of certain clans or tribal confederacies, and although the Saṃhitâ itself, in its oldest form, may have been intended as a common prayer-book, so to speak, for the whole of the Brâhmanical community, it is certain that in the stage in which it has been finally handed down it includes a certain portion of hymn material (and even some secular poetry) which could never have been used for purposes of religious service. It may, therefore, be assumed that the Ṛik-saṃhitâ contains all of the nature of popular lyrics that was accessible to the collectors, or seemed to them worthy of being preserved. The question as to the exact period when the hymns were collected cannot be answered with any approach to accuracy. For many reasons, however, which cannot be detailed here, scholars have come to fix on the year 1000 B.C. as an approximate date for the collection of the Vedic hymns. From that time every means that human ingenuity could suggest was adopted to secure the sacred texts against the risks connected with oral transmission. But, as there is abundant evidence to show that even then not only had the text of the hymns suffered corruption, but their language had become antiquated to a considerable extent, and was only partly understood, the period during which the great mass of the hymns were composed must have lain considerably further back, and may very likely have extended over the earlier half of the second millenary, or from about 2000 to 1500 B.C.

As regards the people which raised for itself this imposing monument, the hymns exhibit it as settled in the regions watered by the mighty Sindhu (Indus), with its eastern and western tributaries. The land of the five rivers forms the central home of the Vedic people; but, while its advanced guard has already debouched upon the plains of the upper Gangâ and Yamunâ, those who bring up the rear are still found loitering far behind in the narrow glens of the Kubhâ (Cabul) and Gomatî (Gomal). Scattered over this tract of land, in hamlets and villages, the Vedic Âryas are leading chiefly the life of herdsmen and husbandmen. The numerous clans and tribes, ruled over by chiefs and kings, have still constantly to vindicate their right to the land but lately wrung from an inferior race of darker hue; just as in these latter days their kinsmen in the Far West are ever on their guard against the fierce attacks of the dispossessed red-skin. Not unfrequently, too, the light-colored Âryas rage internecine war with one another,—as when the Bharatas, with allied tribes of the Panjab, goaded on by the royal sage Viśvâmitra, invade the country of the Tṛitsu king Sudâs, to be defeated in the "ten kings' battle," through the inspired power of the priestly singer Vasishṭha. The priestly office has already become one of high social importance by the side of the political rulers, and to a large extent an hereditary profession; but it does not yet present the baneful features of an exclusive caste. The Aryan housewife shares with her husband the daily toil and joy, the privilege of worshipping the national gods, and even the triumphs of song-craft, some of the finest hymns being attributed to female seers.

The religious belief of the people consists in a system of natural symbolism, a worship of the elementary forces of nature, regarded as beings endowed with reason and power superior to those of man. In giving utterance to this simple belief, the priestly spokesman has, however, frequently worked into it his own speculative and mystic notions. Indra, the stout-hearted ruler of the cloud-region, receives by far the largest share of the devout attentions of the Vedic singer. His ever-renewed battle with the malicious demons of darkness and drought, for the recovery of the heavenly light and the rain-spending cows of the sky, forms an inexhaustible theme of spirited song. Next to him, in the affections of the people, stands Agni (ignis), the god of fire, invoked as the genial inmate of the Aryan household, and as the bearer of oblations, and mediator between gods and men. Indra and Agni are thus, as it were, the divine representatives of the king (or chief) and the priest of the Aryan community; and if, in the arrangement of the Saṃhitâ, the Brâhmanical collectors gave precedence to Agni, it was but one of many avowals of their own hierarchical pretensions. Hence also the hymns to Indra are mostly followed, in the family collections, by those addressed to the Viśve Devâḥ (the "all-gods") or to the Maruts (Mavors, Mars), the warlike storm-gods and faithful companions of Indra, as the divine impersonation of the Aryan freemen, the *viś* or clan. But, while Indra and Agni are undoubtedly the favorite figures of the Vedic pantheon, there is reason to believe that these gods had but lately supplanted another group of deities who play a less prominent part in the hymns, viz., Father Heaven (Dyaus Pitar, Ζεὺς πατήρ, Jupiter); Varuṇa (οὐρανος), the all-embracing firmament; Mitra (Zend. Mithra), the genial light of day; and Savitar (Saturnus) or Sûrya (ἡέλιος), the vivifying sun.

Of the Brâhmaṇas that were handed down in the schools of the *Bahvṛichas* (*i.e.*, "possessed of many verses"), as the followers of the Ṛigveda are called, two have come down to us, viz., those of the Aitareyins and the Kaushîtakins. The *Aitareya-brâhmaṇa*[1] and the *Kaushîtaki-* (or *Śânkhâyana-*) *brâhmaṇa* evidently have for their groundwork the same stock of traditional exegetic matter. They differ, however, considerably as regards both the arrangement of this matter and their stylistic handling of it, with the exception of the numerous legends common to both, in which the discrepancy is comparatively slight. There is also a certain amount of material peculiar to each of them. The Kaushîtaka is, upon the whole, far more concise in its style and more systematic in its arrangement—merits which would lead one to infer that it is probably the more modern work of the two. It consists of thirty chapters (*adhyâya*); while the Aitareya has forty, divided into eight books (or pentads, *pañchakâ*, of five chapters each). The last ten adhyâyas of the latter work are, however, clearly a later addition,—though they must have already formed part of it at the time of Pâṇini (*c.* 400 B.C.?), if, as seems probable, one of his grammatical sûtras, regulating the formation of the names of Brâhmaṇas, consisting of thirty and forty adhyâyas, refers to these two works. In this last portion occurs the well-known legend (also found in the Śânkhâyana-sûtra, but not in the Kaushîtaki-brâhmaṇa) of Śunaḥśepa, whom his father Ajîgarta sells and offers to slay, the recital of which formed part of the inauguration of kings. While the Aitareya deals almost exclusively with the Soma sacrifice, the Kaushîtaka, in its first six chapters, treats of the several kinds of *haviryajña*, or offerings of rice, milk, ghee, etc., whereupon follows the Soma sacrifice in this way, that chapters 7–10 contain the practical ceremonial and 11–30 the recitations (*śastra*) of the hotar. Sâyaṇa, in the introduction to his commentary on the work, ascribes the Aitareya to the sage Mahidâsa Aitareya (son of Itarâ), also mentioned elsewhere as a philosopher; and it seems likely enough that this person arranged the Brâhmaṇa and founded the school of the Aitareyins. Regarding the authorship of the sister work we have no information, except that the opinion of the sage Kaushîtaki is frequently referred to in it as authoritative, and generally in opposition to the Paingya—the Brâhmaṇa, it would seem, of a rival school, the Paingins.

Each of these two Brâhmaṇas is supplemented by a "forest-portion," or Âraṇyaka. The *Aitareyâraṇyaka*[2] is not a uniform production. It consists of five books (*âraṇyaka*), three of which, the first and the last two, are of a liturgical nature, treating of the ceremony called *mahâvrata* or great vow. The second and third books, on the other hand, are purely speculative, and are also styled the *Bahvṛicha-brâhmaṇa-upanishad*. Again, the last four chapters of the second book are usually singled out as *the Aitarcyopanishad*,[3] ascribed, like its Brâhmaṇa (and the first book), to Mahidâsa Aitareya; and the third book is also referred to as the *Saṃhitâ-upanishad*. The fourth and fifth books are doubtless of later origin, being composed in sûtra-form. Even native authorities exclude them from the sacred canon, and ascribe them to Âśvalâyana and Śaunaka respectively, of whom more further on. As regards the *Kaushîtaki-âraṇyaka*, our MS. material is not yet sufficient to enable us to determine its exact extent and arrangement. It would, however, seem that there are two different recensions of this treatise, a shorter one, consisting of nine, and a longer one of fifteen, adhyâyas. Four of these, variously placed at the beginning or end, or after the second adhyâya, constitute the highly interesting *Kaushîtaki-* (*brâhmaṇa-*) *upanishad*,[4] of which we possess two different recensions. The remaining portions of the Âraṇyaka seem to correspond, to some extent, to the ceremonial sections of the Aitareya-âraṇyaka.

Of *Kalpa-sûtras*, or manuals of sacrificial ceremonial, composed for the use of the hotar priest, two different sets

[1] Edited, with an English translation, by M. Haug, 2 vols., Bombay, 1863. An edition in Roman transliteration, with extracts from the commentary, has been published by Th. Aufrecht, Bonn, 1879.

[2] Edited, with Sâyaṇa's commentary, by Râjendralâla Mitra, in the *Bibliotheca Indica*, 1875–76. The first three books have been translated by F. Max Müller in *Sacred Books of the East*, vol. i.

[3] Edited and translated by Dr. Röer, in the *Bibl. Ind.* The last chapter of the second book, not being commented upon by Sâyaṇa, is probably a later addition.

[4] Text, commentary, and translation published by E. B. Cowell, in the *Bibl. Ind.* Also a translation by F. Max Müller in *Sacred Books of the East*, vol. i.

are in existence, the *Âśvalâyana* -and the *Śânkhâyana-sûtra.*

Sûtras of Rigveda.

Each of these works follows one of the two Brâhmaṇas of tne Ṛik as its chief anthority, viz., the Aitareya and Kaushîtaka respectively. Both consist of a *Śrauta-* aud a *Gṛihya-sûtra.* Âśvalâyana seems to have lived about the same time as Pâṇini,—his own teacher, Śaunaka, who completed the Ṛik-prâtiśâkhya, being probably intermediate between the great grammarian and Yâska, the author of the Nirukta. Śannaka himself is said to have been the author of a Śrauta-sûtra (which was, however, more of the nature of a Brâhmana) and to have destroyed it on seeing his pupil's work. A Gṛihya-sûtra is still quoted under his name by later writers. The Âśvalâyana Śrauta-sûtra[1] consists of twelve, the Gṛihya[1] of four, adhyâyas.

Regarding Śânkhâyana still less is known; bnt he, too, was doubtless a comparatively modern writer, who, like Âśvalâyana, founded a new school of ritualists. Hence the Kaushîtaki-brâhmana, adopted (and perhaps improved) by him, also goes under his name, just as the Aitareya is sometimes called Âśvalâyana-brâhmaṇa. The Śânkhâyana Śrauta-sûtra consists of eighteen adhyâyas. The last two chapters of the work are, however, a later addition,[2] while the two preceding chapters, on the contrary, present a comparatively archaic, brâhmaṇa-like appearance. The Gṛihya-sûtra[3] consists of six chapters, the last two of which are likewise later appendages. The *Sâmbavya Gṛihya-sûtra,* of which a single MS. is at present known, seems to be closely connected with the preceding work. Prof. Bühler also refers to the Ṛigveda the *Vâsishṭha-dharmasâstra,*[4] composed of mixed sûtras and couplets.

A few works remain to be noticed, bearing chiefly on the textual form and traditionary records of the Ṛik-saṃhitâ. In our remarks on the Vedângas, the Prâtiśâkhyas have already been referred to as the chief repositories of śikshâ or Vedic phonetics. Among these works the *Ṛik-prâtiśâkhya*[5] occupies the first place. The original composition of this important work is ascribed to the same *Śâkalya* from whom the vulgate recension of the (Śâkala) Saṃhitâ takes its name. He is also said to be the author of the existing *Pada-pâtha* (*i.e.*, the text-form in which each word is given unconnected with those that precede and follow it),—which report may well be credited, since the pada-text was doubtless prepared with a view to an examination, such as is presented in the Prâtiśâkhya, of the phonetic modifications undergone by words in their syntactic combination. In the Prâtiśâkhya itself, Śâkalya's father (or Śâkalya the elder) is also several times referred to as an authority on phonetics, though the younger Śâkalya is evidently regarded as having improved on his father's theories. Thus both father and son probably had a share in the formulation of the rules of pronunciation and modification of Vedic sounds. The completion or final arrangement of the Ṛik-prâtiśâkhya, in its present form, is ascribed to Śannaka, the reputed teacher of Âśvalâyana. Śaunaka, however, is merely a family name ("descendant of Śunaka"), which is given even to the ṛishi Gṛitsamada, to whom nearly the whole of the second maṇḍala of the Ṛik is attributed. How long after Śâkalya this particular Śannaka lived we do not know; but some generations at all events would seem to lie between them, considering that in the meantime the Śâkalas, owing doubtless to minor differences on phonetic points in the Saṃhitâ text, had split into several branches, to one of which, the Śaiśira (or Śaiśirîya) school, Śannaka belonged. While Śâkalya is referred to both by Yâska and Pâṇini, neither of these writers mentions Śaunaka. It seems nevertheless likely, for several reasons, that Pâṇini was acquainted with Śaunaka's work, though the point has by no means been definitely settled. The Ṛik-prâtiśâkhya is composed in mixed ślokas, or couplets of various metres, a form of composition for which Śaunaka seems to have had a special predilection. Besides the Prâtiśâkhya, and the Gṛihya-sûtra mentioned above, eight other works are ascribed to Śaunaka, viz., the *Bṛihad-devatâ,* an account, in epic ślokas, of the deities of the hymns, which supplies much valuable mythological information; the *Ṛig-vidhâna,* a treatise, likewise in epic metre, on the magic effects of Vedic hymns and verses; the *Pâda-vidhâna,* a similar treatise, apparently no longer in existence; and five different indexes or catalogues (*anukramaṇî*) of the ṛishis, metres, deities, sections (*anuvâka*), and hymns of the Ṛigveda. It is, however, doubtful whether the existing version of the Bṛihaddevatâ is the original one; and the Ṛigvidhâna would seem to be much more modern than Śaunaka's time. As regards the Anukramaṇîs, they seem all to have been composed in mixed ślokas; but, with the exception of the Anuvâkânukramaṇî, they are only known from quotations, having been superseded by the *Sarvânukrama,* or complete index, of *Kâtyâyana.* Both these indexes have been commented upon by Shadgurusishya, towards the end of the 12th century of our era.

Sâma-veda-saṃhitâ.

B. *Sâma-veda.*—The term *sâman,* of uncertain derivation, denotes a solemn tune or melody to be sung or chanted to a *ṛich* or verse. The set chants (stotra) of the Soma sacrifice are as a rule performed in triplets, either actually consisting of three different verses, or of two verses which, by the repetition of certain parts, are made, as it were, to form three. The three verses are usually sung to the same tune; but in certain cases two verses sung to the same tune had a different sâman enclosed between them. One and the same sâman or tune may thus be sung to many different verses; but, as in teaching and practicing the tunes the same verse was invariably used for a certain tune, the term "sâman," as well as the special technical names of sâmans, are not unfrequently applied to the verses themselves with which they were most commonly connected, just as one would quote the beginning of the text of an English hymn, when the tune usually sung to that hymn is meant. The Indian chant somewhat resembles the Gregorian or Plain Chant.[6] Each sâman is divided into five parts or phrases (*prastâva* or prelude, etc.), the first four of which are distributed between the several chanters, while the finale (*nidhana*) is sung in unison by all of them.

In accordance with the distinction between *ṛich* or text and *sâman* or tune, the sâman-hymnal consists of two parts, viz., the *Sâmaveda-saṃhitâ,* or collection of texts (ṛich) used for making up sâman-hymns, and the *Gâna,* or tune-books, song-books. The textual matter of the Saṃhitâ consists of somewhat under 1600 different verses, selected from the Ṛik-saṃhitâ, with the exception of some seventy-five verses, some of which have been taken from Khila hymns, whilst others, which also occur in the Atharvan or Yajurveda, as well as such not otherwise found, may perhaps have formed part of some other recension of the Ṛik. The *Sâmaveda-saṃhitâ*[7] is divided into two chief parts, the *pûrva-* (first) and the *uttara-* (second) *ârchika.* The second part contains the texts of the sâman-hymns, arranged in the order in which they are actually required for the stotras or chants of the various Soma sacrifices. The first part, on the other hand, contains the body of tune-verses, or verses used for practicing the several sâmans or tunes upon,—the tunes themselves being given in the *Grâma-geya-gâna* (*i.e.*, songs to be sung in the village), the tune-book specially belonging to the Pûrvârchika. Hence the latter includes all the first verses of those triplets of the second part which had special tunes peculiar to them, besides the texts of detached sâmans occasionally used outside the regular ceremonial, as well as such as were perhaps no longer required but had been so used at one time or other. The verses of the Pûrvârchika are arranged on much the same plan as the family-books of the Ṛik-saṃhitâ, viz., in three sections containing the verses addressed to Agni, Indra, and Soma (*pava-mâna*) respectively,—each section (consisting of one, three, and one adhyâyas respectively) being again arranged according to the metres. Hence this part is also called *Chhandas-* (metre) *ârchika.* Over and above this natural arrangement of the two ârchikas, there is a purely formal division of the texts into six and nine prapâṭhakas respectively, each of which, in the first part, consists of ten decades (daśat) of verses. We have two recensions of the Saṃhitâ, belonging to the Râṇâyanîya and Kauthuma schools, and differing but slightly from each other. Besides the six prapâṭhakas (or five adhyâyas) of the Pûrvârchika, some schools have an additional "forest" chapter, called the *Âraṇyaka-saṃhitâ,* the tunes of which—along with others apparently intended for being chanted by anchorites—are contained in the *Araṇya-gâna.* Besides the two tune-books belonging to the Pûrvârchika, there are two others, the *Ûha-gâna* ("modification-songs") and *Uhya-gâna,* which follow the order of the Uttarârchika, giving the several sâman-hymns chanted at the Soma sacrifice, with the modifications the tunes undergo

[1] Both works have been published with the commentary of Gârgya Nârâyaṇa, by native scholars, in the *Bibl. Ind.* Also the text of the Gṛihya, with a German translation by A. F. Stenzler.

[2] See A. Weber's analysis, *Ind. Studien,* ii. p. 288 *sq.* This work, with its commentaries, is only accessible in manuscript.

[3] Edited, with a German translation, by H. Oldenberg (*Ind. Stud.*, vol. xv.), who also gives an account of the Sâmbavya Gṛihya.

[4] Text with Krishnapandita's commentary, published at Benares; translation by G. Bühler in *Sacred Books,* vol. xiv.

[5] Edited, with a French translation, by A. Regnier, in the *Journal Asiatique,* 1856-8; also, with a German translation, by M. Müller, 1869.

[6] Burnell, *Ârsheyabrahmana,* p. xli.

[7] Edited and translated by J. Stevenson, 1843; a critical edition, with German translation and glossary, was published by Th. Benfey, 1848; also an edition, with the Gânas and Sâyaṇa's commentary, by Sâtyavrata Sâmasramî, in the *Bibl. Ind.*, in 5 vols.

when applied to texts other than those for which they were originally composed. The Sâman hymnal, as it has come down to us, has evidently passed through a long course of development. The practice of chanting probably goes back to very early times; but the question whether any of the tunes, as given in the Gânas, and which of them, can lay claim to an exceptionally high antiquity will perhaps never receive a satisfactory answer.

Sâma-veda-brâhmaṇas.

The title of *Brâhmaṇa* is bestowed by the Chhandogas, or followers of the Sâmaveda, on a considerable number of treatises. In accordance with the statements of some later writers, their number was usually fixed at eight; but within the last few years one new Brâhmaṇa has been recovered, while at least two others which are found quoted may yet be brought to light in India. The majority of the Sâmaveda-brâhmaṇas present, however, none of the characteristic features of other works of that class; but they are rather of the nature of sûtras and kindred treatises, with which they probably belong to the same period of literature. Moreover, the contents of these works—as might indeed be expected from the nature of the duties of the priests for whom they were intended—are of an extremely arid and technical character, though they all are doubtless of some importance, either for the textual criticism of the Saṃhitâ or on account of the legendary and other information they supply. These works are as follows:—(1) the *Tâṇḍya-mahâ-* (or *Prauḍha-*) *brâhmaṇa*,[1] or "great" Brâhmaṇa,—usually called *Panchavimśa-brâhmaṇa* from its "consisting of twenty-five" adhyâyas—which treats of the duties of the udgâtars generally, and especially of the various kinds of chants; (2) the *Shaḍvimśa*, or "twenty-sixth," being a supplement to the preceding work,—its last chapter, which also bears the title of *Adbhuta-brâhmaṇa*,[2] or "book of marvels," is rather interesting, as it treats of all manner of portents and evil influences, which it teaches how to avert by certain rites and charms; (3) the *Sâmavidhâna*,[3] analogous to the Ṛigvidhâna, descanting on the magic effects of the various sâmans; (4) the *Ârsheya-brâhmaṇa*, a mere catalogue of the technical names of the sâmans in the order of the Pûrvârchika, known in two different recensions; (5) the *Devatâ-dhyâya*, which treats of the deities of the sâmans; (6) the *Chhândogya-brâhmaṇa*, the last eight adhyâyas (3–10) of which constitute the important Chhândogyopanishad;[4] (7) the *Saṃhitopanishad-brâhmaṇa*, treating of various subjects connected with chants; (8) the *Vaṃśa-brâhmaṇa*, a mere list of the Sâmaveda teachers. To these works has to be added the *Jaiminîya-* or *Talavakâra-brâhmaṇa*, discovered by the late Dr. A. Burnell, but as yet only known by a few extracts. From Prof. Whitney's account of it,[5] the work stands much on a level with the Brâhmaṇas of the Ṛik and Yajurveda. A portion of it is the well-known *Kena-* (or *Talavakâra-*) *upanishad*, on the nature of Brahman, as the supreme of deities.

Sâmaveda sûtras.

If the Sâmaveda has thus its ample share of Brâhmaṇa-literature, though in part of a somewhat questionable character, it is not less richly supplied with sûtra-treatises, some of which probably belong to the oldest works of that class. There are three Śrauta-sûtras, which attach themselves more or less closely to the Panchavimśa-brâhmaṇa: Maśaka's *Ârsheya-kalpa*, which gives the beginnings of the sâmans in their sacrificial order, thus supplementing the Ârsheya-brâhmaṇa, which enumerates their technical names; and the Śrauta-sûtras of *Lâṭyâyana*[6] and *Drâhyâyaṇa*, of the Kauthuma and Râṇâyanîya schools respectively, which differ but little from each other, and form complete manuals of the duties of the udgâtars. Another sûtra, of an exegetic character, the *Anupada-sûtra*, likewise follows the Panchavimśa, the difficult passages of which it explains. Besides these, there are a considerable number of sûtras and kindred technical treatises bearing on the prosody and phonetics of the sâma-texts. The more important of them are—the *Ṛiktantra*, apparently intended to serve as a Prâtiśâkhya of the Sâmaveda; the *Nidâna-sûtra*,[7] a treatise on prosody; the *Pushpa-* or *Phulla-sûtra*, ascribed either to Gobhila or to Vararuchi, and treating of the phonetic modifications of the ṛich in the sâmans; and the *Sâmatantra*, a treatise on chants, of a very technical nature. Further, two *Gṛihya-sûtras*, belonging to the Sâmaveda, are hitherto known, viz., the *Drâhyâyaṇa-gṛihya*, ascribed to Khâdira, and that of Gobhila[8] (who is also said to have composed a śrauta-sûtra), with a supplement, entitled *Karmapradîpa*, by Kâtyâyana. To the Sâmaveda seems further to belong the *Gautama-dharma-śâstra*,[9] composed in sûtras, and apparently the oldest existing compendium of Hindu law.

Saṃhitâs of Black Yajur-veda.

C. *Yajur-veda.*—This, the sacrificial Veda of the Adhvaryu priests, divides itself into an older and younger branch, or, as they are usually called, the Black (*kṛishṇa*) and the White (*śukla*) Yajurveda. Tradition ascribes the foundation of the Yajurveda to the sage Vaiśampâyana. Of his disciples three are specially named, viz., Kaṭha, Kalâpin, and Yâska Paingi, the last of whom again is stated to have communicated the sacrificial science to Tittiri. How far this genealogy of teachers may be authentic cannot now be determined; but certain it is that in accordance therewith we have three old collections of Yajus-texts, viz., the *Kâṭhaka*, the *Kâlâpaka* or *Maitrâyaṇî Saṃhitâ*,[10] and the *Taittirîya-saṃhitâ*.[11] The Kâṭhaka and Kâlâpaka are frequently mentioned together; and the author of the "great commentary" on Pâṇini once remarks that these works were taught in every village. The Kaṭhas and Kâlâpas are often referred to under the collective name of Charakas, which apparently means "wayfarers" or itinerant scholars; but according to a later writer (Hemachandra) Charaka is no other than Vaiśampâyana himself, after whom his followers would have been thus called. From the Kaṭhas proper two schools seem early to have branched off, the Prâchya- (eastern) and Kapishṭhala-Kaṭhas, the text-recension of the latter of whom has recently been discovered in the *Kapishṭhala-kaṭha-saṃhitâ*. The Kâlâpas also soon became subdivided into numerous different schools. Thus from one of Kalâpin's immediate disciples, Haridru, the Hâridravîyas took their origin, whose text-recension, the *Hâridravika*, is quoted together with the Kâṭhaka as early as in Yâska's Nirukta; but we do not know whether it differed much from the original Kâlâpa texts. As regards the Taittirîya-saṃhitâ, that collection, too, in course of time gave rise to a number of different schools, the text handed down being that of the Âpastambas; while the contents of another recension, that of the Âtreyas, are known from their Anukramaṇî, which has been preserved.

The four collections of old Yajus texts, so far known to us, while differing more or less considerably in arrangement and verbal points, have the main mass of their textual matter in common. This common matter consists of both sacrificial prayers (yajus) in verse and prose and exegetic or illustrative prose portions (brâhmaṇa). A prominent feature of the old Yajus texts, as compared with the other Vedas, is the constant intermixture of textual and exegetic portions. The Charakas and Taittirîyas thus do not recognize the distinction between Saṃhitâ and Brâhmaṇa in the sense of two separate collections of texts, but they have only a Saṃhitâ, or collection, which includes likewise the exegetic or Brâhmaṇa portions. The Taittirîyas seem at last to have been impressed with their want of a separate Brâhmaṇa and to have set about supplying the deficiency in rather an awkward fashion: instead of separating from each other the textual and exegetic portions of their Saṃhitâ, they merely added to the latter a supplement (in three books), which shows the same mixed condition, and applied to it the title of *Taittirîya-brâhmaṇa*.[12] But, though the main body of this work is manifestly of a supplementary nature, a portion of it may perhaps be old, and may once have formed part of the Saṃhitâ, considering that the latter consists of seven aṣṭakas, instead of eight, as this term requires, and that certain essential parts of the ceremonial handled in the Brâhmaṇa are entirely wanting in the Saṃhitâ. Attached to this work is the *Taittirîya-âraṇyaka*,[4] in ten books, the first six of which are of a ritualistic nature, while of the remaining books the first three (7–9) form the *Taittirîyopanishad* (consisting of three parts, viz., the Śikshâvallî or Saṃhitopanishad, and the Ânandavallî and Bhṛiguvallî, also called together the Vârunîupanishad), and the last book forms the Nârâyaṇîya- (or Yâjñikî-) upanishad.

The *Maitrâyaṇî Saṃhitâ*, the identity of which with the original Kâlâpaka has been proved pretty conclusively by Dr. L. v. Schröder, who attributes the change of name of

[1] Edited with Sâyaṇa's commentary, by Anandachandra Vedântavâgîsa, in the *Bibl. Ind.*, 1870–74.
[2] A. Weber, "Omina et Portenta," *Abhandlungen* of Berlin Royal Academy of Sciences, 1858.
[3] The works enumerated under 3, 4, 5, 7, 8 have been edited by A. Burnell; 8 also previously by A. Weber, *Ind. St.*, iv.
[4] Edited and translated by Dr. Röer, *Bibl. Ind.*; also translated by M. Müller, *Sacred Books of the East*, i.
[5] *Proceedings of Am. Or. Soc.*, May, 1883.
[6] Edited with Agnisvâmin's commentary, and the v. ll. of the Drâhyâyaṇa-sûtra, by Anandachandra Vedântavâgîsa, *Bibl. Ind.*, 1872.
[7] Two chapters published by A. Weber, *Ind. St.* viii.
[8] Edited with a commentary, by Chandrakânta Tarkâlankâra, *Bibl. Ind.*
[9] Edited by A. F. Stenzler; translated by G. Bühler, *Sacred Books*, vol. ii.
[10] In proeess of publication by L. v. Schroeder,
[11] Partly published, with Sâyaṇa's commentary, by E. Röer, E. B. Cowell, etc., in *Bibl. Ind.*
[12] Edited with Sâyaṇa's commentary, by Râjendralâla Mitra, *Bibl. Ind.*

the Kâlâpa-Maitrâyaṇîyas to Buddhist influences, consists of four books, attached to which is the *Maitri-* (or *Maitrâyaṇîa=*) *upanishad.*[1] The *Kâṭhaka*, on the other hand, consists of five parts, the last two of which, however, are perhaps later additions, contaiuiug merely the prayers of the hotar priest, and those used at the horse-sacrifice. There is, moreover, the beautiful *Kaṭha-* (or *Kâṭhaka-*) *upanishad,*[2] which is also ascribed to the Atharvaveda, and iu which Dr. Röer would detect allusious to the Sâukhya philosophy, and even to Buddhist doctrines.

Saṃhitâ of White Yajurveda.

The defective arrangement of the Yajus texts was at last remedied by a different school of Adhvaryus, the Vâjasaneyius. The reputed originator of this school and its text-recension is Yâjñavalkya Vâjasaueya (son of Vâjasani). The result of the re-arrangemeut of the texts was a collection of sacrificial mautras, thc *Vâjasaneyi-saṃhitâ*, and a Brâhmaṇa, the *Śatapatha*. On account of the greater lucidity of this arraugement, the Vâjasaneyins called their texts the White (or clear) Yajurveda,—the name of Black (or obscure) Yajus being for opposite reasons applied to the Charaka texts. Both the Saṃhitâ and Brâhmaṇa of the Vâjasaneyins have come down to us in two different recensions, viz., those of the *Mâdhyandina* aud *Kâṇva* schools; aud we fiud besides a cousiderable number of quotations from a Vâjasaneyaka, from which we cannot doubt that there must have been at least oue other recension of the Śatapatha-brâhmaṇa. The differeuce betweeu the two extant recensious is, on the whole, but slight as regards the subject-matter; but in point of diction it is quitc sufficient to make a comparisou especially interesting from a philological point of view. Which of the two versious may be the more original canuot as yet be deterniiued; but the phouetic and grammatical differences will probably have to be accouuted for by a geographical separatiou of the two schools rather than by a difference of age. In several poiuts of difference the Kâṇva recension agrees with the practice of the Ṛik-saṃhitâ, and there probably was some connection between the Yajus school of Kâṇvas and the famous family of ṛishis of that name to which the eighth maṇḍala of the Ṛik is attributed.

The *Vâjasaneyi-saṃhitâ*[3] consists of forty adhyâyas, the first eighteen of which contain the formulas of the ordinary sacrifices. The last fifteen adhyâyas are doubtless a later addition,—as may also be the case as regards the preceding seveu chapters. The last adhyâya is commonly known under the title of Vâjasaneyi-saṃhitâ- (or Iśâvâsya-) upanishad.[4] Its object seems to bc to point out the fruitlessness of mere works, and to insist on the necessity of man's acquiring a knowledge of the supreme spirit. The sacrificial texts of the Adhvaryus consist, in about equal parts, of verses (ṛich) and prose formulas (yajus). The majority of the former occur likewise in the Ṛik-saṃhitâ, from which they were doubtless extracted. Not unfrequently, however, they show considerable discrepancies of reading, which may be explained partly from a difference of recension and partly as the result of the adaptation of these verses to their special sacrificial purpose. As regards the prose formulas, though only a few of them are actually referred to in the Ṛik, it is quite possible that many of them may be of high antiquity.

Brâhmaṇa of White Yajurveda.

The *Satapatha-brâhmaṇa*,[5] or Brâhmaṇa of a hundred paths, derives its name from the fact of its consisting of 100 lectures (adhyâya), which are divided by the Mâdhyandiuas into fourteen, by the Kâṇvas into seventeen books (kâṇḍa). The first nine books of the former, corresponding to the first eleven of the Kâṇvas, and consisting of sixty adhyâyas, form a kind of runniug commeutary on the first eighteeu books of the Vâj.-Saṃhitâ; and it has been plausibly suggested by Prof. Weber that this portion of the Brâhmaṇa may bc rcferred to iu the Mahâbhâshya on Pâṇ. iv. 2, 60, where a Śatapatha aud a Shashṭi-patha (*i.e.*, "consisting of 60 paths") are mentioned together as objects of study, aud that cousequently it may at one time have formed an independent work. This view is also supported by the circumstance that of the remaining five books (10–14) of the Mâdhyandinas the third is called the middle one (madhyama); while the Kâṇvas apply the same epithet to the middlemost of the five books (12–16) preceding their last one. This last book would thus seem to be treated by them as a second supplement, and not without reason, as it is of the Upanishad order aud bears the special title of *Bṛihad-* (great) *âraṇyaka.*[6] Except in books 6–10 (M.), which treat of the construction of fire-altars, and recognize the sage Śâṇḍilya as their chief authority, Yâjñavalkya's opiniou is frequently referred to in the Śatapatha as authoritative. This is especially the case iu the later books, part of the Bṛihadâraṇyaka beiug even called Yâjñavalkîya-kâṇḍa. As regards the age of the Śatapatha, the probability is that the maiu body of the work is cousiderably older thau the time of Pâṇiui, but that some of its latter parts were considered by Pâṇiui's critic Kâtyâyana to be of about the same age as, or not much older than, Pâṇini. Eveu those portions had probably been loug iu existeuce before they obtained recognition as part of the canon of the White Yajus.

The contemptuous manner in which the doctrines of the Charaka-adhvaryus are repeatedly animadverted upon in the Śatapatha betrays not a little of the *odium theologicum* on the part of the divines of the Vâjasaneyins towards their brethren of the older schools. Nor was their animosity confined to mere literary warfare, but they seem to have striven by every meaus to gaiu asceudency over their rivals. The consolidation of the Brâhmauical hierarchy and the institutiou of a common system of ritual worship, which called forth the liturgical Vedic collectious, were doubtless consummated in the so-called Madhya-deśa, or "middle country," lying betweeu the Sarasvatî and the confluence of the Yamunâ and Gangâ; and more especially in its western part, the Kuru-kshetra, or land of the Kurus, with the adjoining territory of the Pauchâlas, between the Yamunâ and Gangâ. From thence the original schools of Vaidik ritualism gradually extended their sphere over the adjacent parts. The Charakas seem for a long time to have held sway in the western and northwestern regions; while the Taittirîyas in course of time spread over the whole of the peninsula south of the Narmadâ (Nerbudda), where their ritual has remained preëminently the object of study till comparatively recent times. The Vâjasaneyins, on the other hand, haviug first gained a footing iu the lands on the lower Ganges, chiefly, it would seem, through the patronage of King Janaka of Videha, thence gradually worked their way westwards, and eventually succeeded in superseding thc older schools north of the Vindhya, with the exception of somc isolated places where even now families of Brâhmans are met with which profess to follow the old Saṃhitâs.

Sûtras of Yajurveda.

In *Kalpa-sûtras* the Black Yajurveda is particularly rich; but, owing to the circumstances just indicated, they are almost entirely confined to the Taittirîya schools. The ouly Śrauta-sûtra of a Charaka school which has hitherto been recovered is that of the Mânavas, a subdivision of the Maitrâyaṇîyas. The *Mânava-śrauta-sûtra*[7] seems to consist of eleven books, the first nine of which treat of the sacrificial ritual, while the tenth coutains the Śulva-sûtra; and the eleventh is made up of a number of supplements (*pariśishṭa*). The *Mânava-gṛihya-sûtra* is likewise in existence; but so far nothing is known, save oue or two quotations, of a *Mânava-dharma-sûtra*, the discovery of which ought to solve some important questions regarding the development of Iudian law. Of sûtra-works belonging to the Kaṭhas, a single treatise, the *Kâṭhaka-gṛihya-sûtra*, is known; while Dr. Jolly considers the *Vishṇu-smṛiti*,[8] a compendium of law, composed in mixed sûtras and ślokas, to bc nothiug but a Vaishṇava recast of the Kâṭhaka-dharma-sûtra, which seems no longer to exist. As regards the Taittirîyas, the Kalpa-sûtra most widely accepted among them was that of Âpastamba, to whose school, as we have seen, was also due our existing recension of the Taittirîya-saṃhitâ. The *Âpastamba-kalpa-sûtra* cousists of thirty *praśna* (questions) the first twenty-five of these constitute the Śrauta-sûtra;[9] 26 and 27 the Gṛihya-sûtra; 28 aud 29 thc Dharma-sûtra;[10] aud the last the Śulva-sûtra. Prof. Bühler has tried to fix the date of this work somewhcre between the 5th and 3d centuries B. C.; but it can hardly yet be considered as definitely settled. Considerably more ancient than this work are the *Baudhâ-yana-kalpa-sûtra*,[11] which consists of the

[1] Text and translation, published by E. B. Cowell, *Bibl. Ind.*

[2] Text, commentary, and translation published by E. Röer, *Bibl. Ind.*

[3] Edited in the Mâdhyandina recension, with the commentary of Mahîdhara, and the v. ll. of the Kâṇva text by A. Weber, 1849.

[4] Translation by E. Röer, *Bibl. Ind.*; by F. M. Müller, *Sacred Books of the East*, I.

[5] Edited by A. Weber, who also translated the first chapter into German. In *Sacred Books of the East*, a translation by J. Eggeling, is being published,—2 vols., contaiuing the first four books, having appeared.

[6] The text with Śankara's commentary, and an English translation, published by E. Röer, *Bibl. Ind.*

[7] See P. v. Bradke, *Z. D. M. G.*, vol. xxxvi. A MS. of a portion of the Śrauta-sûtra, with the commentary of the famous Mîmâmsist Kumârila, has been photo-lithographed by the India Office, under Goldstücker's supervision.

[8] Edited and translated by J. Jolly.

[9] In course of publication, by R. Garbe, in *Bibl. Ind.*

[10] G. Bühler has published the text with extracts from Haradatta's commentary, also a translation in *Sacred Books of the East.*

[11] The Śulva-sûtra has been published, with the commentary of Kapardisvâmin, and a translation by G. Thibaut, in the *Benares Pandit*, 1875. The Dharma-sûtra has been translated by G. Bühler, *Sacred Books*, xiv.

same principal divisions, and the *Bhâradvâja-sûtra*, of which, however, only a few portions have as yet been discovered. The *Hiraṇyakeśi-sûtra*, which is more modern than that of Âpastamba, from which it differs but little, is likewise fragmentary; and several other Kalpa-sûtras, especially that of Langâkshi, are found quoted. The recognized compendium of the White Yajus ritual is the *Śrauta-sûtra* of Kâtyâyana,[1] in twenty-six adhyâyas. This work is supplemented by a large number of secondary treatises, likewise attributed to Kâtyâyana, among which may be mentioned the *Charaṇa-vyûha*,[2] a statistical account of the Vedic schools, which unfortunately has come down to us in a very unsatisfactory state of preservation. A manual of domestic rites, closely connected with Kâtyâyana's work, is the *Kâtîya-gṛihya-sûtra*,[3] ascribed to Pâraskara. To Kâtyâyana we further owe the *Vâjasaneyi-prâtiśâkhya*,[4] and a catalogue (*anukramaṇî*) of the White Yajus texts. As regards the former work, it is still doubtful whether (with Weber) we have to consider it as older than Pâṇini, or whether (with Goldstücker and M. Müller) we are to identify its author with Pâṇini's critic. The only existing Prâtiśâkhya[5] of the Black Yajus belongs to the Taittirîyas. Its author is unknown, and it confines itself entirely to the Taittirîya-saṃhitâ, to the exclusion of the Brâhmaṇa and Âraṇyaka.

D. *Atharva-veda.*—The Atharvan was the latest of Vedic collections to be recognized as part of the sacred canon. That it is also the youngest Veda is proved by its language, which, both from a lexical and a grammatical point of view, marks an intermediate stage between the main body of the Ṛik and the Brâhmaṇa period. It is not less manifest from the spirit of its contents, which shows that the child-like trust of the early singer in the willingness of the divine agents to comply with the earnest request of their pious worshipper had passed away, and in its place had sprung up a superstitious fear of a host of malevolent powers, whose baleful wrath had to be deprecated or turned aside by incantations and magic contrivances. How far some lower form of worship, practiced by the conquered race, may have helped to bring about this change of religious belief it would be idle to inquire; but it is far from improbable that the hymns of the Ṛik reflect chiefly the religious notions of the more intelligent and educated minority of the community, and that superstitious practices like those disclosed by the greater part of the Atharvan and a portion of the tenth book of the Ṛik had long obtained among the people, and became the more prevalent the more the spiritual leaders of the people gave themselves up to theosophic and metaphysical speculations. Hence also verses of the Atharvaveda are not unfrequently used in domestic (gṛihya) rites, but very seldom in the Śrauta ceremonial. But, even if these or such like spells and incantations had long been in popular use, there can be no doubt that by the time they were collected they must have adapted themselves to the modifications which the vernacular language itself had undergone in the mouths of the people.

Atharva-veda-saṃhitâ.

This body of spells and hymns is traditionally connected with two old mythic priestly families, the Angiras and Atharvans, their names, in the plural, serving either singly or combined (Atharvângirasas) as the oldest appellation of the collection. Instead of the Atharvans, another mythic family, the Bhṛigus, are similarly connected with the Angiras (Bhṛigvangirasas) as the depositaries of this mystic science. The current text of the *Atharva-saṃhitâ*[6]—apparently the recension of the Śaunaka school—consists of some 750 different pieces, about five-sixths of which is in various metres, the remaining portion being in prose. The whole mass is divided into twenty books. The principle of distribution is for the most part a merely formal one, in books i.–xiii. pieces of the same or about the same number of verses being placed together in the same book. The next five books, xiv.–xviii., have each its own special subject: xiv. treats of marriage and sexual union; xv., in prose, of the Vrâtya, or religious vagrant; xvi. consists of prose formulas of conjuration; xvii. of a lengthy mystic hymn; and xviii. contains all that relates to death and funeral rites. Of the last two books no account is taken in the Atharva-prâtiśâkhya, and they indeed stand clearly in the relation of supplements to the original collection. The eighteenth book evidently was the result of a subsequent gleaning of pieces similar to those of the earlier books, which had probably escaped the collectors' attention; while the last book, consisting almost entirely of hymns to Indra, taken from the Ṛik-saṃhitâ, is nothing more than a liturgical manual of the recitations and chants required at the Soma sacrifice.

The Atharvan has come down to us in a much less satisfactory state of preservation than any of the other Saṃhitâs, and its interpretation, which offers considerable difficulties on account of numerous popular and out-of-the-way expressions, has so far received comparatively little aid from native sources. A commentary by the famous Vedic exegete Sâyaṇa, which has lately come to light in India, may, however, be expected to throw light on some obscure passages. Even more important is the discovery, some years ago, through the exertions of Sir William Muir, of an entirely different recension of the Atharva-saṃhitâ, preserved in Kashmir. This new recension,[7] supposed to be that of the Paippalâda school, consists likewise of twenty books (kâṇḍa), but both in textual matter and in its arrangement it differs very much from the current text. A considerable portion of the latter, including unfortunately the whole of the eighteenth book, is wanting; while the hymns of the nineteenth book are for the most part found also in this text, though not as a separate book, but scattered over the whole collection. Possibly, therefore, this recension may have formed one of the sources whence the nineteenth book was compiled. The twentieth book is wanting, with the exception of a few of the verses not taken from the Ṛik. As a set-off to these shortcomings the new version offers, however, a good deal of fresh matter, amounting to about one-sixth of the whole. From the Mahâbhâshya and other works quoting as the beginning of the Atharva-saṃhitâ a verse that coincides with the first verse of the sixth hymn of the current text, it has long been known that at least one other recension must have existed; but owing to the defective state of the Kashmir MS. it cannot be determined whether the new recension (as seems likely) corresponds to the one referred to in those works.

The only Brâhmaṇa of the Atharvan, the *Gopatha-brâhmaṇa*,[8] is probably one of the most modern works of its class. It consists of two parts, the first of which contains cosmogonic speculations, interspersed with legends, apparently taken from other Brâhmaṇas, and general instructions on religious duties and observances; while the second part treats, in a very desultory manner, of various points of the sacrificial ceremonial.

Atharva-veda-brâhmaṇa.

The Kalpa-sûtras belonging to this Veda comprise both a manual of śrauta rites, the *Vaitâna-sûtra*,[9] and a manual of domestic rites, the *Kauśika-sûtra*.[10] The latter treatise is not only the more interesting of the two, but also the more ancient, being actually quoted in the other. The teacher Kauśika is repeatedly referred to in the work on points of ceremonial doctrine. Connected with this Sûtra are upwards of seventy *Pariśishṭas*, or supplementary treatises, mostly in metrical form, on various subjects bearing on the performance of gṛihya rites. The last sûtra-work to be noticed in connection with this Veda is the *Śaunakîyâ Chaturâdhyâyikâ*,[11] being a Prâtiśâkhya of the Atharva-saṃhitâ, so called from its consisting of four lectures (adhyâya). Although Śaunaka can hardly be credited with being the actual author of the work, considering that his opinion is rejected in the only rule where his name appears, there is no reason to doubt that it chiefly embodies the phonetic theories of that teacher, which were afterwards perfected by members of his school. Whether this Śaunaka is identical with the writer of that name to whom the final redaction of the Śâkala-prâtiśâkhya of the Ṛik is ascribed is not known; but it is worthy of note that on at least two points where Śâkalya is quoted by Pâṇini, the Chaturâdhyâyikâ seems to be referred to rather than the Ṛik-prâtiśâkhya. Śaunaka is quoted once in the Vâjasaneyi-prâtiśâkhya; and it is possible that Kâtyâyana had the Chaturâdhyâyikâ in view, though his reference does not quite tally with the respective rule of that work.

Atharva-veda-sûtras.

[1] Edited by A. Weber.
[2] Weber, *Ind. Stud.*, iii.
[3] Text and German translation by A. F. Stenzler.
[4] Edited, with Uvata's commentary, and a German translation, by A. Weber, *Ind. Stud.*, iv.
[5] The work has been published by W. D. Whitney, with a translation and a commentary by an unknown author, called Tribhâshyaratna, *i.e.*, "jewel of the three commentaries," it being founded on three older commentaries by Vararuchi (? Kâtyâyana), Mâhisheya, and Atreya.
[6] Edited by Profs. Roth and Whitney, 1856. The second vol., which was to contain the *Variæ Lectiones*, remains still unpublished. Prof. Whitney, however, has lately brought out an Index Verborum to the work. The first three books have been translated into German by Prof. Weber, *Ind. Stud.*, vols. iv., xiii., xvii.
[7] It is in the hands of Prof. R. v. Roth, who has given an account of it in his academic dissertation, "Der Atharvaveda in Kaschmir," 1875.
[8] Edited, in the *Bibl. Ind.*, by Râjendralâla Mitra.
[9] Text and a German translation published by R. Garbe.
[10] This difficult treatise is about to be published by Prof. Bloomfield. Two sections of it have been printed and translated by A. Weber "Omina et Portenta," 1859.
[11] Edited and translated by W. D. Whitney.

Upanishads.

Another class of writings already alluded to as traditionally connected with the Atharvaveda are the numerous *Upanishads*[1] which do not specially attach themselves to one or other of the Saṃhitâs or Brâhmaṇas of the other Vedas. The Âtharvaṇa-upanishads, mostly composed in ślokas, may be roughly divided into two classes, viz., those of a purely speculative or general pantheistic character, treating chiefly of the nature of the supreme spirit, and the means of attaining to union therewith, and those of a sectarian tendency. Of the former category, a limited number—such as the Praśna, Muṇḍaka, and Mâṇḍûkya-upanishads—have probably to be assigned to the later period of Vedic literature; whilst the others presuppose more or less distinctly the existence of some fully developed system of philosophy, especially the Vedânta or the Yoga. The sectarian Upanishads, on the other hand—identifying the supreme spirit either with one of the forms of Vishṇu (such as the Nârâyaṇa, Nṛisiṃhatâpanîya, Râmatâpanîya, Gopâla-tâpanîya), or with Śiva (*e.g.* the Rudropanishad), or with some other deity—belong to post-Vedic times.

II. The Classical Period.

The classical literature of India is almost entirely a product of artificial growth in the sense that its vehicle was not the language of the general body of the people, but of a small and educated class. It would scarcely be possible, even approximately, to fix the time when the literary idiom ceased to be understood by the common people. We only know that in the 3d century B.C. there existed several dialects in different parts of northern India which differed considerably from the Sanskrit; and Buddhist tradition, moreover, tells us that Gautama Śâkyamuni himself, in the 6th century B.C., made use of the local dialect of Magadha (Behar) for preaching his new doctrine. Not unlikely, indeed, popular dialects, differing perhaps but slightly from one another, may have existed as early as the time of the Vedic hymns, when the Indo-Aryans, divided into clans and tribes, occupied the Land of the Seven Rivers; but such dialects must, at any rate, have sprung up after the extension of the Aryan sway and language over the whole breadth of northern India. Such, however, has been the case in the history of all nations; and there is no reason why, even with the existence of local dialects, the literary language should not have kept in touch with the people in India, as elsewhere, but for the fact that from a certain time that language remained altogether stationary, allowing the vernacular dialects more and more to diverge from it. Although linguistic research had been successfully carried on in India for centuries, the actual grammatical fixation of Sanskrit seems to have taken place about contemporaneously with the first spread of Buddhism; and indeed that popular religious movement undoubtedly exercised a powerful influence on the linguistic development of India.

A. *Poetical Literature.*

The national epics.

1. *Epic Poems.*—The Hindus, like the Greeks, possess two great national epics, the *Râmâyaṇa* and the *Mahâbhârata*. The *Râmâyaṇa*, *i.e.*, poem "relating to Râma," is ascribed to the poet Vâlmîki; and, allowance being made for later additions here and there, the poem indeed presents the appearance of being the work of an individual genius. In its present form it consists of some 24,000 ślokas, or 48,000 lines of sixteen syllables, divided into seven books.

(I.) King Daśaratha of Kośala, reigning at Ayodhyâ (Oudh), has four sons born him by three wives, viz., Râma, Bharata, and the twins Lakshmaṇa and Śatrughna. Râma, by being able to bend an enormous bow, formerly the dreaded weapon of the god Rudra, wins for a wife Sîtâ, daughter of Janaka, king of Videha (Tirhut). (II.) On his return to Ayodhyâ he is to be appointed heir-apparent (yuva-râja, *i.e.*, juvenis rex); but Bharata's mother persuades the king to banish his eldest son for fourteen years to the wilderness, and appoint her son instead. Separation from his favorite son soon breaks the king's heart; whereupon the ministers call on Bharata to assume the reins of government. He refuses, however, and, betaking himself to Râma's retreat on the Chitrakûṭa mountain (in Bundelkhund), implores him to return; but, unable to shake Râma's resolve to complete his term of exile, he consents to take charge of the kingdom in the meantime. (III.) After a ten years' residence in the forest, Râma attracts the attention of a female demon (Râkshasî); and, infuriated by the rejection of her advances, and by the wounds inflicted on her by Lakshmaṇa, who keeps Râma company, she inspires her brother Râvaṇa, demon-king of Ceylon, with love for Sîtâ, in consequence of which the latter is carried off by him to his capital Lankâ. While she resolutely rejects the Râkshasa's addresses, Râma sets out with his brother to her rescue. (IV.) After numerous adventures they enter into an alliance with Sugrîva, king of the monkeys; and, with the assistance of the monkey-general Hanumân, and Râvaṇa's own brother Vibhîshaṇa, they prepare to assault Lankâ. (V.) The monkeys, tearing up rocks and trees, construct a passage across the straits—the so-called Adam's Bridge, still designated Râma's Bridge in India. (VI.) Having crossed over with his allies, Râma, after many hot encounters and miraculous deeds, slays the demon and captures the stronghold; whereupon he places Vibhîshaṇa on the throne of Lankâ. To allay Râma's misgivings as to any taint she might have incurred through contact with the demon, Sîtâ now undergoes an ordeal by fire; after which they return to Ayodhyâ, where, after a triumphal entry, Râma is installed. (VII.) In the last book—probably a later addition—Râma, seeing that the people are not yet satisfied of Sîtâ's purity, resolves to put her away; wherenpon, in the forest, she falls in with Vâlmîki himself, and at his hermitage gives birth to two sons. While growing up there, they are taught by the sage the use of the bow, as well as the Vedas, and the Râmâyana as far as the capture of Lankâ and the royal entry into Ayodhyâ. Ultimately Râma discovers and recognizes them by their wonderful deeds and their likeness to himself, and takes his wife and sons back with him.

The *Mahâbhârata*,[2] *i.e.*, "the great (poem or feud) of the Bhâratas," on the other hand, is not so much a uniform epic poem as a miscellaneous collection of epic poetry, consisting of a heterogeneous mass of legendary and didactic matter, worked into and round a central heroic narrative. The authorship of this work is aptly attributed to Vyâsa "the arranger," the personification of Indian diaskeuasis. Only the bare outline of the leading story can here be given.

In the royal line of Hastinâpura (the ancient Delhi)—claiming descent from the moon, and hence called the Lunar race (somavaṃśa), and counting among its ancestors King Bharata, after whom India is called Bhârata-varsha (land of the Bhâratas)—the succession lay between two brothers, when Dhṛitarâshṭra, the elder, being blind, had to make way for his brother Pâṇḍu. After a time the latter retired to the forest to pass the remainder of his life in hunting; and Dhṛitarâshṭra assumed the government, assisted by his uncle Bhîshma, the Nestor of the poem. After some years Pâṇḍu died, leaving five sons, viz., Yudhishṭhira, Bhîma and Arjuna by his chief wife Kuntî, and the twins Nakula and Sahadeva by Mâdrî. The latter having burnt herself along with her dead husband, Kuntî returned with the five princes to Hastinâpura, and was well received by the king, who offered to have his nephews brought up together with his own sons, of whom he had a hundred, Duryodhana being the eldest. From their great-grandfather Kuru both families are called *Kauravas;* but for distinction that name is more usually applied to the sons of Dhṛitarâshṭra, while their cousins, as the younger line, are named after their father, *Pâṇḍavas*. The rivalry and varying fortunes of these two houses form the main plot of the great epopee. The Pâṇḍu princes soon proved themselves greatly superior to their cousins; and Yudhishṭhira, the eldest of them all, was to be appointed heir-apparent. But, by his son's advice, the king, good-natured but weak, induced his nephews for a time to retire from the court and reside at a house where the unscrupulous Duryodhana meant to destroy them. They escaped, however, and passed some time in the forest with their mother. Here

[1] For a full list of existing translations of and essays on the Upanishads, see Introd. to Max Müller's Upanishads, *Sacred Books*, i.

[2] There are several complete editions published in India, the handiest in 4 vols., Calcutta, 1834–9. Numerous episodes from it have been printed and translated by European scholars. There is a French translation, by H. Fauche, of about one half of the work; but it must be used with caution. An English translation is being brought out at Calcutta by Pratap Chundra Roy.

Draupadî, daughter of King Drupada, won by Arjuna in open contest, became the wife of the five brothers. On that occasion they also met their cousin, Kuntî's nephew, the famous Yâdava prince Kṛishṇa of Dvârakâ, who ever afterwards remained their faithful friend and confidential adviser. Dhṛitarâshṭra now resolved to divide the kingdom between the two houses; whereupon the Pâṇḍavas built for themselves the city of Indraprasṭha (on the site of the modern Delhi). After a time of great prosperity, Yudhishṭhira, in a game of dice, lost everything to Duryodhana, when it was settled that the Pâṇḍavas should retire to the forest for twelve years, but should afterwards be restored to their kingdom if they succeeded in passing an additional year in disguise, without being recognized by any one. During their forest-life they met with many adventures, among which may be mentioned their encounter with King Jayadratha of Chedi, who had carried off Draupadî from their hermitage. After the twelfth year has expired they leave the forest, and, assuming various disguises, take service at the court of king Virâṭa of Matsya. Here all goes well for a time till the queen's brother Kîchaka, a great warrior and commander of the royal forces, falls in love with Draupadî, and is slain by Bhîma. The Kauravas, profiting by Kîchaka's death, now invade the Matsyan kingdom, when the Pâṇḍavas side with king Virâṭa, and there ensues, on the field of Kurukshetra, a series of fierce battles, ending in the annihilation of the Kauravas. Yudhishṭhira now at last becomes yuva-râja, and eventually king—Dhṛitarâshṭra having resigned and retired with his wife and Kuntî to the forest, where they soon after perish in a conflagration. Learning also the death of Kṛishṇa, Yudhishṭhira himself at last becomes tired of life and resigns his crown; and the five princes, with their faithful wife, and a dog that joins them, set out for Mount Meru, to seek admission to Indra's heaven. On the way one by one drops off, till Yudhishṭhira alone, with the dog, reaches the gate of heaven; but, the dog being refused admittance, the king declines entering without him, when the dog turns out to be no other than the god of Justice himself, having assumed that form to test Yudhishṭhira's constancy. But, finding neither his wife nor his brothers in heaven, and being told that they are in the nether world to expiate their sins, the king insists on sharing their fate, when this, too, proves a trial, and they are all reunited to enjoy perpetual bliss.

Whether this story is partly based, as Lassen suggested, on historical events,—perhaps a destructive war between the neighboring tribes of the Kurus and Panchâlas,—or whether, as Dr. A. Holtzmann thinks, its principal features go back to Indo-Germanic times, will probably never be decided. The complete work consists of upwards of 100,000 couplets,—its contents thus being nearly eight times the bulk of the *Iliad* and *Odyssey* combined. It is divided into eighteen books, and a supplement entitled Harivaṃśa, or genealogy of the god Hari (Kṛishṇa-Vishṇu). In the introduction, Vyâsa, being about to dictate the poem, is made to say (i. 81) that so far he and some of his disciples know 8800 couplets; and further on (i. 101) he is said to have composed the collection relating to the Bhâratas (bhârata-saṃhitâ), and called the *Bhâratam*, which, not including the episodes, consisted of 24,000 ślokas. Now, as a matter of fact, the portion relating to the feud of the rival houses constitutes somewhere between a fourth and a fifth of the work: and it is highly probable that this portion once formed a separate poem, called the *Bhârata*. But, whether the former statement is to be understood as implying the existence at a still earlier time, of a yet shorter version of about one-third of the present extent of the leading narrative cannot now be determined. While some of the episodes are so loosely connected with the story as to be readily severed from it, others are so closely interwoven with it that their removal would seriously injure the very texture of the work. This, however, only shows that the original poem must have undergone some kind of revision, or perhaps repeated revisions. That such has indeed taken place, at the hand of Brâhmans, for sectarian and caste purposes, cannot be doubted.

The earliest direct information regarding the existence of epic poetry in India is contained in a passage of Dion Chrysostom (*c.* 80 A.D.), according to which "even among the Indians, they say, Homer's poetry is sung, having been translated by them into their own dialect and tongue;" and "the Indians are well acquainted with the sufferings of Priam, the lamentations and wails of Andromache and Hecuba, and the prowess of Achilles and Hector." Now, although these allusions would suit either poem they seem on the whole to correspond best to certain incidents in the *Mahâbhârata*, especially as no direct mention is made of a warlike expedition to a remote island for the rescue of an abducted woman, the resemblance of which to the Trojan expedition would naturally have struck a Greek becoming acquainted with the general outline of the *Râmâyaṇa*. Whence Dion derived his information is not known; but as many leading names of the Mahâbhârata and even the name of the poem itself[1] are already mentioned in Pâṇini's grammatical rules, it is not only certain that the Bhârata legend must have been current in his time (? *c.* 400 B.C.), but most probable that it existed already in poetical form, as undoubtedly it did at the time of Patanjali, the author of the "great commentary" on Pâṇini (*c.* 150 B.C.). The great epic is also mentioned, both as *Bhârata* and *Mahâbhârata*, in the *Gṛihya-sûtra* of Âśvaláyana, whom Lassen supposes to have lived about 350 B.C. Nevertheless it must remain uncertain whether the poem was then already in the form in which we now have it, at least as far as the leading story and perhaps some of the episodes are concerned, a large portion of the episodical matter being clearly of later origin. It cannot, however, be doubted, for many reasons, that long before that time heroic song had been diligently cultivated in India at the courts of princes and among Kshatriyas, the knightly order, generally. In the *Mahâbhârata* itself the transmission of epic legend is in some way connected with the Sûtas, a social class which, in the caste-system, is defined as resulting from the union of Kshatriya men with Brâhmaṇa women, and which supplied the office of charioteers and heralds, as well as (along with the Mâgadhas) that of professional minstrels. Be this as it may, there is reason to believe that, as Hellas had her ἀοιδοί who sang the κλέα ἀνδρῶν, and Iceland her skalds who recited favorite sagas, so India had from olden times her professional bards, who delighted to sing the praise of kings and inspire the knights with warlike feelings. But if in this way a stock of heroic poetry had gradually accumulated which reflected an earlier state of society and manners, we can well understand why, after the Brâhmanical order of things had been definitely established, the priests should have deemed it desirable to subject these traditional memorials of Kshatriya chivalry and prestige to their own censorship, and adapt them to their own canons of religious and civil law. Such a revision would doubtless require considerable skill and tact; and if in the present version of the work much remains that seems contrary to the Brâhmanical code and pretensions—*e.g.*, the polyandric union of Draupadî and the Pâṇḍu princes—the reason probably is that such legendary, or it may be historical, events were too firmly rooted in the minds of the people to be tampered with; and all the clerical revisers could do was to explain them away as best they could. Thus the special point alluded to was represented as an act of duty and filial obedience, in this way, that, when Arjuna brings home his fair prize, and announces it to his mother, she, before seeing what it is, bids him share it with his brothers. Nay, it has even been suggested, with some plausibility, that the Brâhmanical editors have completely changed the traditional relations of the leading characters of the story. For, although the Pâṇḍavas and their cousin Kṛishṇa are constantly extolled as models of virtue and goodness, while the Kauravas and their friend Karṇa—a son of the sun-god, born by Kuntî before her marriage with

[1] Viz., as an adj., apparently with "war" or "poem" understood.

Pâṇḍu, and brought up secretly as the son of a Sûta—are decried as monsters of depravity, these estimates of the heroes' characters are not unfrequently belied by their actions,—especially the honest Karṇa and the brave Duryodhana contrasting not unfavorably with the wily Kṛishṇa and the cautious and somewhat effeminate Yudhishṭhira. These considerations, coupled with certain peculiarities on the part of the Kauravas, suggestive of an original connection of the latter with Buddhist institutions, have led Dr. Holtzmann to devise an ingenious theory, viz., that the traditional stock of legends was first worked up into its present shape by some Buddhist poet, and that this version, showing a decided predilection for the Kuru party, as the representatives of Buddhist principles, was afterwards revised in a contrary sense, at the time of the Brâhmanical reaction, by votaries of Vishṇu, when the Buddhist features were generally modified into Śaivite tendencies, and prominence was given to the divine nature of Kṛishṇa, as an incarnation of Vishṇu. The chief objection to this theory probably is that it would seem to make such portions as the *Bhagavad-gîtâ* ("song of the holy one")—the famous theosophic episode in which Kṛishṇa, in lofty and highly poetical language, expounds the doctrine of faith (bhakti) and claims adoration as the incarnation of the supreme spirit—even more modern than many scholars may be inclined to admit as at all necessary, considering that at the time of Patanjali's *Mahâbhâshya* the Kṛishṇa worship, as was shown by Prof. Bhandarkar, had already attained some degree of development. Of the purely legendary matter incorporated with the leading story not a little, doubtless, is at least as old as the latter itself. Some of these episodes—especially the well-known story of Nala and Damayantî, and the touching legend of Sâvitrî—form themselves little epic gems, of which any nation might be proud. There can be no doubt, however, that this great storehouse of legendary lore has received considerable additions down to comparatively recent times, and that, while its main portion is considerably older, it also contains no small amount of matter which is decidedly more modern than the *Râmâyaṇa*.

As regards the leading narrative of the *Râmâyaṇa*, while it is generally supposed that the chief object which the poet had in view was to depict the spread of Aryan civilization towards the south, Mr. T. Wheeler has tried to show that the demons of Lankâ against whom Râma's expedition is directed are intended for the Buddhists of Ceylon. Prof. Weber, moreover, from a comparison of Râma's story with cognate Buddhist legends in which the expedition to Lankâ is not even referred to, has endeavored to prove that this feature, having been added by Vâlmîki to the original legend, was probably derived by him from some general acquaintance with the Trojan cycle of legends, the composition of the poem itself being placed by the same scholar somewhere about the beginning of the Christian era. Though, in the absence of positive proof, this theory, however ably supported, can scarcely be assented to, it will hardly be possible to put the date of the work farther back than about a century before our era; while the loose connection of certain passages in which the divine character of Râma, as an avatâr of Vishṇu, is especially accentuated, raises a strong suspicion of this feature of Râma's nature having been introduced at a later time.

A remarkable feature of this poem is the great variation of its text in different parts of the country, amounting in fact to several distinct recensions. The so-called Gauḍa recension, current in Bengal, which differs most of all, has been edited with an Italian translation, by G. Gorresio; while the version prevalent in Western India, and published at Bombay, has been made the basis for a beautiful poetical translation by Mr. R. Griffith. This diversity has never been explained in a quite satisfactory way; but it was probably due to the very popularity and wide oral diffusion of the poem. Yet another version of the same story, with, however, many important variations of details, forms an episode of the *Mahâbhârata*, the relation of which to Vâlmîki's work is still a matter of uncertainty. To characterize the Indian epics in a single word: though often disfigured by grotesque fancies and wild exaggerations, they are yet noble works, abounding in passages of remarkable descriptive power, intense pathos, and high poetic grace and beauty; and, while, as works of art, they are far inferior to the Greek epics, in some respects they appeal far more strongly to the romantic mind of Europe, namely, by their loving appreciation of natural beauty, their exquisite delineation of womanly love and devotion, and their tender sentiment of mercy and forgiveness.

2. *Purâṇas and Tantras.*—The *Purâṇas* are partly legendary partly speculative histories of the universe, compiled for the purpose of promoting some special, locally prevalent form of Brâhmanical belief. They are sometimes styled a fifth Veda, and may indeed in a certain sense be looked upon as the scriptures of Brâhmanical India. The term *purâṇa*, signifying "old," applied originally to prehistoric, especially cosmogonic, legends, and then to collections of ancient traditions generally. The existing works of this class, though recognizing the Brâhmanical doctrine of the Trimûrti, or triple manifestation of the deity (in its creative, preservative, and destructive activity), are all of a sectarian tendency, being intended to establish, on quasi-historic grounds, the claims of some special god, or holy place, on the devotion of the people. For this purpose the compilers have pressed into their service a mass of extraneous didactic matter on all manner of subjects, whereby these works have become a kind of popular encyclopædias of useful knowledge. It is evident, however, from a comparatively early definition given of the typical Purâṇa, as well as from numerous coincidences of the existing works, that they are based on, or enlarged from, older works of this kind, more limited in their scope, and probably of a more decidedly tritheistic tendency of belief. Thus none of the Purâṇas, as now extant, is probably much above a thousand years old, though a considerable proportion of their materials is doubtless much older, and may perhaps in part go back to several centuries before our era. Purâṇas.

In legendary matter the Purâṇas have a good deal in common with the epics, especially the *Mahâbhârata*,—the compilers or revisers of both classes of works having evidently drawn their materials from the same fluctuating mass of popular traditions. They are almost entirely composed in epic couplets, and indeed in much the same easy flowing style as the epic poems, to which they are, however, greatly inferior in poetic value.

According to the traditional classification of these works, there are said to be eighteen (*mahâ-*, or great) *Purâṇas*, and as many *Upa-purâṇas*, or subordinate Purâṇas. The former are by some authorities divided into three groups of six, according as one or other of the three primary qualities of external existence—goodness, darkness (ignorance), and passion—is supposed to prevail in them, viz., the *Vishṇu, Nâradîya, Bhâgavata, Garuḍa, Padma, Varâha,—Matsya, Kûrma, Linga, Śiva, Skanda, Agni,—Brahmâṇḍa, Brahmavaivarta, Mârkaṇḍeya, Bhavishya, Vâmana*, and *Brahma-Purâṇas*. In accordance with the nature of the several forms of the Trimûrti, the first two groups chiefly devote themselves to the commendation of Vishṇu and Śiva respectively, whilst the third group, which would properly belong to Brahman, has been largely appropriated for the promotion of the claims of other deities, viz., Vishṇu in his sensuous form of Kṛishṇa, Devî, Gaṇeśa, and Sûrya. As Prof. Banerjea has shown in his preface to the *Mârkaṇḍeya*, this seems to have been chiefly effected by later additions and interpolations. The insufficiency of the above classification, however, appears from the fact that it omits the *Vâyu-purâṇa*, probably one of the oldest of all, though some

MSS. substitute it for one or other name of the second group. The eighteen principal Purâṇas are said to consist of together 400,000 couplets. In Northern Indiа the Vaishnava Purâṇas, especially the *Bhâgavata* and *Vishṇu*,[1] are by far the most popular. The Bhâgavata was formerly supposed to have been composed by Vopadeva, the grammarian, who lived in the 13th century. It has, however, been shown[2] that what he wrote was a synopsis of the Purâṇa, and that the latter is already quoted in a work by Ballâla Sena of Bengal, in the 11th century.

From the little we know regarding the Upa-purâṇas, their character does not seem to differ very much from that of the priucipal Purâṇas. Oue of them, the *Brahmâṇḍa-purâṇa*, contains, as an episode, the well-kuown *Adhyâlma-Râmâyaṇa*, a kind of spiritualized version of Vâlmîki's poem. Besides these two classes of works there is a large number of so-called *Sthala-purâṇaz*, or chronicles recounting the history and merits of some holy "place" or shriue, where their recitation usually forms an important part of the daily service. Of much the same nature are the numerous *Mâhâtmyas* (literally "relating to the great spirit"), which usually profess to be sections of one or other Purâṇa. Thus the *Devîmâhâtmya*, which celebrates the victories of the great goddess Durgâ over the Asuras, and is daily read at the temples of that deity, forms a section, though doubtless au interpolated one, of the Mârkaṇḍeya-purâṇa.

Tantras.

The *Tantras*, which have to be considered as a later development of the sectarian Purâṇas, are the sacred writings of the numerous *Śâktas*, or worshippers of the female energy (*śakti*) of some god, especially the wife of Śiva, in one of her many forms (Pârvatî, Devî, Kâlî, Bhavânî, Durgâ, etc.). This worship of a female representation of the divine power appears already in some of the Purâṇas; but in the Tantras it assumes quite a peculiar character, being largely intermixed with magic performances and mystic rites, partly, it would seem, of a grossly immoral nature. This class of writings does not appear to have been in existence at the time of Amarasiṁha (6th century); but they are mentioned in some of the Purâṇas. They are usually in the form of a dialogue between Śiva and his wife. Their number is very large; but they still await a critical examination at the hands of western scholars. Among the best known may be mentioned the *Rudra yâmala*, *Kulârṇava*, *Śyâmâ-rahasya*, and *Kâlikâ-tantra*.

Modern epics.

3. *Modern Epics.*—A new class of epic poems begin to make their appearance about the 5th or 6th century of our era, during a period of renewed literary activity which has been fitly called[3] the Renaissance of Indian literature. These works differ widely in character from those that had preceded them. The great national epics, composed though they were in a language different from the ordinary vernaculars, had at least been drawn from the living stream of popular traditions, and were doubtless readily understood and enjoyed by the majority of the people. The later productions, on the other hand, are of a decidedly artificial character, and must necessarily have been beyond the reach of any but the highly cultivated. They are, on the whole, singularly deficient in incident and invention, their subject matter being almost entirely derived from the old epics. Nevertheless, these works are by no means devoid of merit and interest; and a number of them display considerable descriptive power and a wealth of genuine poetic sentiment, though unfortunately often clothed in language that deprives it of half its value. The simple heroic couplet has mostly been discarded for various more or less elaborate metres; and in accordance with this change of form the diction becomes gradually more complicated,—a growing taste for unwieldy compounds, a jingling kind of alliteration, or rather agnomination, and an abuse of similes marking the increasing artificiality of these productions.

The generic appellation of such works is *kâvya*, which meaning "poem," or the work of an individual poet (*kavi*), is already applied to the *Râmâyaṇa*. Six poems of this kiud are singled out by native rhetoricians as standard works, uuder the title of *Mahâkâvya*, or great poems. Two of these are ascribed to the famous dramatist Kâlidâsa, the most promiuent figure of the Iudian Renaissance, and truly a master of the poetic art. He is said to have been oue of the uiue literary "gems" at the court of Vikramâditya, now geuerally ideutified with King Vikramâditya Harsha of Ujjayinî (Ujjaiu or Oujein), who reigned about the middle of the 6th century, aud seems to have originated the Vikramâditya era, reckoned from 56 B. C. Of the poets whose works have come down to us Kâlidâsa appears to be one of the earliest; but there can be little doubt that he was preceded in this as iu other departments of poetic composition by many lesser lights, eclipsed by the sun of his fame, and forgotteu. Of the six "great pocms" named below the first two are those attributed to Kâlidâsa. (1) The *Raghuvaṁśa*,[4] or "race of Raghu." celebrates the ancestry and deeds of Râma. The work, consisting of nineteen cantos, is manifestly incomplete; but hitherto no copy has beeu discovered of the six additional cautos which are supposed to have completed it. (2) The *Kumâra-sambhava*[5] or "the birth of (the war-god) Kumâra" (or Skanda), the son of Śiva and Pârvatî, consists of eight cantos, the last of which has ouly recently been made public, being usually omitted iu the MSS., probably on account of its amorous character renderiug it unsuitable for educational purposes, for which the works of Kâlidâsa are extensively used in India. Nine additional cantos, which were published at the same time, have been proved to be spurious. Another poem of this class, the *Nalodaya*,[6] or "rise of Nala,"—describing the restoratiou of that king, after having lost his kingdom through gambliug,—is wrongly ascribed to Kâlidâsa, being far inferior to the other works, aud of a much more artificial character. (3) The *Kirâtârjunîyá*,[7] or combat between the Pâṇḍava prince Arjuua and the god Śiva, in the guise of a Kirâta or wild mountaineer, is a poem in eighteeu cantos, by Bhâravi, probably a contemporary of Kâlidâsa, being mentioned together with him in an inscription dated 634 A.D. (4) The *Śiśupâla-badha*, or slaying of Śiśupâla, who, being a prince of Chedi, reviled Krishṇa, who had carried off his iutended wife, and was killed by him at the inauguration sacrifice of Yudhishṭhira, is a poem consistiug of twenty cantos, attributed to Mâgha,[8] whence it is also called *Mâghakâvya*. (5) The *Râvaṇa-badha*, or "slaying of Râvaṇa," more commonly called *Bhaṭṭikâvya*, to distinguish it from other poems (especially one by Pravarasena), likewise bearing the former title, was composed for the practical purpose of illustrating the less common grammatical forms and the figures of rhetoric and poetry. In its closing couplet it professes to have been written at Vallabhî, nuder Śrîdharasena, but several princes of that name being mentioned in inscriptions as having ruled there in the 6th and 7th centuries, its exact date is still uncertain. Bhaṭṭi, apparently the author's name, is usually identified with the well-known grammarian Bhartṛihari, whose death Prof. M. Müller, from a Chinese statement, fixes at 650 A.D., while others make him Bhartṛihari's son. (6) The *Naishadhîya*, or *Naishadha-charita*, the life of Nala, king of Nishadha, is ascribed to Śrî-Harsha (sou of Hîra), who is supposed to have lived in the latter part of the 12th century. A small portion of the simple and noble episode of the *Mahâbhârata* is here retold in highly elaborate aud polished stanzas, and with a degree of lasciviousness which (unless it be chiefly due to the poet's exuberauce of fancy) gives a truly appalling picture of social corruption. Another highly esteemed poem the *Râghavapâṇḍavîya*, composed by Kavirâja ("king of poets"),—whose date is uncertain, though some scholars place him later than the 10th century,—is characteristic of the trifling uses to which the poet's art was put. The well-turned stanzas are so ambiguously worded that the poem may be interpreted as relating to the leadiug story of either the *Râmâyaṇa* or the *Mahâbhârata*.

A still more modern popular development of these artifi-

[1] There are several Indian editions of these two works. The Bhâgavata has been partly printed, in an *édition de luxe*, at Paris, in 3 vols., by E. Burnouf, and a fourth by M. Hauvette-Besnault. Of the Vishnup, there is a translation by H. H. Wilson, 2d ed. enriched with valuable notes by F. Hall. Several other Purâṇas have been printed in India; the Mârkaṇḍeya and Agni Purâṇas, in the *Bibl. Ind.*, by Prof. Banerjea and Râjendralâla Mitra respectively.

[2] Râjendralâla Mitra, *Notices of Sansk. MSS.*, ii. 47.

[3] M. Müller, *India: What can it teach us?* note G.

[4] Edited, with a Latin transl., by A. F. Stenzler; also text, and commentary, by S. P. Pandit.

[5] Text and Latin transl., published by A. F. Stenzler; an English transl., by R. T. H. Griffith.

[6] Text with comm. and Latin transl., edited by F. Benary; Engl. transl., in verse, by Dr. Taylor.

[7] Editions of this and the three following poems have been published in India.

[8] Bhâo Dâji, in his paper on Kâlidâsa, calls Mâgha "a contemporary of the Bhoja of the 11th century."

cial poems are the numerous so-called *Champûs*, being compositions of mixed verse and prose. As specimens of such works may be mentioned the *Champû-bhârata* in twelve cantos, by Ananta Bhaṭṭa, and the *Champû-râmâyaṇa*, or *Bhojachampû*, in five books, by Bhojarâja (or Vidarbharâja) Paṇḍita, being popular abstracts of the two great epics.

Very similar in character to the artificial epics are the panegyrics, composed by court poets in honor of their patrons. Such productions were probably very numerous; but only two of any special interest are hitherto known, viz., the *Śrî-Harsha-charita*, composed in ornate prose, by Bâṇa, in honor of Śîlâditya Harshavardhana (*c.* 610–650 A.D.) of Kânyakubja (Kanauj), and the *Vikramânka-charita*,[1] written by the Kashmir poet Bilhaṇa, about 1085, in honor of his patron, the Châlukya king Vikramâditya of Kalyâṇa, regarding the history of whose dynasty the work supplies much valuable information. In this place may also be mentioned, as composed in accordance with the Hindu poetic canon, the *Râja-taraṅgiṇî*,[2] or chronicle of the kings of Kashmir, the only important historical work in the Sanskrit language, though even here considerable allowance has to be made for poetic license and fancy. The work was composed by the Kashmirian poet Kalhaṇa, about 1150, and was afterwards continued by three successive supplements, bringing down the history of Kashmir to the time of the emperor Akbar. Unfortunately the two existing editions were prepared from very imperfect MS. materials; but Dr. Bühler's discovery of new MSS., as well as of some of the works on which Kalhaṇa's poem is based, ought to enable the native scholar (Prof. Bhandarkar) who has undertaken a new edition to put the text in a more satisfactory condition.

Drama.

4. *The Drama.*—The early history of the Indian drama is enveloped in obscurity. The Hindus themselves ascribe the origin of dramatic representation to the sage Bharata, who is fabled to have lived in remote antiquity, and to have received this science directly from the god Brahman, by whom it was extracted from the Veda. The term *bharata*—(?) *i.e.*, one who is kept, or one who sustains (a part)—also signifies "an actor;" but it is doubtful which of the two is the earlier,—the appellative use of the word, or the notion of an old teacher of the dramatic art bearing that name. On the other hand, there still exists an extensive work, in epic verse, on rhetoric and dramaturgy, entitled *Nâṭya-śâstra*, and ascribed to Bharata. But, though this is probably the oldest theoretic work on the subject that has come down to us, it can hardly be referred to an earlier period than several centuries after the Christian era. Not improbably, however, this work, which presupposes a fully developed scenic art, had an origin similar to that of some of the metrical law-books, which are generally supposed to be popular and improved editions of older sûtra-works. We know that such treatises existed at the time of Pâṇini, as he mentions two authors of *Naṭa-sûtras*, or "rules for actors," viz., Śilâlin and Kṛiśâśva. Now the words *naṭa* and *nâṭya*—as well as *nâṭaka*, the common term for "drama"—being derived from the root *naṭ* (*nart*) "to dance," seem to point to a pantomimic or choral origin of the dramatic art. It might appear doubtful, therefore, in the absence of any clearer definition in Pâṇini's grammar, whether the "actors' rules" he mentions did not refer to mere pantomimic performances. Fortunately, however, Patanjali, in his "great commentary," speaks of the actor as singing, and of people going "to hear the actor." Nay, he even mentions two subjects, taken from the cycle of Vishṇu legends—viz., the slaying of Kaṃsa (by Kṛishṇa) and the binding of Bali (by Vishṇu)—which were represented on the stage both by mimic action and declamation. Judging from these allusions, theatrical entertainments in those days seem to have been very much on a level with our old religious spectacles or mysteries, though there may already have been some simple kinds of secular plays which Patanjali had no occasion to mention. It is not, however, till some five or six centuries later that we meet with the first real dramas, which mark at the same time the very culminating point of Indian dramatic composition. In this, as in other departments of literature, the earlier works have had to make way for later and more perfect productions; and no trace now remains of the intermediate phases of development.

Here, however, the problem presents itself as to whether the existing dramatic literature has naturally grown out of such popular religious performances as are alluded to by Patanjali, or whether some foreign influence has intervened at some time or other and given a different direction to dramatic composition. The question has been argued both for and against the probability of Greek influence; but it must still be considered as *sub judice*. There are doubtless some curious points of resemblance between the Indian drama and the Modern Attic (and Roman) comedy, viz., the prologue, the occasional occurrence of a token of recognition, and a certain correspondence of characteristic stage figures (especially the Vidûshaka, or jocose companion of the hero, presenting a certain analogy to the servus of the Roman stage, as does the Vîṭa of some plays to the Roman parasite)—for which the assumption of some acquaintance with the Greek comedy on the part of the earlier Hindu writers would afford a ready explanation. On the other hand, the differences between the Indian and Greek plays are perhaps even greater than their coincidences, which, moreover, are scarcely close enough to warrant our calling in question the originality of the Hindus in this respect. Certain, however, it is that, if the Indian poets were indebted to Greek playwrights for the first impulse in dramatic composition, in the higher sense, they have known admirably how to adapt the Hellenic muse to the national genius, and have produced a dramatic literature worthy to be ranked side by side with both the classical and our own romantic drama. It is to the latter especially that the general character of the Indian play presents a striking resemblance, much more so than to the classical drama. The Hindu dramatist has little regard for the "unities" of the classical stage, though he is hardly ever guilty of extravagance in his disregard of them. The dialogue is invariably carried on in prose, plentifully interspersed with those neatly turned lyrical stanzas in which the Indian poet delights to depict some natural scene, or some temporary physical or mental condition. The most striking feature of the Hindu play, however, is the mixed nature of its language. While the hero and leading male characters speak Sanskrit, women and inferior male characters use various Prâkrit dialects. As regards these dialectic varieties, it can hardly be doubted that at the time when they were first employed in this way they were local vernacular dialects; but in the course of the development of the scenic art they became permamently fixed for special dramatic purposes, just as the Sanskrit had, long before that time, become fixed for general literary purposes. Thus it would happen that these Prâkrit dialects, having once become stationary, soon diverged from the spoken vernaculars, until the difference between them was as great as between the Sanskrit and the Prâkrits. As regards the general character of the dramatic Prâkrits, they are somewhat more removed from the Sanskrit type than the Pâli, the language of the Buddhist canon, which again is in a rather more advanced state than the language of the Aśoka inscriptions (*c.* 250 B.C.). And, as the Buddhist sacred books were committed to writing about 80 B.C., the state of their language is attested for that period at latest; while the grammatical fixation of the scenic Prâkrits has probably to be referred to the early centuries of our era.

The existing dramatic literature is not very extensive. The number of plays of all kinds of any literary value will scarcely amount to fifty. The reason for this paucity of dramatic productions doubtless is that they appealed to the tastes of only a limited class of highly cultivated persons,

[1] Edited by G. Bühler.
[2] Published at Calcutta; also, with a French transl. by A. Troyer.

and were in consequence but seldom acted. As regards the theatrical entertainments of the common people, their standard seems never to have risen much above the level of the religious spectacles mentioned by Patanjali. Such at least is evidently the case as regards the modern Bengâlî *jâtras*—described by Wilson as exhibitions of some incidents in the youthful life of Krishṇa, maintained in extempore dialogue, interspersed with popular songs—as well as the similar *râsas* of the western provinces, and the rough and ready performances of the *bhaurs*, or professional buffoons. Of the religious drama Sanskrit literature offers but one example, viz., the famous *Gîtagovinda*,[1] composed by Jayadeva in the 12th century. It is rather a mytho-lyrical poem, which, however, in the opinion of Lassen, may be considered as a modern and refined specimen of the early form of dramatic composition. The subject of the poem is as follows: Krishṇa, while leading a cowherd's life in Vṛindâvana, is in love with Râdhâ, the milkmaid, but has been faithless to her for a while. Presently, however, he returns to her "whose image has all the while lingered in his breast," and after much earnest entreaty obtains her forgiveness. The emotions appropriate to these situations are expressed by the two lovers and a friend of Râdhâ in melodious and passionate stanzas of great poetic beauty. Like the Song of Solomon, the Gîtagovinda, moreover, is supposed by the Hindu commentators to admit of a mystic interpretation; for, "as Krishna, faithless for a time, discovers the vanity of all other loves, and returns with sorrow and longing to his own darling Râdhâ, so the human soul, after a brief and frantic attachment to objects of sense, burns to return to the God from whence it came" (Griffith).

Śûdraka.

The *Mṛichchhakaṭikâ*,[2] or "earthen toy-cart," is by tradition placed at the head of the existing dramas; and a certain clumsiness of construction seems indeed to justify this distinction. According to several stanzas in the prologue, the play was composed by a king Śûdraka, who is there stated to have, through Śiva's favor, recovered his eyesight, and, after seeing his son as king, to have died at the ripe age of a hundred years and ten days. According to the same stanzas, the piece was enacted after the king's death; but it is probable that they were added for a subsequent performance. In Bâṇa's novel *Kâdambarî* (*c.* 630 A. D.), a king Śûdraka, probably the same, is represented as having resided at Bidiśâ (Bhilsa) —some 130 miles east of Ujjayinî (Ujjain), where the scene of the play is laid. Chârudatta, a Brâhman merchant, reduced to poverty, and Vasantasenâ, an accomplished courtesau, meet and fall in love with each other. This forms the main story, which is interwoven with a political underplot, resulting in a change of dynasty. The connection between the two plots is effected by means of the king's rascally brother-in-law, who pursues Vasantasenâ with his addresses, as well as by the part of the rebellious cowherd Âryaka, who, having escaped from prison, finds shelter in the hero's house. The wicked prince, on being rejected, strangles Vasantasenâ, and accuses Châdrudatta of having murdered her; but, just as the latter is about to be executed, his lady love appears again on the scene. Meanwhile Âryaka has succeeded in deposing the king, and, having himself mounted the throne of Ujjain, he raises Vasantasenâ to the position of an honest woman, to enable her to become the wife of Châdrudatta. The play is one of longest, consisting of not less than ten acts, some of which, however, are very short. The interest of the action is, on the whole, well sustained; and, altogether, the piece presents a vivid picture of the social manners of the time.

Kâlidâsa.

In Kâlidâsa (? *c.* 550 A. D.) the dramatic art attained its highest point of perfection. From this accomplished poet we have three well-constructed plays, abounding in stanzas of exquisite tenderness and fine descriptive passages, viz., the two well-known mythopastoral dramas, *Śakuntalâ* in seven and *Vikramorvaśî*[3] in five acts, and a piece of court intrigue, distinctly inferior to the other two, entitled *Mâlavikâgnimitra*,[4] in five acts. King Agnimitra, who has two wives, falls in love with Mâlavikâ, maid to the first queen. His wives endeavor to frustrate their affection for each other, but in the end Mâlavikâ turns out to be a princess by birth, and is accepted by the queens as their sister.

In the prologue to this play, Kâlidâsa mentions Bhâsa and Saumila as his predecessors in dramatic composition. Of the former poet some six or seven stanzas have been gathered from anthologies by Prof. Aufrecht, who has also brought to light one fine stanza inscribed to Râmila and Saumila.

Harsha-deva.

Śrî Harsha-deva—whom Dr. F. Hall has proved to be identical with King Śîlâditya Harshavardhana of Kânyakubja (Kanauj), who reigned in the first half of the 7th century—has three plays attributed to him. Most likely, however, he did not write any of them himself, but they were only dedicated to him as the patron of their authors. Such at least seems to have been the case as regards the *Ratnâvalî*,[5] which was probably composed by Bâṇa. It is a graceful drama of genteel domestic manners, in four acts, of no very great originality, the author having been largely indebted to Kâlidâsa's plays. Ratnâvalî, a Ceylon princess, is sent by her father to the court of King Vatsa to become his second wife. She suffers shipwreck, but is rescued and received into Vatsa's palace as one of queen Vâsavadattâ's attendants. The king falls in love with her, and the queen tries to keep them apart from each other; but, on learning the maiden's origin, she becomes reconciled, and recognizes her as a "sister." According to H. H. Wilson, "the manners depictured are not influenced by lofty principle or profound reflection, but they are mild, affectionate, and elegant. It may be doubted whether the harems of other eastern nations, either in ancient or modern times, would afford materials for as favorable a delineation." Very similar in construction, but distinctly inferior, is the *Priyadarśikâ*, in four acts, lately published in India, having for its plot another amour of the same king. The scene of the third play, the *Nâgânanda*,[6] or "joy of the serpents" (in five acts), on the other hand, is laid in semi-divine regions. Jîmûtavâhana, a prince of the Vidyâdharas, imbued with Buddhist principles, weds Malayavatî, daughter of the king of the Sidhas, a votary of Gaurî (Śiva's wife). But, learning that Garuḍa, the mythic bird, is in the habit of consuming one snake daily, he resolves to offer himself to the bird as a victim, and finally succeeds in converting Garuḍa to the principle of ahiṃsâ, or abstension from doing injury to living beings; but he himself is about to succumb from the wounds he has received, when, through the timely intervention of the goddess Gaurî, he is restored to his former condition. The piece seems to have been intended as a compromise between Brâhmanical (Śaiva) and Buddhist doctrines, being thus in keeping with the religious views of king Harsha, who, as we know from Hwen-tsang, favored Buddhism, but was very tolerant to Brâhmans. It begins with a benedictory stanza to Buddha, and concludes with one to Gaurî. The author is generally believed to have been a Buddhist, but it is more likely that he was a Śaiva Brâhman, possibly Bâṇa himself. Nay, one might almost feel inclined to take the hero's self-sacrifice in favor of a Nâga as a travesty of Buddhist principles.

Bhavabhûti.

Bhavabhûti, surnamed Śrî-kaṇṭha, "whose throat is beauty (eloquence)," was a native of Padmapura in the Vidarbha country (the Berars), being the son of the Brâhman Nîlakaṇṭha, and his wife Jâtûkarnî. He is said to have passed his literary life at the court of Yaśovarman of Kanauj, who is supposed to have reigned in the latter part of the 7th and beginning of the 8th century. Bhavabhûti was the author of three plays, two of which, the *Mahâvîracharita*[7] ("life of the great hero") and the *Uttararâmacharita*[8] ("later life of Râma"), in seven acts each, form together a dramatized version of the story of the *Râmâyaṇa*. The third, the *Mâlatî-mâdhava*,[9] is a domestic drama in ten acts, representing the fortunes of Mâdhava and Mâlatî, the son and daughter of two ministers of neighboring kings, who from childhood have been destined for each other, but, by the resolution of the maiden's royal master to marry her to an old and ugly favorite of his, are for a while threatened with permanent separation. The action of the play is full of life, and abounds in stirring, though sometimes improbable, incidents. The poet is considered by native pandits to be not only not inferior to Kâlidâsa, but even to have surpassed him in his *Uttararâmacharita*. But, though he ranks

[1] Ed., with a Latin transl., by C. Lassen; Engl. transl. by E. Arnold.

[2] Edited by A. F. Stenzler, translated by H. H. Wilson; German by O. Böhtlingk and L. Fritze; French by P. Regnaud.

[3] Both these plays are known in different recensions in different parts of India. The Bengali recension of the *Śakuntalâ* was translated by Sir W. Jones, and into French, with the text, by Chézy, and again edited critically by R. Pischel, who has also advocated its greater antiquity. Editions and translations of the western (Devanâgarî) recension have been published by O. Böhtlingk and Mon. Williams. The *Vikramorvaśî* has been edited critically by S. P. Pandit, and the southern text by R. Pischel. It has been translated by H. H. Wilson and E. B. Cowell.

[4] Edited critically by S. P. Pandit; transl. by C. H. Tawney, and previously into German by A. Weber.

[5] Edited by Târânâtha Tarkavâchaspati, and by C. Cappeller in Böhtlingk's *Sanskrit-Chrestomathie;* translated by H. H. Wilson.

[6] Edited by Mâdhava Chandra Ghosha, and translated by P. Boyd, with a preface by E. B. Cowell.

[7] Edited by F. H. Trithen (1848), and twice at Calcutta; translated by J. Pickford.

[8] Edited at Calcutta; transl. by H. H. Wilson and C. H. Tawney.

[9] Edited by R. G. Bhandarkar, 1876; translated by H. H. Wilson.

deservedly high as a lyric poet, he is far inferior to Kâlidâsa as a dramatic artist. Whilst the latter delights in depicting the gentler feelings and tender emotions of the human heart and the peaceful scenes of rural life, the younger poet finds a peculiar attraction in the sterner and more imposing aspects of nature and the human character. Bhavabhûti's language, though polished and felicitous, is elaborate and artificial compared with that of Kâlidâsa, and his genius is sorely shackled by a slavish adherence to the arbitrary rules of dramatic theorists.

Bhaṭṭa Nârâyaṇa.

Bhaṭṭa Nârâyaṇa, surnamed Mṛigarâja or Simha, "the lion," the author of the *Veṇîsaṃhâra*[1] ("the seizing by the braid of hair"), is a poet of uncertain date. Tradition makes him one of the five Kanauj Brâhmans whom king Âdisûra of Bengal, desirous of establishing the pure Vaishṇava doctrine, invited to his court, and from whom the modern Bengâlî Brâhmans are supposed to be descended. The date of that event, however, is itself doubtful; while a modern genealogical work fixes it at 1077, Lassen refers it to the beginning of the 7th century and Grill to the latter part of the 6th. If it could be proved that the poet is identical with the Nârâyaṇa whom Bâna (*c.* 630) mentions as being his friend, the question would be settled in favor of the earlier calculations. The play, consisting of six acts, is founded on the story of the *Mahâbhârata*, and takes its title from the insult offered to Draupadî by one of the Kaurava princes, who, when she had been lost at dice by Yudhishṭhira, dragged her by the hair into the assembly. The piece is composed in a style similar to that of Bhavabhûti's plays, though less polished, and inferior to them in dramatic construction and poetic merit.

The *Hanuman-nâṭaka* is a dramatized version of the story of Râma, interspersed with numerous purely descriptive poetic passages. It consists of fourteen acts, and on account of its length is also called the *Mahâ-nâṭaka*, or great drama. Tradition relates that it was composed by Hanumân, the monkey general, and inscribed on rocks; but, Vâlmîki, the author of the *Râmâyaṇa*, being afraid lest it might throw his own poem into the shade, Hanumân allowed him to cast his verses into the sea. Thence fragments were ultimately picked up by a merchant, and brought to King Bhoja, who directed the poet Dâmodara Miśra to put them together, and fill up the lacunæ; whence the present composition originated. Whatever particle of truth there may be in this story, the "great drama" seems certainly to be the production of different hands. "The language," as Wilson remarks, "is in general very harmonious, but the work is after all a most disjointed and nondescript composition, and the patchwork is very glaringly and clumsily put together." It is nevertheless a work of some interest, as compositions of mixed dramatic and declamatory passages of this kind may have been common in the early stages of the dramatic art. The connection of the poet with King Bhoja, also confirmed by the *Bhoja-prabandha*, would bring the composition, or final redaction, down to about the 10th or 11th century. There are, however, two different recensions of the work, a shorter one commented upon by Mohanadâsa, and a longer one arranged by Madhusûdana. A Dâmodara Gupta is mentioned as having lived under Jayâpîḍa of Kashmir (755–86); but this can scarcely be the same author.

The *Mudrârâkshasa*,[2] or "Râkshasa (the minister) with the signet," is a drama of political intrigue, in seven acts, partly based on historical events, the plot turning on the reconciliation of Râkshasa, the minister of the murdered king Nanda, with the hostile party, consisting of prince Chandragupta (the Greek Sandrocottus, 315–291 B.C.), who succeeded Nanda, and his minister Châṇakya. The plot is developed with considerable dramatic skill, in vigorous, if not particularly elegant, language. The play was composed by Viśâkhadatta, prior, at any rate, to the 11th century, but perhaps as early as the 7th or 8th century, as Buddhism is referred to in it in rather complimentary terms.

The *Prabodha-chandrodaya*,[3] or "the moon-rise of intelligence," composed by Kṛishṇamiśra about the 12th century, is an allegorical play, in six acts, the *dramatis personæ* of which consist entirely of abstract ideas, divided into two conflicting hosts.

Of numerous inferior dramatic compositions we may mention as the best—the *Anarghya-râghava*, by Murârî; the *Bâla-râmâyaṇa*, one of six plays (three of which are known) by Râjaśekhara; and the *Prasanna-râghava*, by Jayadeva, the author of the rhetorical treatise *Chandrâloka*. Abstracts of a number of other pieces are given in H. H. Wilson's *Hindu Theatre*, the standard work on this subject. The dramatic genius of the Hindus may be said to have exhausted itself about the 14th century.

5. *Lyrical, Descriptive, and Didactic Poetry.*—We have already alluded to the marked predilection of the mediæval Indian poet for depicting in a single stanza some peculiar physical or mental situation. The profane lyrical poetry consists chiefly of such little poetic pictures, which form a prominent feature of dramatic compositions. Numerous poets and poetesses are only known to us through such detached stanzas, preserved in native anthologies or manuals of rhetoric. Thus the *Saduktikarṇâmṛita*,[4] or "ear-ambrosia of good sayings," an anthology compiled by Srîdhara Dâsa in 1205, contains verses by four hundred and forty-six different writers; while the *Śârngadharapaddhati*, another anthology, of the 14th century, contains some 6000 verses culled from two hundred and sixty-four different writers and works. These verses are either of a purely descriptive or of an erotic character; or they have a didactic tendency, being intended to convey, in an attractive and easily remembered form, some moral truth or useful counsel. An excellent specimen of a longer poem, of a partly descriptive partly erotic character, is Kâlidâsa's *Megha-dûta*,[5] or "cloud messenger," in which a banished Yaksha (demi-god) sends a love-message across India to his wife in the Himâlaya, and describes, in verse-pictures, the various places and objects over which the messenger, a cloud, will have to sail in his airy voyage. This little masterpiece has called forth a number of more or less successful imitations, such as Lakshmîdâsa's *Śuka-sandeśa*, or "parrot-message," lately edited by the mahârâja of Travancore. Another much admired descriptive poem by Kâlidâsa is the *Ritu-saṃhâra*,[6] or "collection of the seasons," in which the attractive features of the six seasons are successively set forth.

Lyric poetry.

As regards religious lyrics, the fruit of sectarian fervor, a large collection of hymns and detached stanzas, extolling some special deity, might be made from Purâṇas and other works. Of independent productions of this kind only a few of the more important can be mentioned here. Śankarâchârya, the great Vedântist, who probably lived in the 7th century, is credited with several devotional poems, especially the *Ananda-laharî*, or "wave of joy," a hymn of 103 stanzas, in praise of the goddess Pârvatî. The *Sûrya-śataka*, or century of stanzas in praise of Sûrya, the sun, is ascribed to Mayûra, the contemporary (and, according to a tradition, the father-in-law) of Bâṇa (in the early part of the 7th century). The latter poet himself composed the *Chaṇḍikâstotra*, a hymn of 102 stanzas, extolling Śiva's consort. The *Khaṇḍa-praśasti*, a poem celebrating the ten avatâras of Vishṇu, is ascribed to no other than Hanumân, the monkey general, himself. Jayadeva's beautiful poem *Gîtagovinda*, which, like most productions concerning Kṛishṇa, is of a very sensuous character, has already been referred to.

The particular branch of didactic poetry in which India is especially rich is that of moral maxims, expressed in single stanzas or couplets, and forming the chief vehicle of the *Nîti-śâstra* or ethic science. Excellent collections of such aphorisms have been published,—in Sanskrit and German by Dr. v. Böhtlingk, and in English by Dr. J. Muir. Probably the oldest original collection of this kind is that ascribed to Châṇakya,—and entitled *Râjanîtisamuchchaya*, "collection on the conduct of kings"—traditionally connected with the Machiavellian minister of Chandragupta, but (in its present

Didactic poetry.

[1] Edited by J. Grill, 1871.

[2] Edited (Bombay, 1884) by K. T. Telang, who discusses the date of the work in his preface.

[3] Translated by J. Taylor, 1810; by Th. Goldstücker into German, 1842. Edited by H. Brockhaus, 1845.

[4] Râjendralâla Mitra, *Notices*, iii. p. 134.

[5] Text and transl., by H. H. Wilson; with vocabulary by S. Johnson.

[6] The first Sanskrit book published (by Sir W. Jones), 1792. Text and Latin transl. by P. v. Bohlen. Partly transl., in verse, by R. T. H. Griffith, *Specimens of Old Indian Poetry*.

form) doubtless much later—of which there are several recensions, especially a shorter one of one hundred couplets, and a larger one of some three hundred. Another old collection is the *Kâmandakîya-Nîtisâra*,[1] ascribed to Kâmandaki, who is said to have been the disciple of Châṇakya. Under the name of Bhartrihari have been handed down three centuries of sententious couplets, one of which, the *nîti-śataka*, relates to ethics, whilst the other two, the *śṛingâra-* and *vairâgya-śatakas*, consist of amatory and devotional verses respectively. The *Nîti-pradîpa*, or "lamp of conduct," consisting of sixteen stanzas, is ascribed to Vetâlabhaṭṭa who is mentioned as one of nine gems at Vikramâditya's court (*c.* 550 A.D.). The *Amarû-śataka*, consisting of a hundred stanzas, ascribed to a King Amaru (sometimes wrongly to Sankara), and the *Chaura-suratapanchâśikâ*, by Bilhaṇa (11th century), are of an entirely erotic character.

6. *Fables and Narratives.*—For purposes of popular instruction stanzas of an ethical import were early worked up with existing prose fables and popular stories, probably in imitation of the Buddhist *jâtakas*, or birth-stories. A collection of this kind, intended as a manual for the guidance of princes (*in usum delphini*), was translated into Pahlavi in the reign of the Persian king Chosru Nushirvan, 531–579 A.D.; but neither this translation nor the original is any longer extant. A Syriac translation, however, made from the Pahlavi in the same century, under the title of "Qalilag and Dimnag"—from the Sanskrit "Karataka and Damanaka," two jackals who play an important part as the lion's counsellors—has been discovered and published. The Sanskrit original, which probably consisted of fourteen chapters, was afterwards recast,—the result being the exisiting *Panchatantra*,[2] or "five books" (or headings). A popular summary of this work, in four books, the *Hitopadeśa*,[3] or "Salutary counsel," is ascribed to the Brâhman Vishṇusarman. Other highly popular collections of stories and fairy tales, interspersed with moral maxims, are—the *Vetâla-panchaviṃśati* or "twenty-five (stories) of the Vetâla" (the original of the Baitâl Pachîsî), ascribed either to Jambhala Datta, or to Śivadâsa (while Prof. Weber suggests that Vetâla-bhaṭṭa may have been the author), and at all events older than the 12th century, since Somadeva has used it; the *Śuka-saptati*, or "seventy (stories related) by the parrot," the author and age of which are unknown; and the *Siṃhâsana-dvâtriṃśikâ*, or "thirty-two (tales) of the throne," being laudatory stories regarding Vikramâditya, related by thirty-two statues, standing round the old throne of that famous monarch, to King Bhoja of Dhârâ to discourage him from sitting down on it. This work is ascribed to Kshemankara, and was probably composed in the time of Bhoja (who died in 1053) from older stories in the Mahârâshṭra dialect. The original text has, however, undergone many modifications, and is now known in several different recensions. Of about the same date are two great storehouses of fairy tales, composed entirely in ślokas, viz., the *Vṛihat-kathâ*, or "great story," by Kshemendra, also called Kshemankara, who wrote *c.* 1020–40, under King Ananta, and the *Kathâ-saritsâgara*,[4] or "the ocean of the streams of story," composed by Somadeva, in the beginning of the 12th century, to console the mother of King Harshadeva on her son's death. Both these works are based on a work in the Paiśâchî dialect, of the 6th century, viz., Guṇâdhya's *Vṛihat-kathâ*.

Fables and narratives.

In higher class prose works of fiction the Sanskrit literature is extremely poor; and the few productions of this kind of which it can boast are of a highly artificial and pedantic character. These include the *Daśakumâra-charita*,[5] or "the adventures of the ten princes," composed by Daṇḍin, about the 6th century, and the *Vâsavadattâ*,[6] by Subandhu, the contemporary of the poet Bâṇa (*c.* 620), who himself wrote the first part of a novel, the *Kâdambarî*,[7] afterwards completed by his son.

B. Scientific Literature.

I. Law (*Dharma*).—Among the technical treatises of the later Vedic period, certain portions of the Kalpa-sûtras, or manuals of ceremonial, peculiar to particular schools, were referred to as the earliest attempts at a systematic treatment of law subjects. These are the *Dharma-sûtras*, or "rules of (religious) law," also called *Sâmayâchârika-sûtras*, or "rules of conventional usage (samaya-âchâra)." It is doubtful whether such treatises were at any time quite as numerous as the Gṛihya-sûtras, or rules of domestic or family rites, to which they are closely allied, and of which indeed they may originally have been an outgrowth. That the number of those actually extant is comparatively small is, however, chiefly due to the fact that this class of works was supplanted by another of a more popular kind, which covered the same ground. The Dharmasûtras consist chiefly of strings of terse rules, containing the essentials of the science, and intended to be committed to memory, and to be expounded orally by the teacher—thus forming, as it were, epitomes of class lectures. These rules are interspersed with couplets or "gâthâs," in various metres, either composed by the author himself or quoted from elsewhere, which generally give the substance of the preceding rules. One can well understand why such couplets should gradually have become more popular, and should ultimately have led to the appearance of works entirely composed in verse. Such metrical law-books did spring up in large numbers, not all at once, but over a long period of time, extending probably from about the beginning of our era, or even earlier, down to well-nigh the Mohammedan conquest; and, as at the time of their first appearance the epic impulse was particularly strong, other metres were entirely discarded for the epic śloka. These works are the metrical *Dharma-śâstras*, or, as they are usually called, the *Smṛiti*, "recollection, tradition,"—a term which, as we have seen, belonged to the whole body of Sûtras (as opposed to the *Śruti*, or revelation), but which has become the almost exclusive title of the versified institutes of law (and the few Dharmasûtras still extant). Of metrical Smṛitis about forty are hitherto known to exist, but their total number probably amounted to at least double that figure, though some of these, it is true, are but short and insignificant tracts, while others are only different recensions of one and the same work.

Law.

With the exception of a few of these works—such as the *Agni-*, *Yama-*, and *Vishṇu-Smṛitis*—which are ascribed to the respective gods, the authorship of the Smṛitis is attributed to old ṛishis, such as Atri, Kaṇva, Vyâsa, Śâṇḍilya, Bharadvâja. It is, however, extremely doubtful whether in most cases this attribution is not altogether fanciful, or whether, as a rule, there really existed a traditional connection between these works and their alleged authors or schools named after them. The idea, which early suggested itself to Sanskrit scholars, that Smṛitis which passed by the names of old Vedic teachers and their schools might simply be metrical recasts of the Dharma- (or Gṛihya-) sûtras of these schools, was a very natural one, and, indeed, is still a very probable one, though the loss of the original Sûtras, and the modifications and additions which the Smṛitis doubtless underwent in course of time, make it very difficult to prove this point. One could, however, scarcely account for the disappearance of the Dharmasûtras of some of the most important schools except on the ground that they were given up in favor of other works; and is it likely that this should have been done, unless there was some guarantee that the new works, upon the whole, embodied the doctrines of the old authorities of the respective schools? Thus, as regards the most important of the Smṛitis, the *Mânava-Dharmaśâstra*,[8] there exist both a Śrauta- and a Gṛihya-sûtra of the Mânava school of the Black Yajus, but no such Dharmasûtra has hitherto been discovered, though the former existence of such a work has been made all but certain by Prof. Bühler's discovery of quotations from a Mânavam,

Manu.

[1] Edited by Râjendralâla Mitra, *Bibl. Ind.*
[2] Edited by Kosegarten, G. Bühler, and F. Kielhorn; transl. by Th. Benfey, E. Lancereau, L. Fritze.
[3] Edited and transl. by S. Johnson.
[4] Edited by H. Brockhaus; transl. by C. H. Tawney.
[5] Edited by H. H. Wilson; freely translated by P. W. Jacob.
[6] Edited by F. Hall, *Bibl. Ind.*
[7] Edited by Madana Mohana Śarman, and by P. Peterson.
[8] The standard edition is by G. C. Haughton, with Sir W. Jones's translation, 1825; the latest translations by A. Burnell and G. Bühler. There is also a critical essay on the work by F. Johäntgen. On the relation between the Dharmasûtras and Smṛitis see especially West and Bühler, *Digest of Hindu Law*, 3d ed., i. p. 37 *sq.*

consistiug partly of prose rules, and partly of couplets, some of which occur literally in the Manusmṛiti, whilst others have been slightly altered there to suit later doctrines, or have been changed from the original trishṭubh into the epic metre. The idea of an old lawgiver Manu Svâyambhuva,—"sprung from the self-existent (svayambhû)" god Brahman,—reaches far back into Vedic antiquity: he is mentioned as such in early texts; and in Yâska's *Nirukta* a śloka occurs giving his opinion ou a point of inheritance. But whether or not the Mânava-Dharmasûtra embodied what were supposed to be the authoritative precepts of this sage on questions of sacred law we do not know; nor can it as yet be shown that the Manusmṛiti, which seems itself to have undergone considerable modifications, is the lineal descendant of that Dharmasûtra. It is, however, worthy of note that a very close counection exists betweeu the Manusmṛiti and the Vishṇuśâstra; and, as the latter is most likely a modern, only partially remodelled, edition of the Sûtras of the Black Yajus school of the Kaṭhas, the closc relation between the two works would be easily uuderstood, if it could be shown that the Manusmṛiti is a modern development of the Sûtras of another school of the Charaka division of the Black Yajurveda.

The Mânava Dharmaśâstra consists of twelve books, the first aud last of which, treating of creation, transmigration, and final beatitude, are, however, generally regarded as later additions. In them the legendary sage Bhṛigu, here called a Mânava, is introduced as Manu's disciple, through whom the great teacher has his work promulgated. Why this intermediate agent should have been considered necessary is by no means clear. Except in these two books the work shows no special relation to Manu, for, though he is occasionally referred to in it, the same is done in other Smṛitis. The question as to the probable date of the final redaction of the work cannot as yet be answered. Dr. Burnell has tried to show that it was probably composed under the Châlukya king Pulakeśi, about 500 A. D., but his argumentatiou is anything but convincing. From several ślokas quoted from Manu by Varâhamihira, in the 6th century, it would appear that the text which the great astronomer had before him differed very considerably from our Manusmṛiti. It is, however, possible that he referred either to the *Bṛihat-Manu* (Great M.) or the *Vṛiddha-Manu* (Old M.), who are often found quoted, and apparently represent one, if not two, larger recensions of the Smṛiti. The oldest existing commentary on the *Mânava Dharmaśâstra* is by Medhâtithi, who is first quoted in 1200, and is usually supposed to have lived in the 9th or 10th century. He had, however, several predecessors to whom he refers as *pûrve*, "the former ones."

Next in importance among Smṛitis ranks the *Yâjñavalkya Dharmaśâstra*.[1] Its origin and date are not less uncertain, except that, in the opinion of Prof. Stenzler, which has never been questioned, it is based on the Manusmṛiti, and represents a more advanced stage of legal theory and definition than that work. Yâjñavalkya, as we have seen, is looked upon as the founder of the Vâjasaneyins or White Yajus, and the author of the Śatapatha-brâhmaṇa. Iu the latter work he is represented as having passed some time at the court of King Janaka of Videha (Tirhut); and in accordance therewith he is stated, in the introductory couplets of the Dharmaśâstra, to have propounded his legal doctrines to the sages, while staying at Mithilâ (the capital of Videha). Hence, if the conuection between the metrical Smṛitis and the old Vedic schools be a real one and not one of name merely we should expect to find in the Yâjñavalkya-smṛiti special coincidences of doctrine with the Kâṭîya-sûtra, the principal Sûtra of the Vâjasneyins. Now, some sufficieutly strikiug coiucidences between this Smṛiti and Pâraskara's *Kâṭîya-Gṛihyasûtra* have indeed been pointed out; aud if there ever existed a Dharmasûtra belongiug to the same school, of which no trace has hitherto been fouud, the points of agreement between this and the Dharmaśâstra might be expected to be even more numerous. As in the case of Manu, ślokas arc quoted in various works from a *Bṛihat-* and a *Vṛiddha-Yâjñavalkya*. The Yâjñavalkya-smṛiti consists of three books, corresponding to the three great divisions of the Indian theory of law: *âchâra*, rule of conduct (social and caste duties); *vyavâhâra*, civil and criminal law; and *prâyaśchitta*, penance or expiation. There are two important commentaries on the work: the famous *Mitâkshará*,[2] by Vijñâneśrara, who lived under the Châlnkya king Vikramâditya of Kalyâna (1076–1127); and another by Aparârka or Aparâditya, a petty Silâra prince of the latter half of the 12th century.

Yâjñavalkya.

The *Parâśara-smṛiti* contains no chapter ou jurisprudeuce, but treats only of religious duties and expiations in 12 adhyâyas. The deficiency, was, however, supplied by the famous exegete Mâdhava (in the latter half of the 14th century), who made use of Parâśara's text for the compilation of a large digest of religious law, usually called *Parâśara-mâdhavîyam*, to which he added a third chapter on vyavahâra,[3] or law proper. Besides the ordinary text of the Parâśara-smṛiti, consisting of rather less than 600 couplets, there is also extant a *Bṛihat-Parâśarasmṛiti*, probably an amplification of the former, containing not less than 2980 (according to others even 3300) ślokas. The *Nâradîya Dharmaśâstra*, or *Náradasmṛiti*, is a work of a more practical kind; indeed, it is probably the most systematic and business-like of all the Smṛitis. It does not concern itself with religious and moral precepts, but is strictly confined to law. Of this work again there are at least two different recensions. Besides the text translated by Dr. Jolly, a portion of a larger recension has come to light in India. This versiou has been commented upon by Asahâya, "the peerless"—a very esteemed writer on law, who is supposed to have lived before Medhâtithi (? 9th century)—and it may therefore be considered as the older recension of the two. But, as it has been found to contain the word *dînâra*, an adaptation of the Roman *denarius*, it cannot, at any rate, be older than the 2d century; indeed, its date is probably several centuries later.

Parâśara.

Whether any of the Dharmaśâstras were ever used in India as actual "codes of law" for the practical administration of justice is very doubtful; indeed, so far as the most prominent works of this class are concerued, it is highly improbable.[4] No doubt these works were held to be of the highest authority as laying down the principles of religious and civil duty; but it was not so much any single text as the whole body of the Smṛiti that was looked upon as the embodiment of the divine law. Hence, the moment the actual work of codification begins in the 11th century, we find the jurists engaged in practically showing how the Smṛitis confirm and supplement each other, and in reconciling seeming contradictions between them. This new phase of Indian jurisprudence commences with Vijñâneśvara's *Mitâkshará*, which, though primarily a commentary on Yâjñavalkya, is so rich in original matter and illustrations from other Smṛitis that it is far more adapted to serve as a code of law than the work it professes to explain. This treatise is held in high esteem all over India, with the exception of the Bengal or Gauḍiya school of law, which recognizes as its chief authority the digest of its founder, Jîmûtavâhaua, especially the chapter on succession, entitled *Dâyabhâga*.[5] Based on the Mitâkshará are the *Smṛiti-chandriká*,[6] a work of great common-sense, written by Devaṇḍa Bhaṭṭa, in the 13th century, and highly esteemed in Southern India; and the *Víramitrodaya*, a compilation consisting of two chapters, on âchâra and vyavâhâra, made in the first half of the 17th century by Mitramiśra, for Râjâ Vîrasiṃha, or Bîrsinh Deo of Orchhâ, who murdered Abul Fazl, the minister of the emperor Akbar, and author of the *Aín i Akbarí*. There is no need here to enumerate any more of the vast number of treatises on special points of law, of greater or less merit, the more important of which will be found mentioned in English digests of Hindu law.

II. PHILOSOPHY.—The Indian mind shows at all times a stroug disposition for metaphysical speculation. In the old religious lyrics this may be detected from the very first. Not to speak of the abstract nature of some even of the oldest Vedic deities, this propensity betrays itself in a certain mystic symbolism, tending to refine and spiritualize the original purely physical character and activity of some of the more prominent gods, and to impart a deep and subtle import to the rites of the sacrifice. The primitive worship of more or less isolated elementary forces and phenomena had evidently ceased to satisfy the religious wants of the more thoughtful miuds. Various syncretist tendencies show the drift of religious thought to be towards some kind of unity of the divine powers, be it in the direction of the pantheistic idea or in that of an organized polytheism, or even towards monotheism. In the latter age of the hymns the pantheistic idea is rapidly gaining ground, and finds vent in various cosmogonic speculations; and in the Brâhmaṇa period we see it fully developed. The fuudamental conception of this doctrine finds its expression in the two syuonymous terms *brahman* (neutr.), originally

PHILOSOPHY.

[1] Edited, with a German transl. by A. F. Stenzler.
[2] Transl. by H. T. Colebrooke.
[3] The section of this chapter on inheritance (dâya-vibhâga) has been translated by A. C. Burnell, 1868.
[4] See West and Bühler, *Digest*, i. p. 55. A different view is expressed by A. Burnell, *Dâyavibhâga*, p. xiii.
[5] Transl. by H. T. Colebrooke, 1810.
[6] The section on inheritance has been translated by T. Kristnasawmy Iyer, 1866.

"power of growth," then "devotional impulse, prayer," and *âtman* (masc.), "breath, self, soul."

The recognition of the essential sameness of the individual souls, emanating all alike (whether really or imaginarily) from the ultimate spiritual essence (*parama-brahman*) "as sparks issue from the fire," and destined to return thither, involved some important problems. Considering the infinite diversity of individual souls of the animal and vegetable world, exhibiting various degrees of perfection, is it conceivable that each of them is the immediate efflux of the Supreme Being, the All-perfect, and that each, from the lowest to the highest, could re-unite therewith directly at the close of its mundane existence? The difficulty implied in the latter question was at first met by the assumption of an intermediate state of expiation and purification, a kind of purgatory; but the whole problem found at last a more comprehensive solution in the doctrine of transmigration (*saṃsâra*). Some scholars have suggested[1] that metempsychosis may have been the prevalent belief among the aboriginal tribes of India, and may have been taken over from them by the Indo-Aryans. This no doubt is quite possible; but even in that case we can only assume that speculative minds seized upon it as offering the most satisfactory (if not the only possible) explanation of the great problem of phenomenal existence. It is certainly a significant fact that, once established in Indian thought, the doctrine of metempsychosis is never again called in question,—that, like the fundamental idea on which it rests, viz., the essential sameness of the immaterial element of all sentient beings, the notion of *saṃsâra* has become an axiom, a universally conceded principle of Indian philosophy. Thus the latter has never quite risen to the heights of pure thought; its object is indeed *jijñâsâ*, the search for knowledge; but it is an inquiry (*mîmâṃsâ*) into the nature of things undertaken not solely for the attainment of the truth, but with a view to a specific object,—the discontinuance of saṃsâra, the cessation of mundane existence after the present life. Every sentient being, through ignorance, being liable to sin, and destined after each existence to be born again in some new form, dependent on the actions committed during the immediately preceding life, all mundane existence thus is the source of ever-renewed suffering; and the task of the philosopher is to discover the means of attaining *moksha*, "release" from the bondage of material existence, and *yoga*, "union" with the Supreme Self,—in fact, salvation. It is with a view to this, and this only, that the Indian metaphysician takes up the great problems of life,—the origin of man and the universe, and the relation between mind and matter.

Metempsychosis.

It is not likely that these speculations were viewed with much favor by the great body of Brâhmans engaged in ritualistic practices. Not that the metaphysicians actually discountenanced the ceremonial worship of the old mythological gods as vain and nugatory. On the contrary, they expressly admitted the propriety of sacrifices, and commended them as the most meritorious of human acts, by which man could raise himself to the highest degrees of mundane existence, to the worlds of the Fathers and the Devas. Nevertheless, the fact that these were only higher grades from which the individual self would still be liable to relapse into the vortex of material existence,—that the final goal lay beyond even those worlds, unattainable through aught but a perfect knowledge of the soul's nature and its indentity with the Supreme Self,—this fact of itself was sufficient to depreciate the merit of the sacrificial cult, and to undermine the authority of the sacred rituals. "Know ye that Self," exhorts one of those old idealists,[2] "and have done with other words; for that (knowledge) is the bridge to immortality!" Intense self-contemplation being, moreover, the only way of attaining the all-important knowledge, this doctrine left little or no room for those mediatorial offices of the priest, so indispensable in ceremonial worship; and indeed we actually read of Brâhman sages resorting to Kshatriya princes to hear them expound this, the true doctrine of salvation. But, in spite of their anti-hierarchical tendency, these speculations continued to gain ground; and in the end the body of treatises propounding the pantheistic doctrine, the Upanishads, were admitted into the sacred canon, as appendages to the ceremonial writings, the Brâhmaṇas. The Upanishads thus form literally "the end of the Veda," the *Vedânta;* but their adherents claim this title for their doctrines in a metaphorical rather than in a material sense, as "the ultimate aim and consummation of the Veda." In later times the radical distinction between these speculative appendages and the bulk of the Vedic writings was strongly accentuated in a new classification of the sacred scriptures. According to this scheme they were supposed to consist of two great divisions,—the *Karma-kâṇḍa, i.e.*, "the work-section," or practical ceremonial (exoteric) part, consisting of the Saṃhitâs and Brâhmaṇas (including the ritual portions of the Âraṇyakas), and the *Jñânakâṇḍa*, "the knowledge-section," or speculative (esoteric) part. These two divisions are also called respectively the *Pûrva-* ("former") and *Uttara-* ("latter," or higher[3]) *kâṇḍa;* and when the speculative tenets of the Upanishads came to be formulated into a regular system it was deemed desirable that there should also be a special system corresponding to the older and larger portion of the Vedic writings. Thus arose the two systems—the *Pûrva-* (or *Karma-*) *mîmâṃsâ*, or "former (practical) speculation," and the *Uttara-* (or *Brahma-*) *mîmâṃsâ*, usually called the Vedânta philosophy.

It is not yet possible to determine, even approximately, the time when the so-called *Darśanas* (literally "demonstrations"), or systems of philosophy, were first formulated. And, though they have certainly developed from the tenets enunciated in the Upanishads, there is considerable doubt as to the exact order in which these systems succeeded each other. The authoritative *exposés* of the systems have apparently passed through several redactions; and, in their present form, these sûtra-works[4] evidently belong to a comparatively recent period, being probably not older than the early centuries of our era. By far the ablest general review of the philosophical systems (except the Vedânta) produced by a native scholar is the *Sarva-darśana-saṅgraha*[5] ("summary of all the Darśanas"), composed in the 14th century, from a Vedântist point of view, by the great exegete Mâdhava Âchârya.

Philosophical system.

Among the different systems, six are generally recognized as orthodox, as being (either wholly or for the most part) consistent with the Vedic religion,—two and two of which are again more closely related to each other than to the rest, viz.:

(1) *Pûrva-mîmâṃsâ* (*Mîmâṃsâ*), and (2) *Uttara-mîmâṃsâ* (*Vedânta*);
(3) *Sânkhya*, and (4) *Yoga;*
(5) *Nyâya*, and (6) *Vaiśeshika*.

(1) The (*Pûrva-*) *Mîmâṃsâ* is not a system of philosophy in the proper sense of the word, but rather a system of dogmatic criticism and scriptural interpretation. It maintains the eternal existence of the Veda, the different parts of which are minutely classified. Its principal object, however, is to ascertain the religious (chiefly ceremonial) duties enjoined in the Veda, and to show how these duties must be performed, and what are the special merits and rewards attached to them. Hence arises the necessity of determining the principles for rightly interpreting the Vedic texts, as also of what forms its only claim to being classed among speculative systems, viz., a philosophical examination of the means of, and the proper method for arriving at, accurate knowledge. The foundation of this school, as well as the composition of the Sûtras or aphorisms which constitute its chief doctrinal authority, is ascribed to Jaimini. The Sûtras were commented on by Śabara Svâmin; and further annotations (*vârttika*) thereon were supplied by the great theologian Kumârila Bhaṭṭa, who is supposed to have lived in the (6th or) 7th century, and to have worked hard for the re-establishment of Brâhmanism. According to a popular tradition his self-immolation was witnessed by Śankarâchârya. The most approved general introduction to the study of the Mîmâṃsâ is the metrical *Jaiminîya-Nyâya-mâlâ-vistara*,[6] with a prose commentary, both by Mâdhava Âchârya. This distinguished writer, who has already been mentioned several times, was formerly supposed, from frequent statements in MSS., to have been the brother of Sâyaṇa, the well-known interpreter of the Vedas. The late Dr. Burnell,[7] has, however, made it very probable that these two are one and the same person, Sâyaṇa being his Telugu, and Mâdhavâchârya his Brâhmanical name. In 1331 he became the *jagadguru*, or spiritual head, of the Smârtas (a Vedântist sect founded by Sankarâchârya) at the Math of Śringeri, where, under the

Mîmâṃsâ.

[1] See, *e.g.*, A. E. Gough, *The Philosophy of the Upanishads*, p. 24.
[2] Mundaka-upanishad, ii. 2, 5.
[3] *Cf.* Mundaka-upanishad, i. 4, 5, where these two divisions are called "the lower (*apara*) and the higher (*para*) knowledge.
[4] These works have all been printed with commentaries in India; and they have been partly translated by J. R. Ballantyne, and by K. M. Banerjea. The best general view of the systems is to be obtained from H. T. Colebrooke's account, *Misc. Essays*, i., 2d ed., with Prof. Cowell's notes. Compare also the brief abstract given in Goldstücker's *Literary Remains*, vol. i. A very useful classified index of philosophical works was published by F. Hall, 1859.
[5] Edited in the *Bibl. Ind.;* translated by E. B. Cowell and A. E. Gough, 1882.
[6] Edited by Th. Goldstücker, completed by E. B. Cowell.
[7] *Vamsa-brâhmaṇa*, Introd.

patronage of Bukka, king of Vidyânagara, he composed his numerous works. He sometimes passes under a third name, Vidyâraṇya-svâmin, adopted by him on becoming a *sannyâsin*, or religious mendicant.

(2) The *Vedânta* philosophy, in the comparatively primitive form in which it presents itself in most of the Upanishads, constitutes the earliest phase of systematic metaphysical speculation. In its essential features it remains to this day the prevalent belief of Indian thinkers, and enters largely into the religious life and convictions of the people. It is an idealistic monism, which derives the universe from an ultimate conscious spiritual principle, the one and only existent from eternity—the *Âtman*, the Self, or the *Purusha*, the Person, the *Brahman*. It is this primordial essence or Self that pervades all things and gives life and light to them, "without being sullied by the visible outward impurities or the miseries of the world, being itself apart,"—and into which all things will, through knowledge, ultimately resolve themselves. "The wise who perceive him as being within their own Self, to them belongs eternal peace, not to others."[1] But, while the commentators never hesitate to interpret the Upanishads as being in perfect agreement with the Vedântic system, as elaborated in later times, there is often considerable difficulty in accepting their explanations. In these treatises only the leading features of the pantheistic theory find utterance, generally in vague and mystic though often in singularly powerful and poetical language, from which it is not always possible to extract the author's real idea on fundamental points, such as the relation between the Supreme Spirit and the phenomenal world,—whether the latter was actually evolved from the former by a power inherent in him, or whether the process is altogether a fiction, an illusion of the individual self. Thus the Katha-upanishad[2] offers the following summary: "Beyond the senses [there are the objects; beyond the objects] there is the mind (manas); beyond the mind there is the intellect (buddhi); beyond the intellect there is the Great Self. Beyond the Great One there is the Highest Undeveloped (avyaktam); beyond the Undeveloped there is the Person (purusha), the all-pervading, characterless (aliṅga). Whatsoever knows him is liberated, and attains immortality." Here the Vedântist commentator assures us that the Great Undeveloped, which the Sânkhyas would claim as their own primary material principle (pradhâna, prakṛiti), is in reality *Mâyâ*, illusion (otherwise called Avidyâ, ignorance, or Śakti power), the fictitious energy which in conjunction with the Highest Self (Atman, Purusha) produces or constitutes the Îsvara, the Lord, or Cosmic Soul, the first emanation of the Âtman, and himself the (fictitious) cause of all that seems to exist. It must remain doubtful, however, whether the author of the Upanishad really meant this, or whether he regarded the Great Undeveloped as an actual material principle or substratum evolved from out of the Purusha, though not, as the Sânkhygas hold, coexisting with him from eternity. Besides passages such as these which seem to indicate realistic or materialistic tendencies of thought, which may well have developed into the dualistic Sânkhya and kindred systems, there are others which indicate the existence even of nihilist theories, such as the Bauddhas—the *śûnya-vâdins*, or affirmers of a void or primordial nothingness—profess. Thus we read in the Chhândogya-upanishad[3]: "The existent alone, my son, was here in the beginning, one only, without a second. Others say, there was the non-existent alone here in the beginning, one only, without a second,—and from the non-existent the existent was born. But how could this be, my son? How could the existent be born from the non-existent? No, my son only the existent was here in the beginning, one only, without a second."

Vedânta.

The foundation of the Vedânta system, as "the completion of the Veda," is naturally ascribed to Vyâsa, the mythic arranger of the Vedas, who is said to be identical with Bâdarâyaṇa, the reputed author of the *Brahma-* (or *Sârîraka-*) *sûtra*, the authoritative, though highly obscure, summary of the system. The most distinguished interpreter of these aphorisms is the famous Malabar theologian Śankara Âchârya (7th or 8th century), who also commented on the principal Upanishads and the Bhagavadgîtâ, and is said to have spent the greater part of his life in wandering all over India, as far as Kashmir, and engaging in disputations with teachers—whether of the Śaiva, or Vaishṇava, or less orthodox persuasions—with the view of rooting out heresy and re-establishing the doctrine of the Upanishads. His controversial triumphs (doubtless largely mythical) are related in a number of treatises current in South India, the two most important of which are the *Śankara-dig-vijaya* ("Śankara's world-conquest"), ascribed to his own disciple Ânandagiri, and the *Śankara-vijaya*, by Mâdhavâchârya. In Śankara's philosophy[4] the theory that the material world has no real existence, but is a mere illusion of the individual soul wrapt in ignorance,=that, therefore it has only a practical or conventional (*vyâvahârika*) but not a transcendental or true (*pâramârthika*) reality,—is strictly enforced. To the question why the Supreme Self (or rather his fictitious development, the Highest Lord, or cosmic soul) should have sent forth this phantasmagory this great thinker (with the author of the Sûtras[5]) can return no better answer than that it must have been done for sport (*lîlâ*), without any special motive—since to ascribe such a motive to the Supreme Lord would be limiting his self-sufficiency,—and that the process of creation has been going on from all eternity. Śankara's *Śârîraka-mîmâṃsâ-bhâshya* has given rise to a large number of exegetic treatises, of which Vâchaspati-miśra's[6] exposition, entitled *Bhâmatî*,[7] is the most esteemed. Of numerous other commentaries on the Brahma-sûtras, the *Śrî-bhâshya*, by Râmânuja, the founder of the Śrî-Vaishṇava sect, is the most noteworthy. This religious teacher, who probably flourished during the first half of the 12th century caused a schism in the Vedânta school. Instead of adhering to Śankara's orthodox *advaita*, or non-duality doctrine, he put forth the theory of *visishṭâdvaita*, *i.e.*, non-duality of the (two) distinct (principles), or, as it is more commonly explained, non-duality of that which is qualified (by attributes). According to this theory the Brahman (which is identical with Vishṇu) is neither devoid of form and quality, nor is it all things; but it is endowed with all good qualities, and matter is distinct from it; bodies consist of souls (*chit*) and matter (*achit*); and God is the soul. With this theory is combined the ordinary Vaishṇava doctrine of periodical descents (*avatâra*) of the deity, in various forms for the benefit of creatures. In Râmânuja's system considerable play is also allowed to the doctrine of faith (*bhakti*). This phase of Indian religious belief, which has attached itself to the Vedânta theory more closely than to any other, and the origin of which some scholars are inclined to attribute to Christian influence, seems first to make its appearance very prominently in the *Bhagavadgîtâ*, the episode of the *Mahâbhârata*, already referred to, and is even more fully developed in some of the Purâṇas, especially the Bhâgavata. In the *Śâṇḍilya-* (*Bhakti-*) *sûtra*,[8] the author and date of which are unknown, the doctrine is systematically propounded in one hundred aphorisms. According to this doctrine mundane existence is due to want of faith, not to ignorance; and the final liberation of the individual soul can only be effected by faith. Knowledge only contributes to this end by removing the mind's foulness, unbelief. Its highest phase of development this doctrine probably reached in the religious creed of the *Bhaktas*, a Vaishṇava sect founded, towards the end of the 15th century, by Chaitanya, whose followers subsequently grafted the Vedânta speculations on his doctrine. A popular summary of the Vedânta doctrine is the *Vedânta-sâra* by Sadânanda, which has been frequently printed and translated.[9]

Râmânuja.

Bhakti.

(3) The *Sânkhya*,[10] or "enumerative" system, probably derives its name from is systematic enumeration of the twenty-four principles (*tattva*) it recognizes,—consisting of twenty-four material and an independent immaterial principle. In opposition to the Vedânta school, which maintains the eternal coexistence of a spiritual principle of reality and an unspiritual principle of unreality, the Sânkhya assumes the external coexistence of a material first cause, which it calls either *mûla-Prakṛiti* (fem.), "chief Originant" (Nature), or *Pradhâna*, "the principal" cause, and a plurality of spiritual elements or Selves, *Purusha*. The system recognizes no intelligent creator (such as the *Îśvara*, or demiurgus, of the Vedânta)—whence it is called *nirîśvara*, godless; but it conceives the Material First Cause, itself unintelligent, to have become developed, by a gradual process of evolution, into all the actual forms of the phenomenal universe, excepting the souls. Its first emanation is *buddhi*, intelligence;

Sânkhya

[1] Katha-upanishad, ii. 5, 11-13.
[2] i. 3, 10; ii. 6, 7.
[3] vi. 2, 1.

[4] P. Deussen, *Das System des Vedânta*, 1883. A. E. Gough, *The Philosophy of the Upanishads* also follows chiefly Śankara's interpretation.
[5] Brahamasûtra, iii., 1. 32-34.
[6] Prof. Cowell assigns him to about the 10th century.
[7] *Bibl. Ind.*
[8] Text, with Svapneśvara's commentary, edited by J. R. Ballantyne; transl. by E. B. Cowell.
[9] Last by G. A. Jacob.
[10] E. Röer, *Lecture on the Sânkhya Philosophy*, Calcutta, 1864; B. St. Hillaire, *Mémoire sur le Sânkhya*, 1852.

whence springs *ahaṃkâra*, consciousness; thence five elementary particles (*tanmâtra*) and eleven organs of sense; and finally, from the elementary particles, five elements. The souls have from all eternity been connected with Nature,—having in the first place become invested with a subtile frame (*linga-*, or *sûkshma-*, *śarîra*), consisting of seventeen principles, viz., intelligence, consciousness, elementary particles, and orgaus of seuse and action, including mind. Invested with this subtile frame, they, for the sake of fruition, connect themselves ever anew with Nature, thus as it were, creating for themselves ever new forms of material existence; and it is only on his attaining perfect knowledge, whereby the ever-changing modes of intelligence cease to be reflected on him, that the Purusha is liberated from the miseries of Saṃsâra.

The reputed founder of this school is the sage Kapila, to whom tradition ascribes the composition of the fundamental text-book, the (*Sânkhya-sûtra*, or) *Sânkhya-pravachana*,[1] as well as the *Tattva-samâsa*, a mere catalogue of the principles. That the Sûtras have undergone subsequent modifications might be inferred from the fact that they twice refer to the opinion of Pañchaśikha, who elsewhere is stated to have received his instruction from Âsuri, the disciple of Kapila, as well as from the sage himself. Of the commentaries on the Sûtras, that by Vijñana Bhikshu,[2] a writer probably of the 16th century, is the most approved. An independent treatise by the same author, the *Sânkhya-sâra*,[2] consisting of a prose and a verse part, is probably the most valuable compendium of Sânkhya doctrines. Another admirable and highly-esteemed treatise is Îśvara-kṛishṇa's *Sânkhya-kârikâ*,[3] which gives, in the narrow compass of seventy-five slokas, a lucid and complete sketch of the system. Though nothing certain is known regarding its author,[4] this work must be of tolerable antiquity, considering that it was commented upon by Gauḍapâda,[5] the preceptor of Govinda, who, on his part, is said to have been the teacher of Śankarâchârya.

(4) The *Yoga* system is merely a schismatic branch of the preceding school, holding the same opinions on most points treated in common in their Sûtras, with the exception of one important point, the existence of God. To the twenty-five principles (*tattva*) of the Nirîśvara Sânkhya, the last of which was the *Purusha*, the Yoga adds, as the twenty-sixth, the *Nirguṇa Purusha*, or Self devoid of qualities, the Supreme God of the system. Hence the Yoga is called the *Seśvara* (theistical) *Sânkhya*. But over and above the purely speculative part of its doctrine, which it shares with the sister school, the theistic Sânkhya has developed a complete system of mortification of the senses—by means of prolonged apathy and abstraction, protracted rigidity of posture, and similar practices,—many of which are already alluded to in the Upanishads,—with the view of attaining to an ecstatic vision of, and reunion (*yoga*) with, the Supreme Spirit. It is from this portion of the system that the school derives the name by which it is more generally known. The authoritative Sûtras of the Yoga, bearing the same title as those of the sister school, viz., *Sânkhya-pravachana*, but more commonly called *Yoga-śâstra*, are ascribed to Patañjali, who is perhaps identical with the author of the "great commentary" on Pâṇini. The oldest commentary on the Sûtras, the *Pâtañjala-bhâshya*, is attributed to no other than Vyâsa, the mythic arranger of the Veda and founder of the Vedânta. Both works have again been commented upon by Vâchaspati-miśra, Vijñânabhikshu, and other writers.

Yoga.

(5) (6) The *Nyâya*[6] and *Vaiseśhika* are but separate branches of one and the same school, which supplement each other and the doctrines of which have virtually become amalgamated into a single system of philosophy. The special part taken by each of the two branches in the elaboration of the system may be briefly stated in Dr. Röer's words: "To the Nyâya belong the logical doctrines of the forms of syllogisms, terms and propositions; to the Vaiśeshikas the systematical explanation of the categories (the simplest metaphysical ideas) of the metaphysical, physical and psychical notions,—which notions are hardly touched upon in the Nyâya-sûtras. They differ in their statement of the several modes of proof,—the Nyâya asserting four modes of proof (from perception, inference, analogy, and verbal communication), the Vaiśeshikas admitting only the two first ones." The term Nyâya (*ni-âya*, "in-going," entering), though properly meaning "analytical investigation," as applied to philosophical inquiry generally, has come to be taken more commonly in the narrower sense of "logic," because this school has entered more thoroughly than any other into the laws and processes of thought, and has worked out a formal system of reasoning which forms the Hindu standard of logic.

Nyâya and Vaiśeshika.

Logic.

The followers of these schools generally recognize seven categories (*padârtha*): substance (*dravya*), quality (*guṇa*), action (*karma*), generality (*sâmânya*), particularity (*viseśha*), intimate relation (*samavâya*), and non-existence or negation (*abhâva*). Substances, forming the substrata of qualities and actions, are of two kinds: eternal (without a cause), viz., space, time, ether, soul, and the atoms of mind, earth, water, fire, and air; and non-eternal, comprising all compounds, or the things we perceive, and which must have a cause of their existence. Causality is of three kinds: that of intimate relation (material cause); that of non-intimate relation (between parts of a compound); and instrumental causality (effecting the union of component parts). Material things are thus composed of atoms (*aṇu*), *i. e.*, ultimate simple substances, or units of space, eternal, unchangeable, and without dimension, characterized only by "particularity (*viśesha*)." It is from this predication of ultimate "particulars" that the Vaiśeshikas, the originators of the atomistic doctrine, derive their name. The Nyâya draws a clear line between matter and spirit, and has worked out a careful and ingenious system of psychology. It distinguishes between individual or living souls (*jîvâtman*), which are numerous, infinite and eternal, and the Supreme Soul (*Paramâtman*) which is one only, the seat of eternal knowledge, and the maker and ruler (*Îśvara*) of all things. It is by his will and agency that the unconscious living souls (soul atoms, in fact) enter into union with the (material) atoms of mind, etc., and thus partake of the pleasures and sufferings of mundane existence. On the Hindu syllogism compare Prof. Cowell's notes to Colebrooke's *Essays*, i. p. 314.

The original collection of *Nyâya-sûtras* is ascribed to Gotama, and that of the *Vaiśeshika-sûtras* to Kaṇâda. The etymological meaning of the latter name seems to be "little-eater, particle-eater," whence in works of hostile critics the synonymous terms *Kaṇa-bhuj* or *Kaṇa-bhaksha* are sometimes derisively applied to him, doubtless in allusion to his theory of atoms. He is also occasionally referred to under the name of Kâśyapa. Both sûtra works have been interpreted and supplemented by a number of writers, the commentary of Viśvanâtha on the Nyâya and that of Śankara-miśra on the Vaiśeshika Sûtras being most generally used. There are, moreover, a vast number of separate works on the doctrines of these schools, especially on logic. Of favorite elementary treatises on the subject may be mentioned Keśavamiśra's *Tarka-bhâshâ*, the *Tarka-sangraha*,[7] and the *Bhâshâ-parichheda*.[8] A large and important book on logic is Gangeśa's *Chintâmaṇi*, which formed the text-book of the celebrated Nuddea school of Bengal, founded by Raghunâtha-śiromaṇi about the beginning of the 16th century. An interesting little treatise is the *Kusumâñjali*,[9] in which the author, Udayana Âchârya (about the 12th century, according to Prof. Cowell) attempts, in 72 couplets, to prove the existence of a Supreme Being on the principles of the Nyâya system.

As regards the different heretical systems of Hindu philosophy, there is no occasion, in a sketch of Sanskrit literature, to enter into the tenets of the two great anti-Brâhmanical sects, the Jainas and Buddhists. While the original works of the former are written entirely in a popular (the Ardha-mâgadhî) dialect, the northern Buddhists, it is true, have produced a considerable body of literature,[10] composed in a kind of hybrid Sanskrit, but only a few of their sacred books have as yet been published;[11] and it is, moreover, admitted on all hands that for the pure and authentic Buddha doctrines we have rather to look to the Pâli scriptures of the southern branch. Nor can we do more here than briefly allude to the theories of a few of the less prominent heterodox

Heretical systems.

[1] Transl. by J. R. Ballantyne; 2d ed. by F. Hall.
[2] Edited by F. Hall.
[3] Edited by C. Lassen, 1832. Translations by H. T. Colebrooke and J. Davies.
[4] One writer makes him the pupil of Pañchaśikha, whilst another even identifies him with Kâlidasâ; *cf.* F. Hall, *Sânkhyasâra*, p. 29.
[5] Transl. by H. H. Wilson. A Chinese translation of a commentary resembling that of Gnaḍapâda is said to have been made during the Ch'en dynasty, 557–583 A.D. (M. Müller, *India*, p. 360).
[6] Besides Colebrooke's *Essay*, with Cowell's notes, see Ballantyne's translation of the *Tarka-Sangraha* and the introduction to Röer's translation of the *Bhâshâparichheda*, and his article, *Z. D. M. G.*, xxi.
[7] Edited and translated by J. R. Ballantyne.
[8] Edited and translated, with commentary, by E. Röer.
[9] Edited and translated, with commentary, by E. B. Cowell.
[10] See B. H. Hodgson, *The Languages, Literature, and Religion of Nepal and Tibet*.
[11] *Lalita-vistara*, edited and partly translated by Râjendralâla Mitra; *Mahâvastu*, edited E. Senart; *Vajra-parichheda*, edited M. Müller; *Saddharma-puṇḍarîka* translated by E. Burnouf ("Lotus de la bonne loi"); and H. Kern, *Sacred Books of the East*.

systems, however interesting they may be for a history of human thought.

The *Châryâkas*, an ancient sect of undisguised materialism, who deny the existence of the soul, and consider the human person (*purusha*) to be an organic body endowed with sensibility and with thought, resulting from a modification of the component material elements, ascribe their origin to Bṛihaspati; but their authoritative text-book, the *Bârhaspatya-sûtra*, is only known so far from a few quotations.

The *Pâñcharâtras*, or *Bhâgavatas*, are an early Vaishṇava sect, in which the doctrine of faith, already alluded to, is strongly developed. Hence their tenets are defended by Râmânuja, though they are partly condemned as heretical in the Brahma-sûtras. Their recognized text-book is the *Nârada-Pâñcharâtra*.[1] According to their theory the Supreme Being (Bhagavat, Vâsudeva, Vishṇu) became four separate persons by successive production. While the Supreme Being himself is imbued with the six qualities of knowledge, power, strength, absolute sway, vigor and energy, the three divine persons successively emanating from him and from one another represent the living soul, mind, and consciousness respectively.

The *Pâśupatas*, one of several Śaiva (Mâheśvara) sects, hold the Supreme Being (*Îśvara*), whom they identify with Śiva, to be the creator and ruler of the world, but not its material cause. With the Sânkhyas they admit the notion of a plastic material cause, the *Pradhâna;* while they follow Patañjali in maintaining the existence of a Supreme God.

III. Grammar (*Vyâkaraṇa*).—We found this subject enumerated as one of the six "limbs of the Veda," or auxiliary sciences, the study of which was deemed necessary for a correct interpretation of the sacred Mantras, and the proper performance of Vedic rites. Linguistic inquiry, phonetic as well as grammatical, was indeed early resorted to both for the purpose of elucidating the meaning of the Veda, and with the view of settling its textual form. The particular work which came ultimately to be looked upon as the "vedânga" representative of grammatical science, and has ever since remained the standard authority for Sanskrit grammar in India, is Pâṇini's *Aṣhṭâdhyâyî*,[2] so called from its "consisting of eight lectures (*adhyâya*)," of four *pâdas* each. For a comprehensive grasp of linguistic facts, and a penetrating insight into the structure of the vernacular language, this work stands probably unrivalled in the literature of any nation,—though few other languages, it is true, afford such facilities as the Sanskrit for a scientific analysis. Pâṇini's system of arrangement differs entirely from that usually adopted in our grammars, viz., according to the so-called parts of speech. As the work is composed in aphorisms intended to be learnt by heart, economy of memory-matter was the author's paramount consideration. His object was chiefly attained by the grouping together of all cases exhibiting the same phonetic or formative feature, no matter whether or not they belonged to the same part of speech. For this purpose he also makes use of a highly artificial and ingenious system of algebraic symbols, consisting of technical letters (*anubandha*), used chiefly with suffixes, and indicative of the changes which the roots or stems have to undergo in word-formation.

Grammar. Pâṇini.

It is self-evident that so complicated and complete a system of linguistic analysis and nomenclature could not have sprung up all at once and in the infancy of grammatical science, but that many generations of scholars must have helped to bring it to that degree of perfection which it exhibits in Pâṇini's work. Accordingly we find Pâṇini himself making reference in various places to ten different grammarians, besides two schools, which he calls the "eastern (*prâñchas*)" and "northern (*udañchas*)" grammarians. Perhaps the most important of his predecessors was Śâkaṭâyana,[3] also mentioned by Yâska—the author of the Nirukta who is likewise supposed to have preceded Pâṇini—as the only grammarian (*vaiyâkaraṇa*) who held with the etymologists (*nairukta*) that all nouns are derived from verbal roots. Unfortunately there is little hope of the recovery of his grammar, which would probably have enabled us to determine somewhat more exactly to what extent Pâṇini was indebted to the labors of his predecessors. There exists indeed a grammar in South Indian MSS., entitled *Śabdânuśâsana*, which is ascribed to one Śâkaṭâyana;[4] but this has been proved[5] to be the production of a modern Jaina writer, which, however, seems to be partly based on the original work, and partly on Pâṇini and others. Pâṇini is also called Dâkshîputra, after his mother Dâkshî. As his birthplace the village Śalâtura is mentioned, which was situated some few miles northwest of the Indus, in the country of the Gandhâras, whence later writers also call him Śâlâturîya, the formation of which name he himself explains in his grammar. Another name sometimes applied to him is Śâlanki. In the *Kathâsaritsâgara*, a modern collection of popular tales mentioned above, Pâṇini is said to have been the pupil of Varsha, a teacher at Pâṭaliputra, under the reign of Nandra, the father (?) of Chandragupta 315–291 B. C.) The real date of the great grammarian is, however, still a matter of uncertainty. While Goldstücker[6] attempted to put his date back to ante-Buddhist times (about the 7th century B. C.), Prof. Weber holds that Pâṇini's grammar cannot have been composed till some time after the invasion of Alexander the Great. This opinion is chiefly based on the occurrence in one of the Sûtras of the word *yavanânî*, in the sense of "the writing of the Yavanas (Ionians)," thus implying, it would seem, such an acquaintance with the Greek alphabet as it would be impossible to assume for any period prior to Alexander's Indian campaign (326 B. C.) But, as it is by no means certain[7] that this term really applies to the Greek alphabet, it is scarcely expedient to make the word the corner-stone of the argument regarding Pâṇini's age. If Patañjali's "great commentary" was written, as seems highly probable, about the middle of the 2d century B. C., it is hardly possible to assign to Pâṇini a later date than about 400 B. C. Though this grammarian registers numerous words and formations as peculiar to the Vedic hymns, his chief concern is with the ordinary speech (*bhâshâ*) of his period and its literature; and it is noteworthy, in this respect, that the rules he lays down on some important points of syntax (as pointed out by Profs. Bhandarkar and Kielhorn) are in accord with the practice of the Brâhmaṇas rather than with that of the later classical literature.

Pâṇini's Sûtras continued for ages after to form the centre of grammatical activity. But, as his own work had superseded those of his predecessors, so many of the scholars who devoted themselves to the task of perfecting his system have sunk into oblivion. The earliest of his successors whose work has come down to us (though perhaps not in a separate form), is Kâtyâyana, the author of a large collection of concise critical notes, called *Vârttika*, intended to supplement and correct the Sûtras, or give them greater precision. The exact date of this writer is likewise unknown, but there can be little doubt that he lived at least a century after Pâṇini. During the interval a new body of literature seems to have sprung up,[8] —accompanied with considerable changes of language,—and the geographical knowledge of India extended over large tracts towards the south. Whether this is the same Kâtyâyana to whom the Vâjasaneyi-prâtiśâkhya (as well as the Sarvânukrama) is attributed, is still doubted by some scholars.[9] Kâtyâyana being properly a family or tribal name, meaning "the descendant of Kâtya," later works usually assign a second name Vararuchi to the writers (for there are at least two) who bear it. The Kathâsaritsâgara makes the author of the Vârttikas a fellow-student of Pâṇini, and afterwards the minister of King Nanda; but, though this date might have fitted Kâtyâyana well enough, it is impossible to place any reliance on the statements derived from such a source. Kâtyâyana was succeeded again, doubtless after a considerable interval, by Patañjali, the author of the (*Vyâkaraṇa-*) *Mahâbhâshya*,[10] or Great Commentary. For the great variety of information it incidentally supplies regarding the literature and manners of the period, this is, from an historical and antiquarian point of view, one of the most important works of the classical Sanskrit literature. Fortunately the author's date has been settled by synchronisms implied in two passages of his work. In one of them the use of the imperfect—as the tense referring to an event, known to people generally, not witnessed by the speaker, and yet capable of being witnessed by him—is illustrated

Kâtyâyana. Patañjali.

[1] Edited by K. M. Banerjea.

[2] Printed, with a commentary, at Calcutta; also, with notes, indexes, and an instructive introduction, by O. Böhtlingk.

[3] *I.e.*, son of Śakaṭa, whence he is also called Śakaṭâṅgaja

[4] Compare G. Bühler's paper, *Orient und Occident*, p. 691 *sq.*

[5] A. Burnell, *On the Aindra School of Sanskrit Grammarians.*

[6] *Pânini, his place in Sanskrit Literature*, 1861.

[7] See Lassen, *Ind. Alt.*, i. p. 723; M. Müller, *Hist. of A. S. Lit.*, p. 521; A. Weber, *Ind. Stud.*, v. p. 2 *sq.*

[8] F. Kielhorn, *Kâtâyana and Patañjali*, 1876. The *Sangraha*, a huge metrical work on grammar, by Vyâdi, which is frequently referred to, doubtless belongs to this period.

[9] *E.g.*, A. Weber. Goldstücker and M. Müller take the opposite view.

[10] Part of this work was first printed by Ballantyne; followed by a lithographed edition, by two Benares pandits, 1871; and a photo-lithographic edition of the text and commentaries, published by the India Office, under Goldstücker's supervision, 1874; finally, a critical edition, now in progress, by F. Kielhorn. For a review of the literary and antiquarian data supplied by the work, see A. Weber, *Ind. Stud.*, xiii. 293 *sq.* The author's date has been frequently discussed, most thoroughly and successfully by R. G. Bhandarkar in several papers. See also A. Weber, *Hist. of I. L.*, p. 223.

by the statement "The Yavana besieged Sâketa," which there is reason to believe can only refer to the Indo-Bactrian king Menander (144–*c.* 124 B.C.), who, according to Strabo, extended his rule as far as the Yamunâ.[1] In the other passage the use of the present is illustrated by the sentence, "We are sacrificing for Pushpamitra,"—this prince (178–*c.* 142 B.C.), the founder of the Śunga dynasty, being known to have fought against the Greeks.[1] We thus get the years 144–142 B.C. as the probable time when the work, or part of it, was composed. Although Patañjali probably gives not a few traditional grammatical examples mechanically repeated from his predecessors, those here mentioned are fortunately such as, from the very nature of the case, must have been made by himself. The Mahâbhâshya is not a continuous commentary on Pâṇini's grammar, but deals only with those Sûtras (some 1720 out of a total of nearly 4000) on which Kâtyâyana had proposed any Vârttikas, the critical discussion of which, in connection with the respective Sûtras, and with the views of other grammarians expressed thereon, is the sole object of Patañjali's commentatorial remarks. Though doubts have been raised as to the textual condition of the work, Prof. Kielhorn has clearly shown that it has probably been handed down in as good a state of preservation as any other classical Sanskrit work. Patañjali is also called Gonardîya,—which name Prof. Bhandarkar takes to mean "a native of Gonarda," a place, according to the same scholar, probably identical with Goṇḍa, a town some 20 miles northwest of Oudh,—and Goṇikâputra, or son of Goṇikâ. Whether there is any connection between this writer and the reputed author of the Yogaśâstra is doubtful. The Mahâbhâshya has been commented upon by Kaiyaṭa, in his *Bhâshyapradîpâ*, and the latter again by Nâgojîbhaṭṭa, a distinguished grammarian of the earlier part of the last century, in his *Bhâshya-pradîpoddyota*.

Kâśikâ vṛitti.

Of running commentaries on Pâṇini's Sûtras, the oldest extant and most important is the *Kâśikâ Vṛitti*,[2] or "comment of Kâśî (Benares)," the joint production of two Jaina writers of probably the first half of the 7th century, viz., Jayâditya and Vâmana, each of whom composed one-half (four adhyâyas) of the work. The chief commentaries on this work are Haradatta Miśra's *Padamañjarî*, which also embodies the substance of the Mahâbhâshya, and Jinendra-buddhi's *Nyâsa*.[3]

Modern grammars.

Educational requirements in course of time led to the appearance of grammars, chiefly of an elementary character, constructed on a more practical system of arrangement—the principal heads under which the grammatical matter was distributed usually being—rules of euphony (*sandhi*); inflection of nouns (*nâman*), generally including composition and secondary derivatives; the verb (*âkhyâta*); and primary (*kṛidanta*) derivatives. In this way a number of grammatical schools[4] sprang up at different times, each recognizing a special set of Sûtras, round which gradually gathered a more or less numerous body of commentatorial and subsidiary treatises. As regards the grammatical material itself, these later grammars supply comparatively little that is not already contained in the older works,—the difference being mainly one of method, and partly of terminology, including modifications of the system of technical letters (*anubandha*). Of the grammars of this description hitherto known the *Chândra-vyâkaraṇa* is probably the oldest,—its author Chandra Âchârya having flourished under King Abhimanyu of Kashmir, who is usually supposed to have lived toward the end of the 2d century,[5] and in whose reign that grammarian is stated, along with others, to have revived the study of the Mahâbhâshya in Kashmir. Only portions of this grammar, with a commentary by Ânandadatta, have as yet been recovered.

Chandra.

Kâtantra.

The *Kâtantra*,[6] or *Kâlâpa*, is ascribed to Kumâra, the god of war, whence this school is also sometimes called *Kaumâra*. The real author probably was Śarva-varman, who also wrote the original commentary (*vṛitti*), which was afterwards recast by Durgasiṃha, and again commented upon by the same writer, and subsequently by Trilochana-dâsa. The date of the Kâtantra is unknown, but it will probably have to be assigned to about the 6th or 7th century. It is still used in many parts of India, especially in Bengal and Kashmir. Other grammars are—the *Sârasvatî Prakriyâ*, by Anubhûti Svarûpâchârya; the *Sankshipta-sâra*, composed by Kramadîśvara, and corrected by Jumara-nandin, whence it is also called *Jaumara*; the *Haima-vyâkaraṇa*,[7] by the Jaina writer Hemachaudra (1088–1172, according to Dr. Bhâo Dâjî), the *Mugdha-bodha*,[8] composed, in the latter part of the 13th century, by Vopadeva, the court paṇḍit of King Mahâdeva (Râmarâja) of Devagiri (or Deoghar); the *Siddhânta-kaumudî*, the favorite textbook of Indian students, by Bhaṭṭojî Dîkshita (17th century); and a clever abridgment of it, the *Laghu-* (*Siddhânta-*) *kaumudî*,[9] by Varadarâja.

Hemachandra, etc.

Several subsidiary grammatical treatises remain to be noticed. The *Paribhâshâs* are general maxims of interpretation presupposed by the Sûtras. Those handed down as applicable to Pâṇini's system have been interpreted most ably by Nâgojîbhaṭṭa, in his *Paribâshenduśekhara*.[10] In the case of rules applying to whole groups of words, the complete lists (*gaṇa*) of these words are given in the *Gaṇapâṭha*, and only referred to in the Sûtras. Vardhamâna's *Gaṇaratnamahodadhi*,[11] a comparatively modern recension of these lists (1140 A.D.), is valuable as offering the only available commentary on the Gaṇas which contain many words of unknown meaning. The *Dhâtupâṭhas* are complete lists of the roots (*dhâtu*) of the language, with their general meanings. The lists handed down under this title,[12] as arranged by Pâṇini himself, have been commented upon, amongst others, by Mâdhava. The *Uṇâdi-sûtras* are rules on the formation of irregular derivatives. The oldest work of this kind, commented upon by Ujjvaladatta,[13] is by some writers ascribed to Kâtyâyana Vararuchi, by others even to Śâkaṭâyana. The oldest known treatise on the philosophy of grammar and syntax is the *Vâkya-padîya*,[14] composed in verse, by Bhartṛihari (? 7th century), whence it is also called *Harikârikâ*. Of later works on this subject, the *Vaiyâkaraṇa-bhûshaṇa*, by Koṇḍabhaṭṭa, and the *Vaiyâkaraṇa-siddhânta-mañjûshâ*, by Nâgojîbhaṭṭa, are the most important.

Subsidiary grammatical treatises.

IV. LEXICOGRAPHY.—Sanskrit dictionaries (*kosha*), invariably composed in verse, are either homonymous or synonymous, or partly the one and partly the other. Of those hitherto published, Śâśvata's *Anekârtha-samuchchaya*,[15] or "collection of homonyms," is probably the oldest. While in the later homonymic vocabularies the words are usually arranged according to the alphabetical order of the final (or sometimes the initial) letter, and then according to the number of syllables, Śâśvata's principle of arrangement—viz., the number of meanings assignable to a word—seems to be more primitive. The work probably next in time is the famous *Amara-kosha*[16] ("immortal treasury") by Amara-siṃha, one of "the nine gems" at the court of King Vikramâditya (*c.* 550 A.D.). This dictionary consists of a synonymous and a short homonymous part; whilst in the former the words are distributed in sections according to subjects, as heaven and the gods, time and seasons, etc., in the latter they are arranged according to their final letter, without regard to the number of syllables. This Kosha has found many commentators, the oldest of those known being Kshîrasvâmin.[17] Among the works quoted by commentators as Amara's sources are the *Trikâṇḍa* and *Utpalinî-koshas*, and the glossaries of Rabhasa, Vyâḍi, Kâtyâyana, and Vararuchi. A Kosha ascribed to Vararuchi,—whom tradition makes one of the nine literary "gems," and hence the contemporary of Amara-siṃha,—consisting of ninety short sections, has been printed at Benares (1865) in a collection of twelve Koshas. The *Abhidhâna-ratnamâlâ*,[18] by Halâyudha; the *Viśvaprakâśa*, by Maheśvara (1111); and the *Abhidhâna-chintâmaṇi*[19] (or *Haima-kosha*), by the Jaina Hemachandra, seem all three to belong to the 12th century.

Dictionaries.

[1] Lassen, *Ind. Alt.*, ii. 341, 362.
[2] Edited by Pandit Bâla Śâstrî, Benares, 1876–78.
[3] As it is quoted by Vopadeva, it cannot be later than the 12th century.
[4] Dr. Burnell, in his *Aindra School*, proposes to apply this term to all grammars arranged on this plan.
[5] Prof. Bhandarkar, *Early History of the Dekhan*, p. 20, proposes to fix him about the end of the 3d century.
[6] Ed., with comm., by J. Eggeling.
[7] Part ed. and transl. by R. Pischel.
[8] Ed. by O. Böhtlingk, 1847.
[9] Ed. and transl. by J. R. Ballantyne. For other modern grammars see Colebrooke, *Essays*, ii. p. 44; Râjendralâla Mitra, *Descriptive Catalogue*, i., Grammar.
[10] Ed. and transl. by F. Kielhorn.
[11] Ed. by J. Eggeling.
[12] Ed. by N. L. Westergaard.
[13] Text and commentary, ed. by Th. Aufrecht.
[14] In course of publication, with commentaries, at Benares.
[15] Ed. by Th. Zachariae.
[16] Edited by H. T. Colebrooke (1808), and by L. Deslongchamps (1839–45).
[17] A grammarian of this name is mentioned as the tutor of King Jayâpîḍa of Kashmir (755–786 A.D.); but Kshîra, the commentator on Amara, is placed by Prof. Aufrecht between the 11th and 12th centuries, because he quotes the Śabdânuśâsana ascribed to Bhojarâja.
[18] Ed. by Th. Aufrecht (1861).
[19] Ed. by O. Böhtlingk and C. Rieu (1847).

Somewhat earlier than these probably is Ajaya Pâla, the author of the (homonymous) *Nânârtha-sangraha*, being quoted by Vardhamâna (1140 A.D.). Of more uncertain date is Purushottama Deva, who wrote the *Trikâṇḍa-śesha*, a supplement to the Amarakosha, besides the *Hárávalí*, a collection of uncommon words, and two other short glossaries. Of numerous other works of this class the most important is the *Medinî*, a dictionary of homonyms, arranged in the first place according to the finals and the syllabic length, and then alphabetically. Two important dictionaries compiled by native scholars of the present century, are the *Śabdakalpadruma* by Râdhâkânta Deva, and the *Vâchaspatya*, by Târânâtha Tarka-vâchaspati. A full account of Sanskrit dictionaries is contained in the preface to the first edition of H. H. Wilson's *Dictionary*, reprinted in his *Essays on Sanskrit Literature*, vol. iii.

V. PROSODY (*Chhandas*).—The oldest treatises on prosody have already been referred to in the account of the technical branches of the later Vedic literature. Among more modern treatises the most important are the *Mṛita-sanjîvanî*, a commentary on Pingala's Sûtra, by Halâyudha (perhaps identical with the author of the glossary above referred to); the *Vṛitta-ratnâkara*, or "jewel-mine of metres," in six chapters, composed before the 13th century by Kedâra Bhaṭṭa, with several commentaries; and the *Chhando-mañjarî*, likewise in six chapters, by Gangâdâsa. The *Śrutabodha*, ascribed, probably wrongly to the great Kâlidâsa, is a comparatively insignificant treatise, dealing only with the more common metres, in such a way that each couplet forms a specimen of the metre it describes. The *Vṛitta-darpaṇa* treats chiefly of Prâkṛit metres. Sanskrit prosody, which is probably not surpassed by any other, either in variety of metre or in harmoniousness of rhythm, recognizes two classes of metres, viz., such as consist of a certain number of syllables of fixed quantity, and such as are regulated by groups of breves or metrical instants, this latter class being again of two kinds, according as it is or is not bound by a fixed order of feet. A pleasant account of Sanskrit poetics is given in Colebrooke's *Essays*, vol. ii.; a more complete and systematic one by Prof. Weber, *Ind. Stud.*, vol. viii. PROSODY.

VI. MUSIC (*Sangîta*).—The musical art has been practiced in India from early times. The theoretic treatises on profane music now extant are, however, quite modern productions. The two most highly esteemed works are the *Sangîta-ratnâkara* ("jewel-mine of music"), by Śârṅgadeva, and the *Sangîta-darpaṇa* ("mirror of music"), by Dâmodara. Each of these works consists of seven chapters, treating respectively of—(1) sound and musical notes (*svara*); (2) melodies (*râga*); (3) music in connection with the human voice (*prakîrṇaka*); (4) musical compositions (*prabandha*); (5) time and measure (*tâla*); (6) musical instruments and instrumental music (*vâdya*); (7) dancing and acting (*nṛitta* or *nṛitya*). The Indian octave consists like our own of seven chief notes (*svara*); but, while with us it is subdivided into twelve semi-tones, the Hindu theory distinguishes twenty-two intervals (*sruti*, audible sound). There is, however, some doubt as to whether these *śrutis* are quite equal to one another,—in which case the intervals between the chief notes would be unequal, since they consist of either two or three or four *śrutis*,—or whether, if the intervals between the chief notes be equal, the *śrutis* themselves vary in duration between quarter-, third-, and semi-tones. There are three scales (*grâma*), differing from each other in the nature of the chief intervals (either as regards actual duration, or the number of śrutis or sub-tones). Indian music consists almost entirely in melody, instrumental accompaniment being performed in unison, and any attempt at harmony being confined to the continuation of the key-note. A number of papers, by various writers, have been reprinted with additional remarks on the subject, in Sourindo Mohun Tagore's *Hindu Music*, Calcutta, 1875. Compare also "Hindu Music," reprinted from the *Hindoo Patriot*, September 7, 1874. MUSIC.

VII. RHETORIC (*Alankâra-śâstra.*)—Treatises on the theory of literary composition are very numerous. Indeed, a subject of this description—involving such nice distinctions as regards the various kinds of poetic composition, the particular subjects and characters adapted for them, and the different sentiments or mental conditions capable of being both depicted and called forth by them—could not but be congenial to the Indian mind. H. H. Wilson, in his *Theatre of the Hindus*, has given a detailed account of these theoretic distinctions with special reference to the drama, which, as the most perfect and varied kind of poetic production, usually takes an important place in the theory of literary composition. The *Bharata-śâstra* has already been alluded to as probably the oldest extant work in this department of literature. Another comparatively ancient treatise is the *Kâvyádarśa*,[1] or "mirror of poetry," in three chapters, by Daṇḍin, the author of the novel Daśakumâracharita, who probably flourished not long after Kâlidâsa (whose Prâkṛit poem Setubandha he quotes) in the 6th century. The work consists of three chapters, treating—(1) of two different local styles (*rîti*) of poetry, the Gaudî and the Vaidarbhî (to which later critics add four others, the Pâñchâlî, Mâgadhî, Lâṭî, and Âvantikâ); (2) of the graces and ornaments of style, as tropes, figures, similes; (3) of alliteration, literary puzzles, and twelve kinds of faults to be avoided in composing poems. Another treatise on rhetoric, in Sûtras, with a commentary entitled *Kâvyálankâra-vṛitti*, is ascribed to Vâmana. Prof. Cappeller, to whom we owe an edition of this work, is inclined to fix it as late as the 12th century; but it may turn out to be somewhat older. The *Kâvyálankâra*, by the Kashmirian Rudraṭa, must have been composed prior to the 11th century, as a gloss on it (by Nami), which professes to be based on older commentaries, was written in 1068. Dhanañjaya, the author of the *Daśarûpa*,[2] or "ten forms (of plays)," the favorite compendium of dramaturgy, appears to have flourished in the 10th century. In the concluding stanza he is stated to have composed his work at the court of King Muñja, who is probably identical with the well-known Mâlava prince, the uncle and predecessor of King Bhoja of Dhârâ. The Daśarûpa was early commented upon by Dhanika, possibly the author's own brother, their father's name being the same (Vishṇu). Dhanika quotes Râjaśekhara, who is supposed to have flourished about 1000 A.D.,[3] but may after all have to be put somewhat earlier. The *Sarasvatî-kaṇṭhâbharaṇa*, "the neck-ornament of Sarasvatî (the goddess of eloquence)," a treatise, in five chapters, on poetics generally, remarkable for its wealth of quotations, is ascribed to King Bhoja himself (11th century), probably as a compliment by some writer patronized by him. The *Kávya-prakáśa*,[4] "the lustre of poetry," another esteemed work of the same class, in ten sections, was probably composed in the 12th century,—the author, Mammata, a Kashmirian, having been the maternal uncle of Srî-Harsha, the author of the Naishadhîya. The *Sáhitya-darpaṇa*,[5] or "mirror of composition," the standard work on literary criticism, was composed in the 15th century, on the banks of the Brahmaputra, by Viśvanâtha Kavirâja. The work consists of ten chapters, treating of the following subjects: (1) the nature of poetry; (2) the sentence; (3) poetic flavor (*rasa*); (4) the divisions of poetry; (5) the functions of literary suggestion; (6) visible and audible poetry (chiefly on dramatic art); (7) faults of style: (8) merits of style; (9) distinction of styles; (10) ornaments of style. RHETORIC.

VIII. MEDICINE (*Âyur-veda, Vaidya-śâstra*).—Though the early cultivation of the healing art is amply attested by frequent allusions in the Vedic writings, it was doubtless not till a much later period that the medical practice advanced beyond a certain degree of empirical skill and pharmacentic routine. From the simultaneous mention of the three humors (wind, bile, phlegm) in a vârttika to Pâṇini (v. 1, 38), some kind of humoral pathology would, however, seem to have been prevalent among Indian physicians several centuries before our era. The oldest existing work is supposed to be the *Charaka-saṃhitá*,[6] a bulky cyclopædia in ślokas, mixed with prose sections, which consists of eight chapters, and was probably composed some centuries after Christ. Of equal authority, but probably somewhat more modern, is the *Suśruta* (*-saṃhitá*),[7] which Suśruta is said to have received from Dhanvantari, the Indian Æsculapius, whose name, however, appears also among the "nine gems" (*c.* 550 A.D.). It consists of six chapters, and is likewise composed in mixed verse and prose,—the greater simplicity of arrangement, as well as some slight attention paid in it to surgery, betokening an advance upon Charaka. Both works are, however, characterized by great prolixity, and contain much matter which has little connection with medicine. The late Prof. E. Haas, in two very suggestive papers,[8] tried to show that the work of Suśruta (identified by him with Socrates, so often confounded in the Middle Ages with Hippocrates) was probably not composed till after the Mohammedan conquest, and that, so far from the Arabs (as they themselves declare) having derived some of their knowledge of medical science from Indian authorities, the Indian Vaidyaśâstra was nothing but a poor copy MEDICINE.

[1] Ed. with commentary, by Premachandra Tarkabâgisa, *Bibl. Ind.*
[2] Edited by Fitzedw. Hall, *Bibl. Ind.*, 1865.
[3] R. Pischel, *Gött. Gel. A.*, 1883; G. Bühler, *Ind. Ant.*, 1884, p. 29.
[4] Ed. by Mahesa Chandra Nyâyaratna, 1866.
[5] Text and translation in *Bibl. Ind.*
[6] Ed. by Jibananda Vidyasagara, Calc., 1877.
[7] Ed. by Madhusûdana Gupta, 1835–37, and by Jibananda Vidyasagara, 1873.
[8] *Z. D. M. G.*, 1876, p. 617 *sq.*; 1877, p. 647 *sq.*

of Greek medicine, as transmitted by the Arabs. But even though Greek influence may be traced in this as in other branches of Indian science, there can be no doubt,[1] at any rate, that both Charaka and Suśruta were known to the Arab Râzî (*c.* 932 A.D.) and to the author of the Fihrist (completed 987 A.D.), and that their works must therefore have existed, in some form or other, at least as early as the 9th century. Among the numerous later medical works the most important general compendiums are Vâgbhaṭa's *Ashṭâṅga-hṛidaya*, "the heart of the eight-limbed (body of medical science)," and Bhâva Miśra's *Bhâva-prakâśa;* while of special treatises may be mentioned Mâdhava's system of nosology, the *Rugviniśchaya*, or *Mâdhava-nidâna*, and Śârngadhara's compendium of therapeutics, the *Śârngadhara-saṃhitâ*. Materia medica, with which India is so lavishly endowed by nature, is a favorite subject with Hindu medical writers,—the most valued treatise being the *Râja-nighaṇṭu*, by the Kashmirian Narahari. The best general view of this branch of Indian science is continued in T. A. Wise's *Commentary on Hindu Medicine*, 1845, and in his *History of Medicine*, vol. i., 1867; but the whole subject, including the principal original works, still awaits a critical investigation.

ASTRONOMY AND MATHEMATICS.

IX. ASTRONOMY AND MATHEMATICS.—Hindu astronomy may be broadly divided into a pre-scientific and a scientific period. While the latter clearly presupposes a knowledge of the researches of Hipparchus and other Greek astronomers, it is still doubtful whether the earlier astronomical and astrological theories of Indian writers were entirely of home growth or partly derived from foreign sources. From very ancient (probably Indo-European) times chronological calculations were based on the synodical revolutions of the moon,—the difference between twelve such revolutions (making together 354 days) and the solar year being adjusted by the insertion, at the time of the winter solstice, of twelve additional days. Besides this primitive mode the Rigveda also alludes to the method prevalent in post-Vedic times, according to which the year is divided into twelve (*sâvana* or solar) months of thirty days, with a thirteenth month intercalated every fifth year. This quinquennial cycle (*yuga*) is explained in the *Jyotisha*, regarded as the oldest astronomical treatise. An institution which occupies an important part in those early speculations is the theory of the so-called lunar zodiac, or system of lunar mansions, by which the planetary path, in accordance with the duration of the moon's rotation, is divided into twenty-seven or twenty-eight different stations, named after certain constellations (*nakshatra*) which are found alongside of the ecliptic, and with which the moon (masc.) was supposed to dwell successively during his circuit. The same institution is found in China and Arabia; but it is still doubtful[2] whether the Hindus, as some scholars hold, or the Chaldæans, as Prof. Weber thinks, are to be credited with the invention of this theory. The principal works of this period are hitherto known from quotations only, viz., the *Gârgî Saṃhitâ*, which Prof. Kern would fix at *c.* 50 B.C., the *Nâradî Saṃhitâ*, and others.

The new era, which the same scholar dates from *c.* 250 A.D., is marked by the appearance of the five original Siddhântas (partly extant in revised redactions and in quotations), the very names of two of which suggest Western influence, viz., the *Paitâmaha-*, *Sûrya-*,[3] *Vasishṭha-*, *Romaka-* (*i.e.*, Roman), and *Pauliśa-siddhântas*. Based on these are the works of the most distinguished Indian astronomers, viz., Âryabhaṭa,[4] probably born in 476; Varâha-mihira,[5] probably 505–507; Brahma-gupta, who completed his *Brahma-siddhânta* in 628; Bhaṭṭa Utpala (10th century), distinguished especially as commentator of Varâha-mihira; and Bhâskara Âchârya, who finished his great course of astronomy, the *Siddhânta-śiromaṇi*, in 1150. In the works of several of these writers, from Âryabhaṭa onwards, special attention is paid to mathematical (especially arithmetical and algebraic) computations; and the respective chapters of Bhâskara's compendium, viz., the *Lîlâvatî* and *Vîja-gaṇita*[6] still form favorite textbooks of these subjects. The question whether Âryabhaṭa was acquainted with the researches of the Greek algebraist Diophantus (*c.* 360 A.D.) remains still unsettled; but, even if this was the case, algebraic science seems to have been carried by him beyond the point attained by the Greeks. (J. E.)

SANSON, NICOLAS (1600–1667), a French cartographer, who, while it is a mistake to call him the creator of French geography, attained a great and well-deserved eminence in his profession. He was born of an old Picardy family of Scottish descent, at Abbeville, on December 20, 1600, and was educated by the Jesuits at Amiens. The mercantile pursuit by which he first sought to make his living proved a failure, but in 1627 he was fortunate enough to attract the attention of Richelieu by a map of Gaul which he had constructed while still in his teens, and through the cardinal's influence he was appointed royal engineer in Picardy and geographer to the king. How highly his services were appreciated by his royal patrons is shown by the fact that when Louis XIII. came to Abbeville he preferred to become the guest of Sanson (then employed on the fortifications), instead of occupying the sumptuous lodgings provided by the town. Sanson's success was embittered by a quarrel with the Jesuit Labbe, whom he accused of plagiarizing him in his *Pharus Galliæ Antiquæ*, and by the death of his eldest son Nicolas, killed during the disturbances of the Fronde (1648). He died at Paris July 7, 1667. Two younger sons, Adrien (died 1708) and Guillaume (died 1703), succeeded him as geographers to the king.

Sanson's principal works are *Galliæ Antiquæ Descriptio Geographica*, 1627; *Britannia*, 1638, in which he seeks to identify Strabo's Britannia with Abbeville (!); *La France*, 1644; *In Pharum Galliæ Antiquæ Philippi Labbe Disquisitiones*, 1647–1648; and *Geographia Sacra*. In 1692 Jaillot collected Sanson's maps in an *Atlas Nouveau*. His cartography is generally bold and vigorous.

SANSOVINO, ANDREA CONTUCCI DEL MONTE (1460–1529), an able Florentine sculptor, who lived during the rapid decline of plastic art which took place from about the beginning of the 16th century; he was the son of a shepherd called Niccolo di Domenico Contucci, and was born in 1460 at Monte Sansavino near Arezzo, whence he took his name, which is usually softened to Sansovino. He was a pupil of Antonio Pollaiuolo, and during the first part of his life worked in the purer style of 15th-century Florence. Hence his early works are by far the best, such as the terra-cotta altar-piece in Santa Chiara at Monte Sansavino, and the marble reliefs of the Annunciation, the Coronation of the Virgin, a Pietà, the Last Supper, and various statuettes of saints and angels in the Corbinelli chapel of S. Spirito at Florence, all executed between the years 1488 and 1492. From 1491 to 1500 Andrea worked in Portugal for the king, and some pieces of sculpture by him still exist in the monastic church of Coimbra.[7] These early reliefs show strongly the influence of Donatello. The beginning of a later and more pagan style is shown in the statues of St. John baptizing Christ which are over the east door of the Florentine baptistery. This group was, however, finished by the weaker hand of Vincenzo Danti. In 1502 he executed the marble font at Volterra, with good reliefs of the Four Virtues and the Baptism of Christ. In 1505 Sansovino was invited to Rome by Julius II. to make the monuments of Cardinal Ascanio Maria Sforza and Cardinal Girolamo della Rovere for the retro-choir of S. Maria del Popolo. The architectural parts of these monuments and their sculptured foliage are extremely graceful and executed with the most minute delicacy, but the

[1] See Prof. Aug. Müller's paper, *Z. D. M. G.*, 1880, p. 465.

[2] See especially Prof. Whitney's essay on the Lunar Zodiac, in his *Oriental and Linguistic Studies*.

[3] The *Sûrya-siddhânta*, translated by (W. D. Whitney and) E. Burgess, 1860.

[4] The *Âryabhaṭîya*, edited by H. Kern, 1874.

[5] The *Bṛihat-saṃhitâ* and *Yogayâtrâ*, edited and translated by H. Kern; the *Laghu-jâtaka*, edited by A. Weber and H. Jacobi.

[6] A translation of both treatises, as well as of the respective chapters of Brahma-gupta's work, was published (1817) by H. T. Colebrooke, with an important "Dissertation on the Algebra of the Hindus," reprinted in the *Misc. Essays*, ii. p. 375 *sq.*

[7] See Raczinski, *Les Arts en Portugal*, Paris, 1846, p. 344.

recumbent effigies show the beginning of a serious decline in taste. Though skilfully modelled, they are uneasy in attitude, and have completely lost the calm dignity and simple lines of the earlier effigies, such as those of the school of Mino da Fiesole in the same church. These tombs had a very important influence on the monumental sculpture of the time, and became models which for many years were copied by most later sculptors with increasing exaggerations of their defects. In 1512, while still in Rome, Sansovino executed a very beautiful group which shows strongly the influence of Leonardo da Vinci, both in the pose and in the sweet expression of the faces; it is a group of the Madonna and Child with St. Anne, now over one of the side altars in the church of S. Agostino. From 1513 to 1528 he was at Loreto, where he cased the outside of the Santa Casa in white marble, covered with reliefs and statuettes in niches between engaged columns; a small part of this gorgeous mass of sculpture was the work of Andrea himself, but the greater part was executed by Montelupo, Tribolo, and others of his numerous school of assistants and pupils. Though the general effect of the whole is very rich and magnificent, the individual pieces of sculpture are both dull and feeble, showing the unhappy results of an attempt to imitate Michelangelo's grandeur of style. The earlier reliefs, those by Sansovino himself, are the best, still retaining some of the sculpturesque purity of the older Florentines. He died in 1529.

SANSOVINO, Jacopo (1477–1570), was called Sansovino after his master Andrea (see above), his family name being Tatti. Born in 1477, he became a pupil of Andrea in 1500, and in 1510 accompanied him to Rome, devoting himself there to the study of antique sculpture. Julius II. employed him to restore damaged statues, and while working in the Vatican he made a full-sized copy of the Laocoon group, which was afterwards cast in bronze, and is now in the Uffizi at Florence. In 1511 he returned to Florence, and began the statue of St. James the Elder, which is now in a niche in one of the great piers of the Duomo. Under the influence of his studies in Rome he carved a nude figure of Bacchus and Pan, now in the Bargello, near the Bacchus of Michelangelo, from the contrast with which it suffers much. Soon after the completion of these works, Jacopo returned to Rome, and designed for his fellow-citizens the grand church of S. Giovanni dei Fiorentini, which was afterwards carried out by Antonio Sangallo the younger. A marble group of the Madonna and Child, now at the west of S. Agostino, was his next important work. It is heavy in style, and quite without the great grace and beauty of the Madonna and St. Anne in the same church by his master Andrea. In 1527 Jacopo fled from the sack of Rome to Venice, where he was welcomed by his friends Titian and Pietro Aretino; henceforth till his death in 1570 he was almost incessantly occupied in adorning Venice with a vast number of magnificent buildings and many second-rate pieces of sculpture. Among the latter Jacopo's poorest works are the colossal statues of Neptune and Mars on the grand staircase of the ducal palace, from which it is usually known as the "Giants' Staircase." His best are the bronze doors of the sacristy of St. Mark, cast in 1562; inferior to these are the series of six bronze reliefs round the choir of the same church, attempted imitations of Ghiberti's style, but unquiet in design and unsculpturesque in treatment. In 1565 he completed a small bronze gate with a graceful relief of Christ surrounded by Angels; this gate shuts off the altar of the Reserved Host in the choir of St. Mark's.

Jacopo's chief claim to real distinction rests upon the numerous fine Venetian[1] buildings which he designed, such as the public library, the mint, the Scuola della Misericordia, the Palazzo de' Cornari, and the Palazzo Delfino, with its magnificent staircase,—the last two both on the grand canal; a small loggia which he built at the foot of the great Campanile, richly decorated with sculpture, has recently been pulled down and much damaged, but is being rebuilt. Among his ecclesiastical works the chief are the church of S. Fantino, that of S. Martino, near the arsenal, the Scuola di S. Giovanni degli Schiavoni, and, finest of all, the church of S. Geminiano, near St. Mark's, a very good specimen of the Tuscan and Composite orders used with the graceful freedom of the Renaissance.

The otherwise prosperous course of the artist's life was interrupted by one serious misfortune. In 1545 the roof of the public library, which he was then constructing, gave way and fell in; on account of this he was imprisoned, fined, and dismissed from the office of chief architect of the cathedral, to which he had been appointed by a decree of the signoria on April 7, 1529. Owing, however, to the intervention of his friends, Titian, Pietro Aretino, and others, he was soon set at liberty, and in 1549 he was restored to his post. He did good service to the cathedral of St. Mark's by strengthening its failing domes, which he did by encircling them with bands of iron. Sansovino's architectural works have much beauty of proportion and grace of ornament, a little marred in some cases by an excess of sculptured decoration, though the carving itself is always beautiful both in design and execution. He used the classic orders with great freedom and tasteful invention—very different from the dull scholasticism of most of his contemporaries. His numerous pupils were mostly men of but little talent.

SANTA ANNA, Antonio Lopez de (1798–1876), for many years a prominent figure in the troubled politics of Mexico, was born at Jálapa on February 21, 1798. Having entered the army, he joined the party of Iturbide (*q.v.*) in 1821, and gained distinction and promotion by the part he took in the surprise and capture of Vera Cruz. In the following year he quarrelled with his chief and himself became leader of a party, but without in the first instance achieving success. In 1828, however, he sided with Guerrero, who made him war minister, and also commander-in-chief after a successful operation against the Spaniards in 1829. He successively accomplished the overthrow of Guerrero in favor of Bustamante and of Bustamante in favor of Pedraza, and finally in March, 1833, was himself elected president. In 1836 he was defeated and taken by the Texan revolutionists, but returned to Mexico the following year. In 1844, after considerable vicissitudes, he was deposed and banished, but he was brought back once more to the presidential chair in 1846. This second term of office lasted till the fall of Mexico in 1847, when he resigned. He was made president again in 1853, but finally abdicated in 1855. In 1867 he took part in "pronunciamientos" which led to his banishment. In 1874 he was permitted to return to his native soil, where he died two years afterwards.

SANTA CRUZ. See Saint Croix. For Santa Cruz de Santiago see Canary Islands, vol. iv. p. 705; and for Santa Cruz or Nitendi Island see New Hebrides, vol. xvii. p. 405.

SANTA FÉ, a city of the Argentine Republic, capital of the province of Santa Fé (38,600 square miles;[2] 189,000 inhabitants), occupies an area of 400 acres, 90 miles north of Rosario, on the northeast or left bank of the Rio Salado at its junction with the Paraná, in a district subject to periodical inundations. It is the seat of the governor, the bishop, and the legislature, and contains a cathedral, a Jesuits' church (1654) and college (the latter an important institution

[1] [Pronounced by Symonds "the crowning triumph of Venetian art." *Renaissance in Italy, Fine Arts*, p. 85.—Am. Ed.]

[2] [There are no reliable areas obtainable, and the estimates vary from the 18,000 sq. m. of the Statesman's Year Book for 1884, which claims to be official, to the 43,700 in the evidently inaccurate table of vol. ii. p. 434.—Am. Ed.]

with 400 boarders), a new bishop's palace, a town-hall (with a fine tower), extensive infantry barracks, and a large market. A foundry, a macaroni-factory, oil-factories, and tile-works are the chief industrial establishments. The population in 1881 was 10,400, a decrease since 1869. Santa Fé was founded in 1573 by Juan de Garay.

SANTA FÉ, a city of the United States, capital of New Mexico, stands in a wide plain surrounded by mountains about 7000 feet above the sea, in 35° 41′ N. lat. and 105° 46′ W. long., near the Santa Fé Creek, which joins the Rio Grande del Norte 14 or 15 miles farther southwest. It is connected by a branch line (18 miles) with the Atchison, Topeka, and Santa Fé Railroad at Lamy Junction, 835 miles from Atchison. The houses are mainly constructed of adobe, and the irregularity of the plan shows how recently the city has come under the influence of "American" progress. Among the more noteworthy buildings are the new capitol, for which funds were voted in 1883, the Roman Catholic cathedral, erected since 1870, and the old governor's palace, a long low edifice occupying one side of the principal *plaza*, which now contains a soldiers' monument in honor of those who fell in the service of the United States. Santa Fé is an important centre of trade, and the development of the mining industries in the vicinity is rapidly increasing its prosperity. The population was 6635 in 1881.

One of the oldest cities of North America, Santa Fé de San Francisco was the capital of New Mexico from 1640, but remained in comparative seclusion till the early part of the present century, when it became a main station on what was called the Santa Fé Trail—the trade route between the United States and Mexico, or more especially between St. Louis and Chihuahua. A custom-house was established in the city in 1821, and the first American mercantile house began business in 1826. By 1843 the value of the merchandise entrusted to the train of 230 wagons from St. Louis was $450,000. General Kearny built Fort Marcy at Sauta Fé in 1846, and in 1851 the city became the capital of the new Territory. In 1862 it was occupied for some days by the Confederates.

SANTA FÉ DE BOGOTÁ. See Bogotá.

SANTÁL PARGANÁS, The, a British district in the lieutenant-governorship of Bengal, forming the southern portion of the Bhágalpur division, and lying between 23° 48′ and 25° 19′ N. lat., and between 86° 30′ and 87° 58′ E. long. The total area of the district is 5456 square miles; it is bounded on the north by the districts of Bhágalpur and Purniah, on the east by Maldah, Murshidábád, and Bírbhúm, on the south by Bardwán and Mánbhúm, and on the west by Hazáribagh and Bhágalpur. Three distinct types of country are represented within the area of the Santál Parganás: in the east a sharply defined belt of hills stretches for about a hundred miles from the Ganges to the Naubil River; west of this point a rolling tract of long ridges with intervening depressions covers an area of about 2500 square miles; while the third type is exemplified by a narrow strip of flat alluvial country about 170 miles long, lying for the most part along the loop line of the East Indian Railway. The Rajmahal Hills are the only range of any importance in the district, and occupy an area of 1366 square miles; but they nowhere exceed 2000 feet in height. Several other hill ranges occur, which are with few exceptions covered almost to their summits with dense jungle; they are all difficult of access; there are, however, numerous passes through all the ranges. Coal and iron are found in almost all parts of the country, but the coal is of such inferior quality that all attempts to work it have failed. Wild animals, including tigers, leopards, bears, hyænas, deer, and wild pig, with a variety of small game, are common almost everywhere. The climate varies; the alluvial tract has the damp heat and moist soil characteristic of Bengal, while the undulating and hilly portions are swept by the hot westerly winds of Behar, and are very cool in the winter months. The average annual rainfall is over 50 inches. The district is traversed on the east by the loop line, and on the west by the chord line, of the East Indian Railway; the total length of railway is about 130 miles.

The census of 1881 disclosed a total population in the Sautál Parganás of 1,568,093 (males 785,330, females 782,763); Hindus numbered 847,590, Mohammedans 108,899, and Christians 3057. The total number of persons belonging to the aboriginal tribes was 605,517, of whom the great majority (537,546) were Santáls. For an account of this interesting tribe, see India, vol. xii. p. 817. The population is almost entirely rural; only two towns contain over 5000 inhabitants each, viz., Deoghar, which is the only municipality, with a population of 8015, and Shahebgunge with 6512. The administrative headquarters are at Naya Dumka.

Rice forms the staple crop of the Santál Parganás, and is largely grown in the alluvial strip of country which runs along the eastern boundary of the district. Other crops are millets, wheat, barley, maize, various pulses and oil-seeds, jute, flax, sugar-cane, cotton, and indigo. The district is singularly destitute of any local manufactures; iron is roughly smelted by Kol settlers from Chutiá Nagpur; coarse cloth is woven as a domestic manufacture, and bell-metal utensils are made to a small extent; indigo is also manufactured. The trade is carried on by means of permanent markets. Exports consist chiefly of rice, Indian corn, oil-seeds, tasar-silk cocoons, lac, small-sized timber, and hill bamboos; while European piece goods, salt, and brass or bell-metal utensils for household use compose the bulk of the imports. In 1883–84 the gross revenue of the district amounted to £45,437 [$220,823.82], of which the land-tax yielded £22,556 [$109,622.16].

The Santáls have been known to the British since the latter part of the 18th century. In 1832 two Government officials were deputed to demarcate with solid masonry pillars the present area of the Daman-i-Koh, or skirts of the hills. The permission to Santáls to settle in the valleys and on the lower slopes of the Daman stimulated Santál immigration to an enormous extent. The Hindu money-lender soon made his appearance amongst them, and led to the rebellion of 1855–56. The insurrection was not quelled without bloodshed, but it led to the establishment of a form of administration congenial to the immigrants; and a land settlement has since been carried out on conditions favorable to the occupants of the soil.

SANTA MARIA. See Capua.

SANTA MAURA, or Leucadia (Λευκάδα, ancient Λευκάς), one of the Ionian Islands, with an area of 110 square miles and a population (1880) of 25,000 (20,892 in 1870), lies off the coast of Acarnania (Greece), immediately south of the entrance to the Gulf of Arta. It first appears in history as a peninsula (*Odyssey*, xxiv. 378), and, if the statements of ancient authorities be accepted literally, it owed its existence as an island to the Corinthians, whose canal across the isthmus was again after a long period of disuse opened up by the Romans. But it is probable rather that Leucas was then as now separated from the mainland by a shallow lagoon (two feet or less.) During the English occupation a canal for boats of four to five feet draught was formed from Fort Santa Maura to the town, but the 16-feet-deep ship canal which it was proposed (1844) to carry right across the lagoon or submerged isthmus to Fort Alexander was only partially excavated.[1] Santa Maura, measuring about 20 miles from north to south and 5 to 8 miles in breadth, is a rugged mass of limestone and bituminous shales (partly Tertiary), rising in its principal ridges to heights of 2000 and 3000 feet, and presenting very limited areas of level ground. The grain crop suffices only for a few months' local consumption; but olive oil of good quality is produced to the extent of 30,000 to 50,000 barrels per annum; the vineyards (in the west especially) yield 100,000 barrels of red wine (bought mainly by Rouen, Cette, Trieste, and Venice); the currant, introduced about 1859, has gradually come to be the principal source of wealth (the crop

[1] As a six hours' shortening of the steam-passage between the Levant and the Adriatic would be effected by such a channel, the scheme has again been taken up. According to M. Pyat, the engineer employed to report, the dredging could be done for 1,200,000 francs [$231,600].

averaging 2,500,000 lb); and small quantities of cotton, flax, tobacco, valonia, etc., are also grown. The salt trade, formerly of importance, has suffered from Greek customs regulations. Though to a large extent unlettered and superstitious, the inhabitants are industrious and well-behaved. The chief town (5000 inhabitants) properly called Amaxikhi, but more usually Santa Maura, after the neighboring fort, is situated at the northeast end of the island opposite the lagoon. In the southwest is the village of Vasiliki, where a wharf protected by a mole was built in 1877-78 for shipping the currant crop. Remains of Cyclopean and polygonal walls exist at Kaligoni (south of Amaxikhi), probably the site of the ancient acropolis of Neritus (or Nericus), and of the later and lower Corinthian settlement of Leucas. From this point a Roman bridge seems to have crossed to the mainland. Between the town and Fort Santa Maura extends a remarkably fine Turkish aqueduct partly destroyed along with the town by the earthquake of 1825. Forts Alexander and Constantine commanding the bridge are relics of the Russian occupation; the other forts are of Turko-Venetian origin. The magnificent cliff, some 2000 feet high, which forms the southern termination of the modern island still bears the substructions of the temple of Apollo Leucatas (hence the modern name Capo Ducato). At the annual festival of Apollo a criminal was obliged to plunge from the summit into the sea, where, however, an effort was made to pick him up; and it was by the same heroic leap that Sappho and Artemisia, daughter of Lygdamis, are said to have ended their lives.

SANTANDER, a province in the north of Spain, on the shores of the Bay of Biscay, bounded on the E. by Biscaya, on the S. by Burgos and Palencia, and on the W. by Leon and Oviedo. The area is 2113 square miles. The province is mountainous in character, being traversed from east to west by the Cantabrian chain, which in the Picos de Europa reaches a height of over 8700 feet, and sends off numerous branches to the sea. On the north side of the range the streams are all short, the principal being the Ason, the Miera, the Pas, the Besaya, the Soja, and the Nansa, which flow into the Bay of Biscay; part of the province lies to the southward of the watershed, and is drained by the upper Ebro. The valleys of Santander are fertile, and produce various kinds of grain, maize, pulse, hemp, flax, and vegetables. Oranges, lemons, grapes, figs, and other fruits flourish, and forests of oak, chestnut, walnut, and fir cover the hills. Rich pasturage for cattle and swine and a good supply of game are also found among them, and the fisheries along the coast are likewise productive. Foreign capital has been successfully applied to the development of lead, coal, and iron mines; and the mountains contain quarries of limestone, marble, and gypsum, and abound with mineral springs. The district was part of the Roman province of Cantabria, which, after passing under the empire of the Goths, became the principality of the Asturias. The portion called Asturia de Santa Juliana, or Santillana, was included in the kingdom of Old Castile, and, on the subdivision of the old provinces of Spain in 1833, became the province of Santander. The people are of a purer race than in parts of Spain subjected by the Moors, and both in mental and physical qualities show their Teutonic ancestry. The industries of the country are consequently in a flourishing condition, and, besides the natural products above mentioned, there are foundries, breweries, distilleries, tanneries; cotton, linen, cloth, and flour mills; brick and tile works; and manufactories of hats, soap, buttons, preserves, and chocolate. The province is traversed from north to south by the railway and high road from Santander by Palencia to Madrid; the highest point on the railway (Venta de Pazozal) is 3229 feet above the sea. For purposes of administration the province is divided into eleven partidos judiciales, containing 103 ayuntamientos, and returns two senators and five deputies to the cortes. The population in 1877 numbered 235,299. Besides Santander, the capital, the only places having within the municipal boundaries a population exceeding 5000 are Castro-Urdiáles (7623), Valle de Pielagos (5500), Torrelavega (7192), and Valderredible (7240). Santoña has 4428, and Laredo 4384. Santillana (1776) has a fine Romanesque church and cloister) 12th century), and was the birthplace of the architect Juan de Herrera.

SANTANDER (*Portus Blendium*, *Fanum S. Andreæ*), capital of the above province, 316 miles by rail from Madrid, is the seat of a bishopric and one of the chief seaports of Spain. The population in 1877 numbered 41,000 having almost doubled in the preceding quarter of a century, and the trade of the port has increased in an even greater proportion. The town is situated on the inside of a rocky peninsula, which separates it from the Bay of Biscay and forms a magnificent harbor from 2 to 3 miles wide and 4 miles long. The entrance is at the eastern extremity of the promontory, and, though somewhat difficult for sailing vessels in certain winds, has depth of water sufficient for the largest ships. The total burden of the vessels entered in 1882 amounted to 104,449 tons British and 500,342 tons of other nations. The chief exports consisted of iron ore (20,966 tons) to Great Britain, and wine (191,400 galls.) and olive oil (8000 galls.) to France. The city is divided into an upper and a lower town, and contains few buildings of interest. The cathedral was originally a Gothic structure, but has been so altered by later additions that little of the old work remains. In the crypt, or Capilla del Cristo de Abajo, there is a font of Moorish workmanship which has some interest. The castle of S. Felice contains a prison which was probably the first example of the radiating system of construction. Besides these buildings there are the theatre, which was formerly a convent, the hospital, and the Jesuits' church. The city is essentially modern, and its chief features are its well-built houses, its quays, and its factories. In addition to the manufactures of the province mentioned above, Santander has gas-works, phosphorus, sulphuric acid, and sail manufactories, and a large cigar factory, formerly a convent, where over 1000 hands are employed. Besides being a trading port Santander is also a watering-place which enjoys peculiar advantages of climate. The bathing establishment of the Sardinero, on the seaward side of the strip of land the town is built on, offers all the attractions usual to Continental watering-places. There is communication by rail with Madrid and by steamer with Liverpool, London, and Hamburg, as well as with Havana and the seaports of Spain.

The port was in 1753 made one of the "puertos habilitados" or ports privileged to trade with America, and in 1755 it was created a "ciudad." Charles V. landed here in 1522 when he came to take possession of the Spanish crown, and from this port Charles I. of England embarked on his return from his ill-fated visit *incognito* in search of a wife. The city was sacked by the French under Soult in 1808; but so little gratitude did the people show to their English allies that it was with the greatest difficulty supplies were found for the troops.

SANTAREM, a city and bishop's see of Portugal, in the province of Estremadura, on the declivities of the right bank of the Tagus, 46½ miles by rail from Lisbon. It has the ruins of an old castle, well known in Portuguese history as a royal residence, especially in the Middle Ages, and several of its churches are of historic and architectural interest. A considerable trade is carried on, and the population was 7001 in 1878.

Santarem, so named after a certain St. Irene, is identified with the ancient Scalabis Præsidium Julium. The death of Diniz I., and the birth, abdication, and death of Don Henrique the cardinal king, all occurred in the city; it gave

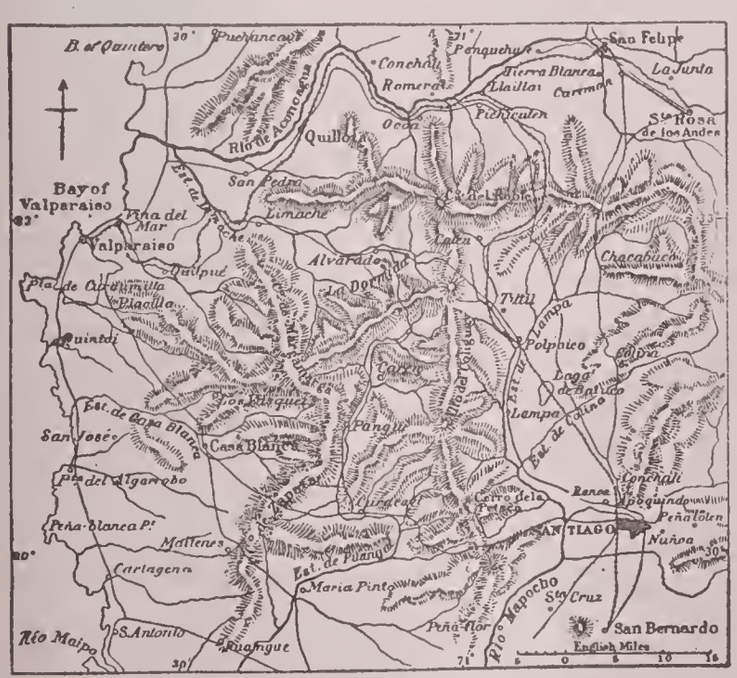
its name to João de Santarem, one of the 15th-century navigators; and Fernando I. and Cabral, discoverer of Brazil, were buried within its walls. The Miguelists were completely routed here by Napier and Villaflor in 1834.

SANTAREM, a city of Brazil, at the head of a comarca in the province of Pará, is situated on the right bank near the mouth of the Rio Tapajós, a right-hand tributary of the Amazon. It is a clean and neat-looking place, with rows of whitewashed houses in the European town, clusters of palm-thatched huts in the Indian suburb, a large church, the ruins of a stone fort, and, standing apart, the municipal buildings with the court-house. As the Rio Tapajós is navigable for steamers to the rapids, 170 miles above Santarem, and for boats to within a short distance of Diamantino, the town carries on a considerable trade with Matto Grosso and the country along the banks. The population and importance of the place, originally founded by a Jesuit missionary for his converts in 1661, and made a city in 1848, are steadily increasing.

SANTERRE, Jean Baptiste (1650–1717), French painter, born at Magny near Pontoise in 1650, was a pupil of Bon Boullongne. He began life as a portrait-painter, but refused to paint any except those who pleased his taste; he was incapable of managing the large compositions then in vogue, but enjoyed for half a century a great reputation as a painter of the nude. He had opened his studio to a class of young girls, to whom he gave lessons, and who served him as models. Much, however, of Santerre's work of this class was destroyed by himself in a fit of lively repentance after a serious illness which attacked him late in life. He died at Paris on November 21, 1717. His paintings, in consequence of his extreme care in choice of vehicles and pigments, have stood well. His Portrait of a Lady in Venetian Costume (Louvre), and his Susanna at the Bath (Louvre, engraved by Porporati), the diploma work executed by him in 1704, when he was received into the Academy, give a good impression of Santerre's taste and of his elaborate and careful method.

SAN THIAGO. See Cape Verd Islands, vol. v. p. 47.

SANTIAGO, the capital of Chili, and the chief town of a province of its own name (now 5223 square miles in extent, reduced in 1883 by the formation of the new province of O'Higgins), is situated in 33° 26′ 42″ S. lat. and 70° 40′ 36″ W. long., at a height of about 1830 feet above the sea, in a wide and beautiful plain between the main range of the Andes and the less elevated heights of Cuesta del Prado, 115 miles east of Valparaiso by rail. In the centre of the city rises the rocky hill of Santa Lucia, with its two fortresses,—recently converted into a pleasure-ground, with theatres, restaurants, and monuments; and immediately to the north-northwest and northeast are those known as Colina, Renca, and San Cristóbal. The snow-clad range of the Andes, in which the summits of La Chapa and Los Amarillos are conspicuous, is visible from Santiago. A turbid mountain stream, the Mapocho, flows west through the heart of the city to join the Colina and ultimately the Maipú or Maipo; its floods were sometimes, as in 1609 and 1783, the cause of great damage till the construction of a solid embankment was undertaken under the government of Ambrosio O'Higgins; it is now crossed by several handsome bridges, the oldest of which, a structure of eleven arches, dates from 1767–1779. From the very first Santiago was laid out with great regularity in parallelograms; but owing to the frequency of earthquakes the dwelling-houses are seldom built of more than a single story in height. The cathedral, situated in the Plaza de la Independencia, is the oldest of the churches. Originally erected by Pedro Valdivia and rebuilt by García Hurtado de Mendoza, it was destroyed by the earthquake of 1647 and rebuilt on a new plan subsequent to 1748. It is 351 feet long by 92 feet wide, but has no very striking features. Among the other ecclesiastical buildings are the church of San Agustin, erected in 1595 by Cristóbal de Vera and in modern times adorned with a pillared portico; the churches of San Francisco, La Merced, and Santo Domingo, dating from the 18th century; the Augustine nunnery founded by Bishop Medellin in 1576; the Carmen Alto, or church of the Carmelite nunnery, an elegant little Gothic building; the stately church of the Reformed Dominicans, rich in marble monolithic columns; and the chapel erected in 1852 to the memory of Pedro Valdivia next to the house in which he is reputed to have lived. The public cemetery, recently secularized, has a large number of marble and bronze monuments,—mostly from Italy. Among the secular buildings the more noteworthy are the palace of the intendency, the old presidential palace (popularly Las Cajas), the congress buildings, the mint, the palace of justice, the municipal theatre. The present university of Santiago dates from 1842,—the older Universidad de San Felipe, which had been established in 1747, having been closed in 1839. It occupies a fine building in the Alameda, and alongside stands the great National Institute of Secondary Education. In 1882 the university was attended by 920 students and the institute by 1059. The city also contains a school of arts and trades (1849), a musical conservatorio (1849), a national museum, a military school established in 1842 and enlarged on the abolition of the naval military school at Valparaiso in 1872 (now re-established), and a school of agriculture founded by the Agricultural Society chartered in 1869. The National Library is a noble collection of books dating from 1813, especially rich in works relating to America; there is also a good library in the National Institute. Besides the official journal, Santiago has four daily papers, as well as various reviews and other serials. Besides the Alameda, a great tree-planted avenue decorated with statues (the Abbé Molina, Generals San Martin, Carrera, O'Higgins, and Friere, etc.), the principal open spaces in Santiago are the Plaza de la Independencia, the Canadilla, a broad tree-bordered avenue, the Alameda de Yungay, the Campo de Marte (where are the Penitentiary, a prison built and administered according to the most approved modern principles, and the large Artillery Park), the Quinta Normal de Agricultura, which comprises zoological and botanical gardens, and the large area in which the International Exhibition of 1875 was held. As the Mapocho was



Environs of Santiago.

unfit for drinking, water was introduced about 1865 by an aqueduct 5 miles long. The prevailing winds at Santiago are from the south and southwest. On an average rain falls for 216 hours in the course of the year, mostly between May and September. Snow and hail are both extremely rare. Earthquakes are so frequent that as many as twenty-seven or thirty shocks are sometimes registered in a year. Those which have proved really disastrous are the earthquakes of 17th March, 1575, 13th May, 1647, 8th July, 1730, 19th November, 1822, and 20th February, 1835. The population of Santiago, which was returned in 1865 as 168,553 (79,920 males and 88,633 females), had increased to 200,000 in 1883.

It was in February, 1541, that Pedro de Valdivia, one of Pizarro's captains, founded the city of Santiago del Nuevo Estremo in accordance with a vow he had made at Cuzco. The place has all along held an important position in Chilian history, but perhaps none of the events with which it is associated sent such a sensation through the world as the burning of the Jesuit church with the loss of more than two thousand lives in the flames (8th December, 1863).

SANTIAGO DE COMPOSTELLA, the former capital of Galicia, in the northwest of Spain, situated in 42° 52′ 30″ N. lat. and 8° 30′ 6″ W. long., 51½ miles west-by-south from Lugo, and 32 miles south-by-west from Corunna, in the province of that name. It lies on the eastern slope of the Monte Pedroso, surrounded by mountains which draw down incessant rain that gives the granite buildings of its deserted streets an extra tint of melancholy and decay. The city is still the seat of a university and of an archbishopric, which lays claim to the primacy of all Spain, but its former glories have quite departed. In the Middle Ages its shrine, which contained the body of St. James the Great, was one of the most famous in Europe, and gathered crowds of pilgrims from all parts. The city became, in fact, the focus of all the art and chivalry of neighboring Christendom, and a spot where conflicting interests could meet on neutral ground. But the days of pilgrimages are past, and, though the Congregation of Rites declared in 1884 that the cathedral still enshrines the veritable body of the apostle, pilgrims are scarcely more often seen than in any other cathedral town. The trade of Santiago can never have been otherwise than dependent on the crowds of pilgrims who visited the shrine. It now only survives in the silversmiths' shops on the Plaza de los Plateros, which still have a steady sale for artistic pieces of peasant jewellery. Otherwise it consists in mere local traffic in cattle, linen, silk, leather, hats, and paper. There is communication by rail with the little seaport of Carril on the west coast. The population within the municipal boundaries was 23,000 in 1885.

The relics of the saint were said to have been discovered in 835 by Theodomir, bishop of Iria, who was guided to the spot by a star, whence the name (*Campus Stellæ*). A chapel was forthwith erected, and the bishopric was transferred thither by a special bull of Pope Leo III.[1] A more substantial building was begun in 868, but was totally destroyed in 997 by Almanzor, who, however, respected the sacred relics. On the reconquest of the city by Burmudo III. the roads which led to it were improved by that monarch, and pilgrims began to flock to the shrine, which fast grew in reputation. In 1078 the erection of the present cathedral was begun during the episcopate of Diego Pelaez, and was continued until 1188, when the western doorway was completed. It is a cruciform building in the Romanesque style, 280 feet long, 60 feet wide, and 70 feet high, and keeps its original form in the interior, but is disfigured externally by much poor late work. Besides the classic dome and clock-tower, the two western towers have been raised to a height of 220 feet and crowned with cupolas, and between them has been erected a classic portico, above which is a niche containing a statue of St. James. The façade was the work of Casas y Noboa in 1738, and the statue was by Ventura Rodriguez in 1754. The design is mediocre, and gains its chief effect from forming part of an extended architectural composition on the Plaza Mayor, a grand square which is surrounded on all sides by public buildings. The ground rises to the cathedral, which is reached by a magnificent quadruple flight of steps, flanked by statues of David and Solomon. Access to the staircase is given through some fine wrought-iron gates, and in the centre, on the level of the Plaza, is the entrance to a Romanesque chapel, La Iglesia Baja, constructed under the portico and contemporary with the cathedral. To the north and south, and in a line with the west front, are dependent buildings of the 18th century, grouping well with it. Those to the south contain a light and elegant arcade to the upper windows, and serve as a screen to the cloisters, built in 1533 by Fonseca, afterwards archbishop of Toledo. They are said to be the largest in Spain, and are a fair example of the latest Gothic. The delicate sculpture over the heads of the windows and along the wall of the cloister is very noticeable. On the north of the cathedral is the Plazuela S. Juan, where the peasants collect to do their marketing. Here is the convent of S. Martin, built in 1636, which, after serving as a barrack, is now used as an ecclesiastical seminary, restored to the church. It has a tolerable cloister and bell-tower. The north side of the cathedral is much overlaid by classical and Churrigueresque work; and the same treatment has been applied to the east end, where is the Puerta Santa, which is kept closed, except in jubilee years, when it is opened by the archbishop. The corner of the south transept on the Plaza de los Plateros has been mutilated by the erection of the clock-tower, but the façade is fortunately preserved intact. Perhaps the chief beauty of the cathedral, however, is the Portico de la Gloria, behind the western classic portal. It is a work of the 12th century, and probably the utmost development of which round-arched Gothic is capable. The shafts, tympana, and archivolts of the three doorways which open on to the nave and aisles are a mass of strong and nervous sculpture. The design is a general representation of the Last Judgment, and the subjects are all treated with a quaint grace which shows the work of a real artist. Faint traces of color remain and give a tone to the whole work. The cathedral is at such a height from the ground that it is probable that, until the erection of the present grand staircase, the portico could not be reached from the Plaza, but stood open to the air. There are no marks of doors in the jambs, and the entrance to the chapel beneath would have been blocked by any staircase which differed much in plan from the present one. The interior of the church is one of the purest and best examples of Romanesque work to be met with in Spain. The absence of a clerestory throws an impressive gloom over the barrel-vaulted roof, which makes the building seem larger than it is. A passage leads from the north transept to the Parroquia of San Juan, or La Corticela, a small but interesting portion of the original foundation. Many fine examples of metal work are in the cathedral, as, for instance, the two bronze ambos in the choir by Juan B. Celma of 1563, the gilt chandeliers of 1763, and the enamelled shrines of Sts. Cucufato and Fructuoso. In the Capilla del Relicario are a gold crucifix, dated 874, containing a piece of the true cross, and a silver gilt custodia of 1544. The Hospicio de los Reyes, on the north of the Plaza Mayor, for the reception of pilgrims, was begun in 1504 by Enrique de Egas under Ferdinand and Isabella. It consists of two Gothic and two classic courtyards with a chapel in the centre. The gateway is fine, and there is some vigorous carving in the court-yards, one of which contains a graceful fountain. The suppressed Colegio de Fonseca and the adjoining convent of S. Gerónimo have good Renaissance doorways. The university, which was created in 1504 by a bull of Pope Julius II., has fair Renaissance buildings, which date from 1532. Those of the Seminario (1777) have no merit. The chapel of the convent of S. Francisco, the cloisters of the half-ruined S. Augustin, the belfry of S. Domingo, the church of S. Feliz de Celorio, which is a modernized building of the 14th century, and the façades of several houses of the 12th and 13th centuries are also good examples of different architectural styles.

SANTIAGO (or ST. JAGO) DE CUBA, a city and seaport of Cuba, at one time the capital of the whole island, and now the chief town of the eastern department, is situated in 19° 57′ 7″ N. lat. and 75° 54′ 3″ W. long. (lighthouse), on a fine bay on the south coast. The spacious and well-defended harbor is accessible to the largest vessels, but silt near the wharf allows only those drawing less than 14 feet to come alongside. The city, which climbs a hill-side

[1] [Such is a current story, but Leo III. died in 816. More consistent dates for the discovery of the relics are the 808 or 816 of the article Alfonso II. in *Nouvelle Biographie Générale*. In 835 when Gregory IV. was pope the cult was well established.—Am. Ed.]

150 feet above the bay, has considerably improved since 1870, though its streets are still badly paved. It contains the largest cathedral in the island, a theatre, a custom-house, barracks (1858–1880), and hospitals. Foundries, soap-works, tan-yards, and cigar factories are the only industrial establishments. The exports were valued in 1867 at £1,650,000 [$8,019,000], in 1882 at £1,032,200 [$5,016,492], and in 1883 at £722,632 [$3,511,991.52]. Besides sugar, which forms about two-thirds of the whole, the principal articles are cocoa, rum, tobacco and cigars, coffee, honey and wax, mahogany, and copper-ore—this last at one time to the extent of 25,000 tons per annum, but now in greatly diminished quantity. The copper mines Lomas del Cobre lie on the other side of the bay inland from Punta de Sal. The estimated population is between 24,000 and 30,000.

Founded by Diego Velazquez in 1514, and incorporated as a city in 1522, Santiago is memorable mainly for the French occupation and ransom in 1553, and the affair of the ship "Virginius" in 1873, which resulted in the Spanish Government paying an indemnity to the United States for the murder of Captain Fry and his companions.

SANTIAGO DEL ESTERO, chief town of the province of Santiago in the Argentine Republic, is situated in 27° 46′ S. lat. and 64° 19′ W. long., 520 feet above the sea, on the banks of the Rio Dulce. It is the residence of the provincial governor and the seat of the legislature, and it ranks as the oldest European city in the republic, having been founded by Aguirre in 1552. The most conspicuous building is the cathedral, whose dome contrasts strangely by its size and evident costliness with the poverty of the rest of the town. The population is about 8000 (most of whom have a great deal of Indian blood in their veins). The railway from Rosario to Santiago (689 miles) was opened in 1884.

SANTILLANA, Iñigo Lopez de Mendoza, Marquis of (1398–1458), Castilian poet, was born at Carrion de los Condes in Old Castile on August 19, 1398. His father, Don Diego Hurtado de Mendoza, grand admiral of Castile, having died while Iñigo was still quite young, the boy was brought up by his uncle Don Alfonso Enriquez. From his twentieth year onwards he became an increasingly prominent figure at the court of Juan II. of Castile, distinguishing himself both in civil and military service; he was created Marques de Santillana and Conde del Real de Manzanares for the part he took in the battle of Olmedo in 1445. In the protracted struggle of the Castilian nobles against the preponderating influence of Alvaro de Luna he showed great moderation, but ultimately in 1452 he joined the combination which effected the fall of the favorite in the following year. From the death of Juan II. in 1454 Mendoza took little part in public affairs, devoting himself mainly to the pursuits of literature and to pious meditation. He died at Guadalajara on March 26, 1458.

Mendoza was the first to introduce the Italian sonnet into Castile, but his productions in this class are somewhat conventional in style and have little to recommend them beyond the charm of smooth versification. He was much more successful in the *serranilla* or highland pastoral after the Provençal manner. His long-popular *Centiloquio* (1494), consisting of one hundred proverbs, each rendered in an eight-line stanza, was prepared at the request of Juan II. for the instruction of Don Enrique, the heir-apparent. To the same didactic category belong the *Diálogo de Bias contra Fortuna* (1448) and the *Doctrinal de Privados* (1453). The *Comedieta de Ponza* is a Dantesque dream-dialogue, in octave stanzas, founded on the disastrous sea-fight off Ponza in 1435, when the kings of Aragon and Navarre along with the infante of Castile were taken prisoners by the Genoese.

The works of Santillana have been edited with commentaries by Amador de los Rios (Madrid, 1852).

SANTINI, Giovanni (1787–1877), Italian astronomer, born 30th January, 1787, at Caprese, in the province of Arezzo, was from 1813 director of the observatory at Padua. He wrote *Elementi di Astronomia* (2 vols. 1820, 2d ed. 1830), *Teoria degli Strumenti ottici* (2 vols. 1828), and a great many scientific memoirs and notices, among which are five catalogues of telescopic stars between +10° and −15° declination, from observations made at the Padua observatory. He died June 26, 1877.

SANTO DOMINGO. See Hayti.

SANTORIN. See Thera.

SANTOS, a city and seaport of Brazil in the province of São Paulo, is situated on the north side of the island of São Vicente or Engua-Guaçu, which forms the west side of the harbor-bay (an inlet 3½ miles deep, with soundings varying from 4 to 10 fathoms). It is a well-built town with wide airy streets, and most of the better classes have their residences at Barra Fort (4 miles out) and other suburban villages. Commercially the town has grown to great importance as the terminus of the whole railway system of this part of Brazil—the Santos and Jundiahy line (1867) running inland 87 miles and connecting with the São Paulo and Rio de Janeiro Railway and various other lines. The export of coffee (the great staple) increased from 344,800 60-kilogramme [132 lb 5 oz. in a bag] bags in 1862–63 to 537,478 in 1872–73 and 1,934,194 in 1883–84. The value of the coffee was estimated at £1,630,275 [$7,923,136.50] in 1870–71, and at £3,632,838 [$17,655,592.68] in 1878–79. The export and import trade is estimated to circulate £10,000,000 [$48,600,000] a year. The population has increased since 1870 from 9000 to about 15,000.

As the city of São Vicente, the first permanent Portuguese settlement in Brazil, began to decline from its position as capital of the southern provinces, Santos, founded by Braz Cuba in 1543–46, gradually took its place. In the 17th century it was besieged by the Dutch and English. The provincial assembly passed an enactment by which the city was to be called Cidade de Bonifacio in honor of José Bonifacio d'Andrade e Silva, the national patriot, to whom it had given birth, but the older name of Santos held its ground.

SÃO LEOPOLDO, a German colony in the province of Rio Grande do Sul, Brazil, founded in 1824. It is connected with Porto Alegre by rail and also by the Rio do Jinos, a small but deep and navigable river. The inhabitants of the town and sixteen neighboring settlements number in all about 20,000, and are engaged in cattle-breeding and in the culture of grain, arrow-root, and sugar.

SAÔNE. See Rhone.

SAÔNE, Haute-, a department in the northeast of France, formed in 1790 from the northern portion of Franche Comté, and traversed by the river Saône. Situated between 47° 14′ and 48° 1′ N. lat. and between 5° 21′ and 6° 49′ E. long., it is bounded N. by the department of the Vosges, E. by the territory of Belfort, S. by Doubs and Jura, and W. by Côte-d'Or and Haute-Marne. On the northeast, where they are formed by the Vosges, and to the south along the course of the Ognon the limits are natural. The highest point of the department is the Ballon de Servance (3900 feet), and the lowest the confluence of the Saône and Ognon (610 feet). The general slope is from northeast to southwest, the direction followed by those two streams. In the northeast the department belongs to the Vosgian formation, consisting of pine-clad mountains of sandstone and granite; but throughout the greater part of its extent it is composed of limestone plateaus 800 to 1000 feet high pierced with crevasses and subterranean caves, into which the rain water disappears to issue again as springs in the valleys 200 feet lower down. In its passage through the department the Saône receives from the right the Amance and the Salon from the Langres plateau, and from the left the Coney, the Laterne (augmented by the Breuchin which passes by Luxeuil), the Durgeon (passing Vesoul), and the Ognon. The northeastern districts are cold in climate and have an annual rainfall ranging from 36 to 48 inches. Towards the southwest the characteristics become those of the Rhone valley

generally. At Vesoul and Gray the rainfall only reaches 24 inches per annum.

Out of a total of 1,319,570 acres 664,846 are arable, 375,999 under forest, 153,278 natural meadows and orchards, and 31,752 vineyards. The agricultural population numbers 180,893 out of a total of 295,905. They possess 22,331 horses, 152,609 cattle, 63,000 sheep, 72,678 pigs, 7094 goats, more than 19,000 dogs, and 15,915 beehives (40 tons 15 cwts. of honey in 1881). Wheat is the staple crop—2,727,425 bushels in 1883; next come oats, 3,188,322 bushels; potatoes, 8,175,673 bushels; wine, mostly of middling quality, 4,887,652 gallons (average vintage for the last ten years 6,086,652 gallons); rye, 449,308 bushels; barley, 396,940; meslin, 276,251; buckwheat, 63,945; maize, 64,924; millet, 154; colza, 456 tons; beetroot, 26,365 tons; pulse, 5662 bushels; hemp, linen, tobacco, hops. The woods which cover more than a quarter of the department, are composed of firs in the Vosges and beech trees, oaks, wych elms, and aspens in the other districts. Kirschwasser is manufactured at Fougerolles from the native cherries. The industrial population number 51,477; 550 workmen raise 143,842 tons of iron-ore yearly; copper, silver, and manganese exist in the department, and gold occurs in the bed of the Ognon. Rock-salt mines yield annually 11,000 tons of salt and the materials for a considerable manufacture of sulphuric, hydrochloric, and nitric acids, sulphate of soda, chloride of lime, and Epsom and Glauber salts. Coal mines, with their principal centre at Ronchamp, give employment to more than 2000 workmen, and in 1883 yielded 212,680 tons of coal. Peat, limestone, plaster, building-stone, marble, porphyry, granite, syenite, and sandstone are all worked in the department. The green porphyry pedestal of Napoleon's sarcophagus at Les Invalides and the syenite columns of the Grand Opéra in Paris were cut at Servance. Of the many mineral waters of Haute-Saône the best known are the hot springs of Luxeuil, which, with their sixteen saline and two chalybeate sources, discharge over 127,000 gallons in 24 hours and are used for bathing and drinking. Besides forty-seven iron-working establishments (smelting furnaces, foundries, and wire-drawing mills, producing in 1883 4875 tons of iron smelted by wood-fuel, 286 tons of refined iron and 1040 tons of sheet-iron, etc.), Haute-Saône possesses copper-foundries, engineering works, steel-foundries, and factories for producing tin plate, nails, pins, files, saws, screws, shot, chains, agricultural implements, locks, spinning machinery, edge tools, etc. Window-glass is manufactured by 105 workmen and glass wares by 300, pottery and earthenware by 220 to 230. There are also about 100 brick and tile works; the paper-mills employ 329 hands, and the 21 cotton-mills (66,700 spindles and 2518 looms, of which 154 are hand-looms) upwards of 2000. Print-works, fulling mills, hosiery factories, and straw-hat factories are also of some account; as well as sugar-works, dye-works, saw-mills, starch-works, chemical works, oil-mills, tanyards, and flour-mills. The department exports wheat (893,000 bushels), cattle, iron, wood, pottery, kirschwasser, and cooper's wares. The Saône provides a navigable channel of 40 miles, which is about to be connected with the Moselle and the Meuse by the Canal de l'Est in course of construction along the valley of the Coney. Gray is the great emporium of the water-borne trade, estimated at 200,000 tons per annum. The department has 186 miles of national roads, 3313 miles of other roads, and 235 miles of railway—the Paris-Mulhouse and Nancy-Gray railways, crossing at Vesoul, and various other lines. There are three arrondissements,—Vesoul, Gray (7254 inhabitants in the town), Lure (4360),—28 cantons, 583 communes. Haute-Saône is in the district of the 7th corps d'armée and in its legal, ecclesiastical, and educational relations depends on Besançon. Luxenil (4376 inhabitants), the most important place after the sub-prefectures, is celebrated for its abbey, founded by St. Columban in 590.

SAÔNE-ET-LOIRE, a department of the east central region of France formed in 1790 from the districts of Autunois, Brionnais, Chalonnais, Charollais, and Mâconnais previously belonging to Burgundy. Lying between 46° 9′ and 47° 9′ N. lat., 3° 37′ and 5° 27′ E. long., it is bounded on the N. by the department of Côte d'Or, E. by that of Jura, S.E. by Ain, S. by Rhône and Loire, W. by Allier and Nièvre. The two streams from which it takes its name bound the department on the southeast and on the west respectively. Between these the continental watershed between the Mediterranean and the Atlantic called the Charollais Mountains runs south and north. Its altitude (2500 feet on the south) diminishes to the north in the direction of Côte-d'Or. The culminating point of the department is in the heights of Morvan, on the border of Nièvre (2960 feet). The lowest point, where the Saône leaves the department, is under 550 feet. The Saône crosses the department from north to south, and receives on its right the Dheune, followed by the Canal du Centre and the Grosne, and on its left the Doubs and the Seille. The Loire only receives one important affluent from the right, the Arroux, which is increased by the Bourbince, whose valley is followed by the Canal du Centre. The average temperature is slightly higher at Macon than at Paris—the winters being colder and the summer hotter. The yearly rainfall (32 inches, increasing towards the hilly districts) is distributed over 135 days; there are 25 days of snow and 27 of storm.

Of a total area of 2,116,311 acres (this is one of the largest of the French departments) 1,079,395 are arable, 371,866 forest, 292,287 natural meadows and orchards, and 106,111 vineyards. In 1880 the live-stock comprised 26,000 horses, 6000 asses and mules, 75,000 bulls and oxen, 150,000 cows and heifers, 56,000 calves, 216,000 sheep, 175,000 pigs, 50,000 goats, 35,000 beehives (yielding 214 tons of honey and 52 tons of wax). The white Charollais oxen are one of the finest French breeds, equally suitable for labor and fattening. No fewer than 366,252 of the inhabitants of the department out of a total of 625,559 depend on agriculture. In 1883 there was produced 3,678,276 bushels of wheat, 22,890 meslin, 1,022,037 rye; in 1880 210,375 bushels of barley, 754,875 buckwheat, 809,325 maize, 101,970 millet, 2,107,187 oats, 13,359,307 potatoes, 38,500 pulse, 70,936 tons of beetroot, 206 tons of hemp, 195 tons hempseed, 135,300 bushels colza-seed, 3177 tons colza oil. In 1883 the vintage yielded 22,636,636 gallons of wine, the average quantity of recent years being 21,809,018 gallons. The red wines of Mâconnais (especially those of Thorins) are those in highest repute; Pouilly produces the best white wines. The industrial classes are represented by 150,983 individuals. The coal-basin of Creusot, the sixth in importance in France, produced in 1882 1,269,783 tons. A pit at Épinac is 3937 feet deep. Iron-ore was extracted in 1882 to the amount of 28,654 tons. Slate, limestone, building-stone, mill-stones, granite, marble, marl, plaster, bituminous schists, peat, kaolin, manganese (4360 tons per annum), and certain precious stones are also found in the department. The most celebrated mineral waters are those of Bourbon-Lancy, six out of the seven springs being thermal. They are strongly saline. Metal-working is principally carried on at Creusot, which, with its 13,000 workmen and its 13 smelting furnaces, 100 puddling ovens, 4 Bessemer apparatuses and 4 Martin's ovens, etc., produced in 1882 63,989 tons of iron (965 tons of rails, 21,984 tons of sheet-iron) and 99,823 tons of steel (72,085 tons of rails, 7056 tons of sheet-iron). The engine works produce all sorts of machines, including about 100 locomotives. The Châlon branch works turn out ships, boats, bridges, and boilers. Other foundries and forges in the department produced in 1882 175,113 tons of cast-iron and certain quantities of copper and bronze. The cotton manufacture employs 14,000 spindles and 2000 looms, silk 2900 spindles and 2500 hand-looms, wool-spinning 350 spindles. Other industrial establishments are potteries, tile-works, glass-works (6,000,000 bottles at Épinac alone), distilleries, oil-works, mineral-oil works, cooperages, tanneries, flour-mills, sugar-works—the total number being 850 with 1372 steam engines of 27,780 horse-power. The commerce of the department, especially as regards its exports, deals mainly with coal, metals, machinery, wine, cattle, bricks, pottery, glass. It is facilitated by five navigable streams (181 miles),—Loire, Arroux, Saône, Doubs, Seille,—the Canal du Centre which unites Châlon-sur-Saône with Digoin on the Loire, and the canal from Roanne to Digoin and the lateral Loire Canal, both following the main river valley. The total length of the canals is 90 miles. There are 365 miles of national road, 7098 of other roads, and 487 miles of railway. Saône-et-Loire forms the diocese of Autun; it is part of the district of the 8th corps d'armée (Bourges), and its university is that of Lyons. It is divided into five arrondissements,—Mâcon Châlon-sur-Saône, Autun, Charolles (3350 inhabitants in the town), Louhans (4280),—50 cantons, and 539 communes; the most populous commune is Creusot (28,000 inhabitants, 16,000 in the town). Montceau-les-Mines (4560) is also a mining centre. Cluny (3500) is celebrated for its abbey, now occupied by the normal school of secondary instruction, and Paray-le-Monial (300) for its pilgrimage.

SÃO PAULO, a city of Brazil, capital of a province of the same name, is situated on the northwestern

slope of the Serra do Mar, on a left-hand tributary of the Tiete, a confluent of the Paraná. It is an old and irregularly built city, with some picturesque old churches and convents. The centre of the provincial railway system, 86 miles distant from SANTOS (*q.v.*), its seaport on the Atlantic coast, and 143 miles from Rio de Janeiro, the city has developed very rapidly within recent years. One of the two academies of law which Brazil possesses is seated at São Paulo. The most important public buildings are the cathedral, the provincial governor's and the bishop's palaces, and the theatre. A new system of water-supply and drainage was constructed in 1879–80 by English engineers under a Brazilian company. The population of the city in 1879 numbered about 35,000.

Founded by the Jesuits as a college, São Paulo was made a town in 1560 instead of Santo André, destroyed by order of Mendo de Sa. In 1711 it became a city, in 1740 a bishopric, and in 1823 an "imperial city."

SÃO PEDRO DO RIO GRANDE DO SUL. See RIO GRANDE DO SUL.

SAPOR (SHÁPÚR or SHAHPUHR), the name of three Sásánian kings. See PERSIA, vol. xviii. pp. 619–21.

SAPPAN WOOD is one of several red dye-woods of commerce, all belonging to the Leguminous genus *Cæsalpinia*, or to the closely allied genus *Peltophorum*. It is a native of tropical Asia and the Indian Archipelago, but, as it is one of the most esteemed of the red dyewoods, its cultivation has been promoted in the West Indies and Brazil. The wood is somewhat lighter in color than Brazil wood and its other allies, but the same tinctorial principle, brazilin, appears to be common to all. See BRAZIL WOOD, vol. iv. p. 216.

SAPPHIRE, a blue transparent variety of corundum or native alumina. It differs, therefore, from the Oriental ruby mainly in its color. The color varies from the palest blue to deep indigo, the most esteemed tint being that of the blue cornflower. It often happens that a crystal of sapphire is particolored, and hence a fine cut stone may derive its tint from a deep-colored portion at the back, instead of being uniformly tinted throughout. The sapphire is dichroic, and the color of a fine velvety stone may be resolved by means of the dichroiscope into an ultramarine-blue and a yellowish-green. The origin of the blue color of the sapphire has not been satisfactorily determined, for, although oxide of cobalt may produce it, and is invariably used for coloring imitations of the stone, yet the presence of cobalt is not always revealed in the analysis of the sapphire. According to lapidaries the hardness of the sapphire slightly exceeds that of the ruby, and it is therefore the hardest known mineral, excepting diamond. In consequence of its great hardness it was generally mounted by the ancients in a partially rough state, the surface being polished but not cut. Notwithstanding its hardness it has been occasionally engraved as a gem. There seems no doubt that the ancient σάπφειρος, as well as the sapphire (סַפִּיר) of the Old Testament (Job xxviii. 6), was our lapis lazuli, while the modern sapphire seems to have been known under the name of *ὑάκινθος* or *hyacinthus* (King).

The finest sapphires are obtained from Ceylon, where they occur with other gem-stones as pebbles or rolled crystals in the sands of rivers. The sapphires have generally preserved their crystalline form better than the associated rubies. Some of the slightly-cloudy Ceylon sapphires display when cut *en cabochon* an opalescent star of six rays, whence they are called *star-sapphires* or *asterias*. The principal localities in Ceylon yielding sapphires are Rakewana, Ratnapura, and Satawaka. A few years ago sapphires were discovered in Siam (in the province of Battambong), but the stones from this locality are mostly dull and of too dark a color. In Burmah they occur in association with rubies, but are much less numerous. They have also been recently found in Paldar, north of the Chandrabagha range. The sapphire is widely distributed through the gold-bearing drifts of Victoria and New South Wales, but the color of the stones is usually too dark. Some of the finest specimens have come from the Beechworth district in Victoria. Coarse sapphire is found in many parts of the United States, and a few stones fit for jewellery have been obtained from Corundum Hill, Macon county, North Carolina, and from the other localities mentioned under RUBY. The sapphire also occurs in Europe, being found in the basalts of the Rhine valley and of Le Puy in Velay, but not sufficiently fine for purposes of ornament. The sapphire has been artificially reproduced by similar methods to those described in the article RUBY.

SAPPHO (in Attic Greek Σαπφώ, but called by herself Ψάπφω, which is necessitated by the metre also in *Anthol.*, ix. 190, though Alcæus, himself an Æolian and her contemporary, calls her Σαπφώ), incomparably the greatest poetess the world has ever seen, was a native of Lesbos, and probably both was born and lived at Mytilene. For the idea that she migrated thither from Eresus is merely a conjecture to explain a perfectly imaginary difficulty caused by the grammarians who invented another Sappho, a courtesan of Eresus, to whom to ascribe the current scandals about the poetess. She was the daughter of Scamandronymus and Cleis, of whom nothing more is known. The epistle of Sappho to Phaon, ascribed to Ovid, says that her "parent" died when she was six years old; if Frag. 90 refers to Sappho's own mother, which is very doubtful, this "parent" must be her father. Her date cannot be certainly fixed, but she must have lived about the end of the 7th and beginning of the 6th centuries B.C., being contemporary with Alcæus, Stesichorus, and Pittacus, in fact with the culminating period of Æolic poetry. But of her life very little else is known. One of her brothers, Charaxus, who was engaged in the wine trade between Lesbos and Naucratis in Egypt, fell in love there with a courtesan named Doricha and surnamed for her beauty Rhodopis, whom he freed from slavery and upon whom he squandered his property. Sappho wrote an ode on this, in which she severely satirized and rebuked him. Another brother, Larichus, was public cup-bearer at Mytilene,—a fact for which it was necessary to be *εὐγενής*, so that we may suppose Sappho to have been of good family. For the rest it is known that she had a daughter, named after her grandmother Cleis, and that she had some personal acquaintance with Alcæus. He addressed her in an ode of which a fragment is preserved: "Violet-weaving, pure, sweet-smiling Sappho, I wish to say somewhat, but shame hinders me;" and she answered in another ode: "Hadst thou had desire of aught good or fair, shame would not have touched thine eyes, but thou wouldst have spoken thereof openly." Further than this everything is enveloped in doubt and darkness. The well-known story of her love for the disdainful Phaon, and her leap into the sea from the Leucadian promontory, together with that of her flight from Mytilene to Sicily, which has been connected with her love for Phaon, rests upon no evidence that will bear examination. Indeed, we are not even told whether she died of the leap or not. All critics again are agreed that Suidas was simply gulled by the comic poets when he tells us of her imaginary husband, Cercolas of Andros. The name of Sappho was by these poets consistently dragged in the dirt, and both the aspersions they cast on her character and the embellishments with which they garnished her life passed for centuries as undoubted history. Six comedies entitled *Sappho*, and two *Phaon*, were produced by the Middle Comedy; and when we consider, for example, the way in which Socrates was caricatured by Aristophanes, we are justified in putting no faith whatever in any accounts of Sappho which depend upon such authority, as most of our accounts appear to do.

Welcker[1] was the first to examine carefully the evi-

[1] *Sappho von einem herrschenden Vorurtheil befreyt*, Göttingen, 1816.

dence upon which the current opinion of Sappho's character rested. He found it easy to disprove, in his opinion, all the common accusations against her moral character, but unfortunately, not content with disproving actual statements, went on to uphold Sappho as a model of feminine virtue. Bergk and Mure both combated his views, and in the *Rheinisches Museum* for 1857 may be found the issues between him and the latter clearly stated on both sides, unfortunately with considerable acrimony. It is plain to the impartial reader that both of the controversialists have gone decidedly too far, but it can hardly be denied, however much we should naturally desire to think otherwise, that Mure has very considerably the best of it. We owe thanks to Welcker for clearing the history of Sappho from several fictions, but further than this it is impossible to go; we owe thanks to Mure for preferring truth to sentiment, but we cannot disregard some points of Welcker's argument so completely as he does. In fact, the truth appears to be that Sappho was not, as the Attic comedy represented her, a woman utterly abandoned to vice, and only distinguished among the corrupt community of Lesbos by exceptional immorality and the gift of song,—that indeed she was not notoriously immoral at all, but no worse and perhaps better than the standard of her age and country required. This seems clearly indicated by the epithet *ἁγνα*, with which Alcæus addressed her. On the other hand, not merely tradition but the character of her extant fragments, with the other evidence adduced by Mure, constrain us to resign the pleasant dream of Welcker, K. O. Müller, and their followers, —an ideal and eminently respectable head of a poetic school, with a matronly regard for her pupils, who meant by her own poems anything but what she said, and was more careful to inculcate virtue than unlimited indulgence in passion.

To leave this disagreeable question, we will next indicate briefly all that is known of her position in Lesbos. She was there the centre of a brilliant society and head of a great poetic school, for poetry in that age and place was cultivated as assiduously and apparently as successfully by women as by men. Her most famous pupils were Erinna of Telos and Damophyla of Pamphylia. Besides them we know the names of Atthis, Telesippa, Megara, Gongyla, Gyrinna, Dica, Mnasidica Eunica, and Anactoria, to whom the second ode, *εἰς ἐρωμέναν*, is said to have been addressed. The names also of two of her rivals are preserved—Andromeda and Gorgo; but whether they also presided over similar schools or not is very doubtful, as that idea of them depends on the authority of Maximus Tyrius, which is quite worthless on this point.

In antiquity the fame of Sappho rivalled that of Homer. She was called "the poetess," as he was called "the poet." Different writers style her "the tenth Muse," "the flower of the Graces," "a miracle," "the beautiful," the last epithet referring to her writings, not her person, which is said to have been small and dark. Her poems were arranged in nine books, on what principle is uncertain; she is said to have sung them to the Mixo-Lydian mode, which she herself invented. The few remains which have come down to us amply testify to the justice of the praises lavished upon Sappho by the ancients. The perfection and finish of every line, the correspondence of sense and sound, the incomparable command over all the most delicate resources of verse, and the exquisite symmetry of the complete odes raise her into the very first rank of technical poetry at once, while her direct and fervent painting of passion, which caused Longinus to quote the ode to Anactoria as an example of the sublime, has never been since surpassed, and only approached by Catullus and in the *Vita Nuova*. Her fragments also bear witness to a profound feeling for the beauty of nature; we know from other sources that she had a peculiar delight in flowers, and especially in the rose. The ancients also attributed to her a considerable power in satire, but in hexameter verse they considered her inferior to her pupil Erinna.

The fragments of Sappho have been all preserved by other authors incidentally. An independent fragment, ascribed to her by Blass but rejected by Bergk and of very doubtful authenticity, has been discovered on a papyrus in the Egyptian museum at Berlin (see *Rhein. Mus.* for 1880, p. 287; Bergk, vol. iii. p. 704); but even if really hers it is too fragmentary to be of any value. The best edition of Sappho is to be found in Bergk's *Poetae Lyrici Graeci*, vol. iii., 4th ed., Leipsic, 1882. The only separate edition and the only complete translation in English is that of Mr. Wharton (London, 1885), in which it is unfortunately impossible for the general reader to place much reliance. (J. A. PL.)

SARABAND (Ital. *Sarabanda, Zarabanda;* Fr. *Sarabande*), a slow dance, generally believed to have been imported from Spain in the earlier half of the 16th century, though attempts have sometimes been made to trace it to an Eastern origin. The etymology of the word is very uncertain. The most probable account is that the dance was named after its inventor —a celebrated dancer of Seville, called Zarabanda. During the 16th and 17th centuries the saraband was exceedingly popular, alike in Spain, France, Italy, and England. Its music was in triple time—generally with three minims in the bar—and almost always consisted of two strains, each beginning upon the first beat, and most frequently ending on the second or third. Many very fine examples of it will be found among the *Suites* and *Partitas* of Handel and J. S. Bach; but by far the finest we possess is that which Handel first composed for his overture to *Almira*, and afterwards adapted to the words "Lascia, ch'io pianga," in *Rinaldo*.

SARACENS was the current designation among the Christians of Europe in the Middle Ages for their Moslem enemies, especially for the Moslems in Europe. In earlier times the name of *Saraceni* was applied by Greeks and Romans to the troublesome nomad Arabs of the Syro-Arabian desert who continually harassed the frontier of the empire from Egypt to the Euphrates. It is easy to understand how, after Islam, the name came to be extended to the Moslem enemies of the empire in general, but no satisfactory explanation has been given of the reason why the Romans called the frontier tribes Saracens. It is most natural to suppose that they adopted some name of a tribe or confederation and used it in an extended sense, just as the Syrians called all these northern nomads by the name of the tribe of Tayyi'. The common derivation from the Arabic *sharḳî*, "eastern," is quite untenable. Springer suggests that the word may be simply *sharaḳá*, "allies."

SARAGOSSA. See ZARAGOZA.

SARAKHS. See PERSIA, vol. xviii. p. 629.

SÁRAN, or SARUN, a British district in the lieutenant-governorship of Bengal, lying between 25° 40′ and 26° 38′ N. lat. and 83° 58′ and 85° 14′ E. long. It forms one of the northwestern districts of the Patná division in the Behar province, and comprises an area of 2622 square miles. Sáran is bounded on the north by the district of Gorakhpur in the Northwestern Provinces, on the east by the Bengal districts of Champáran and Tirhut, on the south by the Ganges, separating it from Sháhábád and Patná districts, and on the west by Gorakhpur. It is a vast alluvial plain, possessing no mountains, and scarcely any hills or even undulations, but with a general inclination towards the southeast, as indicated by the flow of the rivers in that direction. The rivers and watercourses are very numerous, few tracts being better supplied in this respect. The principal rivers besides the Ganges are the Gandak and Ghagrá, which are navigable throughout the year. There is little or no waste land, and the district has long been noted for the high state of its cultivation. Sáran is beautifully wooded; mango trees are very numerous; and it yields large crops of rice, besides other cereals, tobacco, opium, indigo,

cotton, and sugar-cane. Though possessing no railways or canals, the district is well provided with roads. There is very little jungle; large game is not met with, but snakes are very numerous. Sáran is subject to blight, flood, and drought; its average annual rainfall is 45 inches. The administrative headquarters are at Chhapra.

The census of 1881 returned the population at 2,280,382 (1,083,565 males and 1,196,817 females); Hindus numbered 2,010,958, Mohammedans 269,142, and Christians 282. The population is entirely agricultural; there are only three towns with more than 10,000 inhabitants, viz., Chhapra (51,670), Sewan (13,319), and Revelganj (12,493). Manufactures are few and of little account; the principal are indigo, sugar, brass-work, pottery, saltpetre, and cloth. The commerce of Sáran consists chiefly in the export of raw produce, of which the chief articles are oil-seeds, indigo, sugar, and grain of all sorts except rice; the imports consist principally of rice, salt, and European piece-goods. Revelganj is the chief trading mart. The gross revenue of the district in 1883–84 amounted to £203,734 [$990,147.24], of which the land contributed £122,612 [$595,894.32]. Sáran formerly constituted one district with Champáran. The revenue areas of the two districts were not finally separated until 1866, but the magisterial jurisdictions were first divided in 1837.

SARAPIS. See SERAPIS.

SARATOFF, a government of southeastern Russia, on the right bank of the lower Volga, having Penza and Simbirsk on the north, Samara and Astrakhan on the east, and the Don Cossacks, Voronezh, and Tamboff on the west. The area is 32,624 square miles, and the population (1882) 2,113,077. The government has an irregular shape; and a narrow strip, 140 miles long and from 20 to 45 miles wide, extending along the Volga as far south as its Sarepta bend, separates from the river the territory of the Don Cossacks. Saratoff occupies the eastern part of the great central plateau of Russia, which gently slopes towards the south so as imperceptibly to merge into the steppe region; its eastern slope, deeply cut into by ravines, abruptly falls towards the Volga. As the higher parts of the plateau range from 700 to 900 feet above the sea, while the Volga flows at an elevation of only 20 feet at Khvalynsk in the north, and is 48 feet beneath sea-level at Sarepta, the steep ravine-cut slopes of the plateau give a hilly aspect to the banks of the river. In the south, and especially in the narrow strip above mentioned, the country assumes the characteristics of true elevated steppes, intersected with waterless ravines.

Every geological formation from the Carboniferous up to the Miocene is represented in Saratoff; the older ones are, however, mostly concealed under the Cretaceous, whose fossiliferous marls, flint-bearing clays, and iron-bearing sandstones cover broad areas. The Jurassic deposits seldom make their appearance from beneath them. Eocene sands, sandstones, and marls, rich in marine-fossils and in fossil wood, extend over large tracts in the east. The boulder-clay of the Finland and Olonetz ice-sheet penetrates in Saratoff as far southeast as the valleys of the Medvyeditsa and the Sura; while extensive layers of loess and other deposits of the Lacustrine or Post-Glacial period appear in the southeast and elsewhere above the Glacial deposits. Iron-ore is abundant; chalk, lime, and white pottery clay are extracted to a limited degree. The mineral waters at Sarepta, formerly much visited, have been superseded in public favor by those of Caucasus.

Saratoff is well watered, especially in the north. The Volga, from 1 to 7 miles in width, separates it from Samara and Astrakhan for a length of 500 miles; its tributaries are but small, except the Sura, which rises in Saratoff and serves for the northward transit of timber. The tributaries of the Don are more important: the upper Medvyeditsa and the Khoper, which both have a southward course parallel to the Volga and water Saratoff each for about 200 miles, are navigated notwithstanding their shallows, ready-made boats being brought in separate pieces from the Volga for that purpose. The Ilôvla, which flows in the same direction into the Don, is separated from the Volga only by a strip of land 15 miles wide; Peter I. proposed to utilize it as a channel for connecting the Don with the Volga, but the idea was never carried out, and the two rivers are now connected by the railway (52 miles) from Tsaritsyn to Kalatch which crosses the southern extremity of Saratoff.

Lakes and marshes occur only in a few river-valleys. The region is rapidly drying up, and the forests diminishing. In the south, about Tsaritsyn, where the hills were densely covered with them a few centuries ago, they have almost wholly disappeared. In the north they still cover more than a third of the surface, the aggregate area under wood being reckoned at 2,661,000 acres. The remainder is distributed as follows: arable land, 11,509,000 acres; prairies and pasture lands, 3,799,000; uncultivable, 2,049,800. Such is the scarcity of timber that the peasants' houses are made of clay, the corner posts and door and window frames being largely shipped from the wooded districts of the middle Volga. The climate is severe and quite continental. The average yearly temperatures are 41.5° at Saratoff (January, 12.4°; July, 71.5°) and 44.4° at Tsaritsyn (January, 13.2°; July, 74.6°). The average range of temperature is as much as 119°. The Volga is frozen for an average of 162 days at Saratoff and 153 days at Tsaritsyn. The soil is very fertile, especially in the north, where a thick sheet of black-earth covers the plateaus; sandy clay and salt clay appear in the south.

The population is very various, emigrants from all parts of Russia being mixed with Finnish and Tartar stems and with German colonists. The Great Russians constitute 75 per cent. of the population, Little Russians 7 per cent., Germans 7, Mordvinians 6, and Tartars 3.5 per cent. The Tchuvashes may number about 11,000, Mescheriaks about 3000, and Poles about 5000. All are unequally distributed, Little Russians being more numerous in the districts of Atkarsk, Bałashoff, Tsaritsyn, and Kamyshin (18 to 13 per cent.), the Mordvinians in Kuznetsk and Petrovsk (16 per cent.), and the Germans in Kamyshin (40 per cent.). The immigration of the Germans took place in 1763–1765, and their wealthy colonies have the aspect of minor West-European towns (see SAMARA).

Only 285,140 of the population reside in ten towns, the remainder (1,827,937) being distributed over 5602 villages, of which some have from 5000 to 12,000 inhabitants, and no less than 150 reckon more than 2000. The annual mortality is 42 per 1000 (1882), but this high figure is more than compensated for by the births, which in the same year were 51 per 1000. The chief occupation is agriculture. More than one-half of the arable land (6,210,000 acres) was under crops in 1881. In 1884 the returns were rye, 3,374,000 quarters (1,608,300 in 1883); wheat, 850,700; barley, 103,400; oats, 1,657,700 (2,432,700 in 1883); and various, 764,400. Drought, and sometimes also noxious insects, cause great fluctuations in the harvest; but nevertheless almost every season leaves a considerable balance of corn for export. Oil-yielding plants are also cultivated; linseed in all districts except Tsaritsyn; mustard, both for grain and oil, extensively about Sarepta and in the Kamyshin district; and sunflower (140,000 quarters), in the northern districts. Gardening is a considerable source of income around Saratoff, Volsk, Atkarsk, and Kamyshin. The *molokan* dissenters have great plantations of watermelons, melons, pumpkins, etc. The peasants of Saratoff are no better off than those of the other governments of southeast Russia (see SAMARA). Years of scarcity are common, and invariably mean ruin for the peasants. Cattle-breeding, formerly a large source of income, is rapidly falling off. Between 1877 and 1882 there was an decrease of 271,000 head, and murrain swept away large numbers of cattle in 1883.

Manufactures are developing but slowly, the chief of them, those dealing with animal produce, being checked by the falling off in cattle-breeding. The 6500 industrial manufacturing establishments of Saratoff employed an aggregate of only 17,500 workmen, with an annual production of but 20,973,500 roubles (£2,097,350 or $10,193,121) in 1882. The most considerable were—cottons, £17,200 [$83,592]; woollen cloth, £64,480 [$313,372.80]; tanneries, £85,830 [$417,133.80]; tallow, soap, wax-candles, flour, £1,217,800 [$5,918,508]; oils, £125,360 [$609,249.60]; distilleries, £255,780 [$1,243,090.80]; iron, £15,390 [$74,795.40]; and machinery, £37,195 [$180,767.70]. Various petty trades are rapidly developing

among the peasantry. Shipbuilding is carried on in the Volga villages; wooden vessels and implements are made in the north, and pottery in several villages; and quite recently the fabrication of lead-pencils has been added at Buturlinovka. Very many peasants have still every year to leave their homes in search of work on the Volga and elsewhere. An active trade is carried on by the merchants of the chief towns,—corn, hides, tallow, oils, being exported; the merchants of Saratoff, moreover, are intermediaries in the trade of southeast Russia with the central provinces. The chief ports are Saratoff, Tsaritsyn, Kamyshin, and Khvalynsk.

Saratoff is divided into 10 districts, the chief towns of which and their populations in 1882 were as follows: Saratoff (112,430 inhabitants); Atkarsk (7610); Balashoff (10,090); Kamyshin (14,460); Khvalynsk (17,650); Kuznetsk (17,930); Petrovsk (15,020); Serdobsk (10,360); Tsaritsyn (31,220); and Volsk or Voljsk (34,930). The German colony of Sarepta, although without municipal institutions, is a lively little town with 5650 inhabitants, which carries on an active trade in mustard, woollen cloth, and various manufactured wares. Dubovka (13,450 inhabitants) derives its importance from its traffic with the Don; the villages Samoilovka in the district of Balashoff and Kolyar in Volsk have each more than 11,000 inhabitants; Balanda and Arkadak are important grain-markets.

The district of Saratoff has been inhabited since at least the Neolithic Period; its inhabitants of a later epoch have left numerous bronze remains in the *kurgans*, but the question of their ethnological position is still unsettled. In the 8th and 9th centuries the half-nomad Burtases peopled the territory and recognized the authority of the Khazar princes. Whether the Burtases were the ancestors of the Mordvinians—as some ethnologists are inclined to admit—has not yet been determined. At the time of the Mongolian invasion, the Tartars took possession of the territory, and one of their settlements around the khan's palace at Urek, 10 miles from Saratoff, seems to have had some importance, as well as those about Tsaritsyn and Dubovka. The incursions of the Crimean Tartars devastated the country about the 15th century, and after the fall of Kazañ and Astrakhan the territory was annexed to Moscow. Saratoff and Tsaritsyn, both protected by forts, arose in the second half of the 16th century; but the forests and deep ravines of the territory continued for two centuries more to give shelter to numerous bands of squatters, Raskolniks, and runaway serfs, who did not recognize the authority of Moscow; they sometimes robbed the caravans of boats on the Volga and were ready to support the insurrections both of Razin and of the impostors of the 18th century. Dmitrievsk (now Kamyshin) and Petrovsk were founded about the end of the 17th century, and a palisaded wall was erected between the Volga and the Don, while other lines of military posts were kept in the north and west. A special "voisko" of Volga Cossacks was founded in 1731, but as they also joined the rebellions they were soon transferred to the Terek. Regular colonization may be said to have begun only at the end of the 18th century, when Catherine II. called back the runaway dissenters, invited German colonists, and ordered her courtiers to settle here their serfs, deported from central Russia. In this way the population of the lieutenancy, which extended also along the left bank of the Volga, reached 640,000 in 1777. It exceeded one million in 1817. In 1851 the territory on the left bank of the Volga was transferred to the new Samara government.

(P. A. K.)

SARATOFF, capital of the above government, situated on the right bank of the Volga, 532 miles by rail to the southeast of Moscow, has become one of the most important cities of eastern Russia, and ranks among the very few Russian cities which have more than 100,000 inhabitants. It is picturesquely situated on the side of hills which come close down to the Volga. One of these, the Sokolova Hill (560 feet) is liable to frequent landslips, which are a continual source of danger to the houses of poorer inhabitants at its base. The terrace on which Saratoff is built being intersected by two ravines, the city is divided into three parts; the outer two may be considered as suburbs. A large village, Pokrovskaya, with about 20,000 inhabitants, situated on the opposite bank of the Volga, though in the government of Samara, is in reality a suburb of Saratoff. Apart from this suburb, Saratoff had in 1882 a population of 112,430 (49,660 in 1830, and 69,660 in 1859). It is better built than many towns of central Russia. Its old cathedral (1697) is a very plain structure, but the new one, completed in 1825, is fine, and has a striking campanile. The theatre and the railway station are also fine buildings. The streets are wide and regular, and there are several broad squares. A new fine-art gallery was erected in 1884 by the Russian painter Bogoluboff, who has bequeathed to the city his collection of modern pictures and of various objects of art. A school of drawing and the public library are in the same building, which has received the name of "Radistcheff's Museum" (in memory of Radistcheff, the author prosecuted by Catherine II.).

Agriculture and gardening are still the support of a section of the population, who rent land in the neighborhood of the city. The culture of the sunflower deserves special mention. The local manufacturing establishments do not keep pace with the rapidly increasing trade, and their aggregate production cannot be estimated at more than £450,000 [$2,187,000]. The distilleries are first in importance; next come the manufactures of liqueurs (£160,000 or $777,600), flour-mills (about £40,000 or $194,400), oil-works (£56,000 or $272,160), and tobacco-factories (about £40,000 or $194,400). The city has not only a trade in corn, oil, hides, tallow, woollen cloth, wool, fruits, and various raw produce exported from Samara, but also a trade in salt from Crimea and Astrakhan, which is in the hands of the Samara merchants, and in iron from the Urals and wooden wares from the upper Volga governments. Saratoff also supplies southeastern Russia with manufactured articles and grocery wares imported from central Russia. The traffic of the port was estimated at about 5,700,000 roubles [$2,770,200] in 1882. The shallowness of the Volga opposite the town, and the immense shoals along its right bank are, however, a great drawback. Vast sand-banks, which formerly lay above the city, have gradually shifted their position, and it is supposed that in a few years Saratoff will be situated on a shoal about 1 mile wide. In 1882 and 1883 steamers were compelled to discharge cargoes 50 miles below Saratoff or at the Pokrovskaya suburb on the left bank,—so that a branch railway for conveying the cargoes of the steamers has now been constructed south of the city.

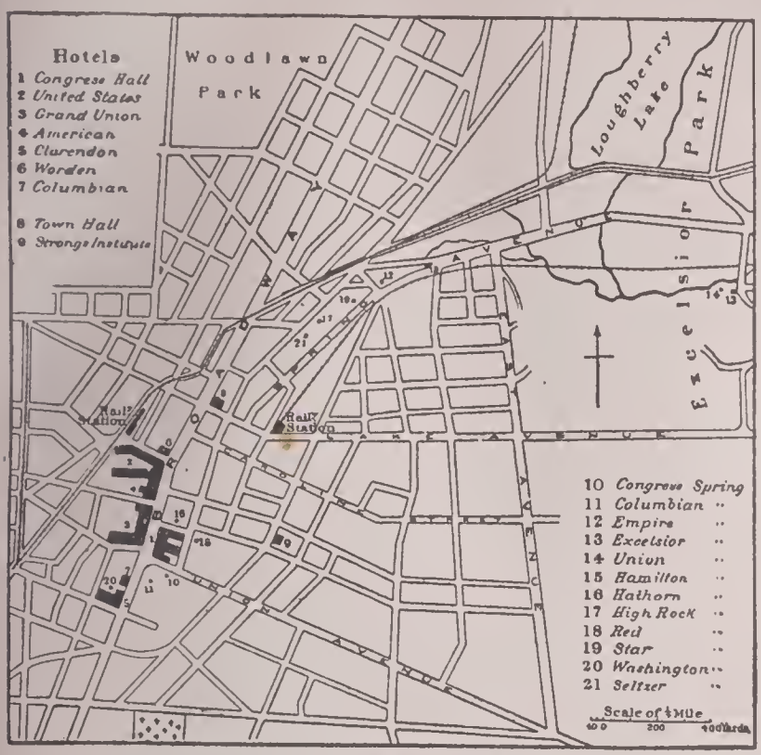
The town of Saratoff was founded at the end of the 16th century, on the left bank of the Volga, some seven miles above the present site, to which it was removed about 1605. The place it now occupies (Sarytau, or Yellow Mountain) has been inhabited from a remote antiquity. Although founded for the maintenance of order in the Volga region, Saratoff, which was not fortified, was several times pillaged in the 17th and 18th centuries. Razin took it, and his followers kept it until 1671; the insurgent Cossacks of the Don under Bulavin and Nekrasoff pillaged it in 1708 and Pugatcheff in 1774. After being placed under Kazañ and later under Astrakhan, it became the chief town of the Saratoff government in 1797.

SARATOGA SPRINGS, a village of the United States, whose mineral waters, apart from any charm of situation, have rendered it one of the most fashionable of summer resorts. It lies in the east of Saratoga county, New York, 186 miles by rail north of New York city, on a level plateau in the valley of the Hudson, not far from the junction of this river with the stream discharging from Saratoga Lake. The number and size of its hotels (some of which are among the largest in the world and can accomodate upwards of 1000 guests) and the large influx of wealthy and fashionable visitors, bringing its population up to 30,000, render Saratoga Springs anything rather than a "village." Its resident inhabitants even numbered 8421 in 1880 and the township contained 10,820. There are Presbyterian, Baptist, Methodist, Episcopal, and Roman Catholic churches, a large town-hall, a high school and other educational institutions, a fire department building, a circular railway, and numerous private mansions. Congress Park was laid out in 1875–6. In July and August the race-course of the Saratoga Racing Association attracts the best patronage of the American turf.

The Indians seem at an early date to have known of the medicinal virtues of the High Rock Spring, and in 1767 Sir William Johnson,[1] carried thither by a party of Mohawks, was restored to health by drinking its waters. General Schuyler cut a road through the forest from Schuylerville, and in 1784 erected the first frame house in the neighbor-

[1] [Colonial Indian agent (1715–74), removed from Ireland to the Mohawk valley, was made a sachem, fought Dieskau at Lake George in 1755, was made baronet and pensioned by the crown, captured Fort Niagara, had many concubines, among them Molly Brandt, an Indian.—Am. Ed.]

hood of the springs. Hotels began to be built about 1815. New springs have from time to time been discovered, and their number has also been increased by boring, so that now there are 28 in all. They rise in a stratum of Potsdam sandstone underlain by Laurentian gneiss, etc., and reach the surface by passing through a bed of blue clay. All are charged with carbonic acid gas. The following are among the most notable: Congress Spring in Congress Park, dis-



Plan of Saratoga Springs.

covered in 1792 (chloride of sodium, bicarbonates of lime and magnesium); Washington or Champagne Spring (1806); Columbian Spring (1806); Hathorn Spring (1868); Pavilion Spring (1839); Putnam Spring; Geyser Spring (bored in 1870 to a depth of 140 feet and spouting 25 feet into the air); Glacier, spouting spring (bored in 1871 to 300 feet); Flat Rock Spring, known as early as 1774, but lost, and only recovered in 1884. The water from several of the springs is largely bottled and exported. The Geyser Spring (1¼ miles S. W.) and White Sulphur Spring and Eureka Spring (1½ miles E.) are beyond the limits of the accompanying plan.

SARÁWAK, a territory in the northwest of Borneo, which, reclaimed from piracy and barbarism by the energy of Sir James BROOKE (*q. v.*), was converted into an independent and prosperous state. With an area estimated at from 35,000 to 40,000 square miles, it has a population of about 250,000. The coast extends from Tanjong Datu, a prominent cape in 2° 3′ N. lat., northwards to the frontier of Brunei in 3° 10′—a distance in a straight line of about 280 miles, but, following the sinuosities, about 400 miles. Inland the boundaries towards the Dutch territory are hypothetically determined by the line of watershed between the streams flowing northwest and those flowing east-southeast and southwest, but the frontier districts are to a considerable extent unexplored. Towards the coast there are tracts of low alluvial land; and some of the rivers reach the sea by deltas out of all proportion to the length of their course. The surface of the country soon, however, begins to rise and to be diversified with irregular hills, sometimes of rounded sandstone, sometimes of picturesque and rugged limestone. The Bongo Hills, in the residency of Saráwak, are about 3000 feet high; and along the frontier, where the Seraung Mountains, the Klinkong Mountains, the Batang Lupar Mountains, etc., are supposed to form more or less continuous ranges, there are altitudes of from 4000 to 8000 feet. In some of the limestone mountains there are caves of enormous extent (a detailed account will be found in Boyle, *Adventures among the Dyaks of Borneo*, 1865). The Rejang is the largest river in Saráwak. Its sources are only 120 or 130 miles directly inland near Mount Lawi, Mount Marud (8000 feet), and Gura Peak; but it flows obliquely southwest for 350 miles, and the principal branches of its delta (the Eyan river and the Rejang proper) embrace a territory of 1600 square miles with a coast-line of 60 miles. In their upper course the headwaters have a rapid descent, and none of them are navigable above Balleh where the Rejang is deflected westward by the accession of the Balleh river. Left-hand tributaries from a low line of hills to the south—the Katibas, Nymah, Kanowit, and Kajulan rivers—continue to swell the main stream; but there are no tributaries of any importance from the right hand, the country in that direction being drained directly seawards by a number of short rivers—the Oya, Mukah, Balinean, Tatau, and Bintulu,—of which the first three rise in the Ulat-Bulu Hills (3600 feet). At the apex of the Rejang delta lies the village and government of Sibu, and at the mouth of the Rejang branch is the important village and shipping-port of Rejang. Passing over the small river basins of the Kalukah and the Saribas we reach the Batang Lupar, which ranks next to the Rejang, and is navigable for large vessels as far as Lingga, about 30 miles from its mouth—the bar having 3½ fathoms water at high tide. The value of the navigable portion of the Batang Lupar, is however, greatly lessened by the formidable bores to which it is subject; they begin about three days before full moon and change, and last about three days, rushing up the river with a crest about 6 feet high for a distance of 60 miles. In several of the other rivers a similar phenomenon is observed. The broad mouth of the Batang Lupar opens in the angle where the coast, which has run nearly north and south from the delta of the Rejang, turns abruptly west; and all the rivers which reach the sea between this point and Tanjong Datu—the Sadong, the Samarahan, the Saráwak (with its tributaries the Senna, the Samban, the Poak, etc.), the Lundu, are short.

The mineral wealth of Saráwak is not unimportant. Gold washing has long been carried on in the central residency, though not with more than moderate success; and more recently a fairly prolific gold-field has been opened in the neighborhood of Marup, on the Batang Lupar, where there is a flourishing Chinese settlement. Of much greater value are the antimony ores which occur more especially in the district of the headstreams of the Saráwak, in the most various localities, occasionally as dykes *in situ*, but more frequently in boulders deep in the clayey soil, or perched on tower-like summits and craggy pinnacles, accessible only by ladders. Those rich deposits have, however, been largely exhausted, and no new ones have been discovered in other parts of the territory, so that the Borneo Company (which has the monopoly of this and other minerals in the country) has been tempted to erect local furnaces to reduce the poorer qualities of ore and the refuse of the mines to regulus on the spot. A deposit of cinnabar was discovered by Mr. Helms in 1867, at Tegora, at the foot of the Bongo Mountains, but no other occurrence of this ore of quicksilver in the territory has yet been reported. In 1876 quicksilver was exported to the value of 108,050 dollars, and in 1879 to 76,620. Coal has been worked for many years at the government mines of Simunjun, on the banks of a right-hand affluent of the Sadong; and there is known to exist at Silantek up the Lingga river (a left-hand affluent of the Batang Lupar) a very extensive coal-field, whose products, still intact, could be brought down for shipment at Lingga by a railway of some 18 miles in length. Diamonds are occasionally found, and copper, manganese, and plumbago have been discovered, but not in paying quantities.

Like the rest of Borneo, Saráwak is largely covered with forest and jungle. The bilian or ironwood is not only used locally but exported, especially from the Batang Lupar district, to China, where it is highly valued as a house-building and furniture timber. Gutta-percha, india-rubber (*gutta-susu*), and birds' nests are also exported, but in

diminishing quantities; and their place is being taken by gambier and pepper, the cultivation of which was introduced by the rajah. Gambier figured at 20,461 piculs [2,728,133⅓ lb] in the exports of 1881 and at 22,432 [2,990,933⅓ lb] in 1884, and pepper at 28,807 piculs [3,840,933⅓ lb] in 1881, and 43,490 [5,798,666⅔ lb] in 1884. The territory of Saráwak is said to furnish more than half the sago produce of the world, and most of it is grown on the marshy banks of the Oya, Mukah, and other rivers of the northern residency of Saráwak to the distance of about 20 miles inland. The total value of the exports of Saráwak in 1884 was 1,145,248 dollars (1,071,528 from Kuching), that of the imports 1,083,255 dollars. Natuna and Dutch vessels are the most numerous in the shipping returns.

The government is an absolute monarchy—the present rajah being the nephew of Sir James Brooke. The rajah is assisted by a supreme council of six, consisting of two chief European residents and four natives, nominated by himself; there is also a general council of fifty, which meets once every three years or oftener if required. For administrative purposes the country is divided into eight districts corresponding to the number of principal river basins. Three chief districts are presided over by European officers. The military force—some 250 men—is under the control of an English commandant. There is also a small police force, and the Government possesses a few small steam vessels. The civil service is regularly organized, with pensions, etc. The revenue is in a satisfactory state, showing 64,899 dollars to the good in the period between 1875 and 1884. In 1884 the revenue was 276,269 dollars and the expenditure 289,291. Roman Catholics and Protestants both have missions in Saráwak; and the English bishop of Singapore and Labuan is also styled bishop of Saráwak. The population consists of Malays, Chinese, Land Dyaks, Sea Dyaks, and Milanows. "Without the Chinaman," says the rajah (*Pall Mall Gazette*, 19th September, 1883) "we can do nothing." When not allowed to form secret societies he is easily governed, and this he is forbidden to do on pain of death. The Dyaks within the territory have given up head-hunting. The Milanows, who live in the northern districts, have adopted the Malay dress and in many cases have become Mohammedans; they are a quiet, contented, and laborious people. Slavery still prevails in Saráwak, but arrangements are made for its entire abolition in 1888. Kuching, the capital of Saráwak, on the Saráwak river, is a place of 12,000 inhabitants and is steadily growing.

History.—In 1839–40 Saráwak, the most southern province of the sultanate of Brunei, was in rebellion against the tyranny of the governor, Pangeran Makota, and Muda Hassim had been sent to restore order. The insurgents held out at Balidah or Blidah fort in the Siniawan district, and there James Brooke first took part in the affairs of the territory. By his assistance the insurrection was suppressed, and on September 24th he was appointed chief of Saráwak. In 1843 Captain Keppel and Mr. Brooke expelled the pirates from the Saribas river and in 1844 they defeated those on the Batang Lupar, to whom Makota had attached himself. In 1849 another severe blow was struck by the destruction of Sirib Sahib's fort at Patusan. The Chinese, who had begun to settle in the country about 1850 (at Bau, Bidi, etc.), made a violent attempt to massacre the English and seize the government, but they were promptly and severely crushed after they had done havoc at Kuching. During Sir James Brooke's absence in England (1857–1860) his nephew Captain J. Johnson (who had taken the name Brooke, and is generally called Captain Brooke) was left in authority; but a quarrel afterwards ensued and Sir James Brooke was in 1868 succeeded by Charles Johnson (or Brooke), a younger nephew. The independence of Saráwak had been recognized after much controversy by England in 1863 and previously by the United States.

See Charles Brooke, *Ten Years in Saráwak*, 1866; Gertrude L. Jacob, *The Raja of Saráwak*, 1876; Spenser St. John, *Life in the Forests of the Far East*, 1862, and *Life of Sir James Brooke*, 1879; Helms, *Pioneering in the Far East*, 1882; "Notes on Saráwak," in *Proc. Roy. Geogr. Soc.*, 1881, by W. M. Crocker.

SARDANAPALUS was, according to the account of Ctesias (preserved by Diodorus, 23 *sq.*), the last king of Nineveh, and he is described in terms that have made his name proverbial as the type of splendid and luxurious effeminacy. Ctesias's story cannot be called historical; but the name Sardanapalus seems to be a corruption of Assurbanipal (see vol. iii. p. 163).

SARDINE (*Clupea pilchardus*). See PILCHARD. Another of the *Clupeidæ* (*C. scombrina*) is the "oil-sardine" of the eastern coast of the Indian Peninsula.

SARDINIA (Ital. *Sardegna*, Fr. *Sardaigne*, Span. *Cerdeña*, called by the ancient Greeks Ἰχνοῦσα, from a fancied resemblance to the print of a foot), an island in the Mediterranean, about 140 miles from the west coast of Italy, of which kingdom it forms a part. It is separated from the island of Corsica by the Strait of Bonifacio, which is about 7½ miles wide, and only about 50 fathoms deep. Sardinia lies between 8° 4′ and 9° 49′ E. long., and extends from 38° 55′ to 41° 16′ N. lat. The length from Cape Teulada in the southwest to Cape Longo Sardo in the north is about 160 miles, the breadth from Cape Comino to Cape Caccia about 68 miles. The area of the island is 9187 square miles,—that of the department (*compartimento*), including the small islands adjacent, being 9294 square miles. It ranks sixth in point of size among the islands of Europe, coming next after Sicily.

The greater part of the island is mountainous, especially in the east, where the mountains stretch almost continuously from north to south, and advance close up to the coast. The elevations, however, are not so high as in the sister island of Corsica. The culminating point is Monte Gennargentu, which rises, about 22 miles from the east coast, almost exactly on the parallel of 40° N., to the height of 6250 feet, and is consequently little more than two-thirds of the height of the chief peaks of Corsica. On the east side the principal breach in the continuity of the mountains occurs in the north, where a narrow valley opening to the east at the Gulf of Terranova cuts off the mountains of Limpara in the extreme northeast. The western half of the island has more level land. The principal plain, that of the Campidano, stretches from southeast to northwest, between the Gulf of Cagliari and that of Oristano, and nowhere attains a greater elevation than 250 feet. At both ends it sinks to a much lower level, and has a number of shallow lagoons encroaching on it from the sea. In the corner of the island situated to the southwest of the Campidano there are two small isolated mountains rising to the height of from 3000 to 4000 feet, which are of importance as containing the chief mineral wealth of the island. A small valley runs between them from the southern end of the Campidano to Iglesias, the mining centre of Sardinia. North of the Gulf of Oristano mountains again appear. The extinct volcano of Monte Ferru there rises to the height of 4400 feet, and the streams of basalt which have issued from it in former ages from the ridge or saddle, about 2000 feet high, connecting this mountain with the highland area on the east. Still further north a trachytic plateau, intersected by numerous deep river valleys, occupies a considerable tract, advancing up to the plain of Sassari on the north coast.

The rivers are numerous but short. The principal is the Oristano, which enters the gulf of the same name on the west coast.

Geologically the island is composed mainly of granite and other crystalline rocks. Granite predominates especially in the east, and the mountains of that part of the island were apparently at one time continuous with the similarly constituted mountains of Corsica. Granitic spurs likewise extend to the southwest, and appear in the capes of Spartivento and Teulada. Altogether this rock is estimated to cover one-half of the entire surface. In the west of the island the principal crystalline rocks are porphyritic in structure; sedimentary deposits are comparatively unimportant, and such as are present are mainly either of very ancient or of recent geological date. Silurian formations attain the most considerable development in the southwest round Iglesias, where there occurred the contemporaneous porphyritic outpourings containing the most numerous mineral veins of the island. Between the deposits of Silurian and those of Cretaceous times there are none of any consequence except a few patches of Devonian round the slopes of Gennargentu, interesting as containing some beds of true coal. The members of the Cretaceous system occupy considerable

tracts in the southwest, east (round the Gulf of Orosei), and northwest (in the mountains of Nurra), and a smaller area in the southwest (in the island of San Antioco). Tertiary formations are still more largely developed. They cover the whole plain of the Campidano, the west coast opposite the island of San Antioco, and the narrow valley in the northwest already mentioned. The basalts of Monte Ferru are also of Tertiary date, and it does not appear to have been till that epoch that Sardinia formed a single island.

Map of Sardinia.

In variety of mineral wealth the southern half of Sardinia is the richest province of Italy, and it stands second in the annual value of its mineral products. The chief minerals are sulphates of lead more or less argentiferous (galena), sulphates and silicates of zinc, ordinary iron pyrites, sulphates of iron and copper, of antimony, and of arsenic, besides cobalt, nickel, and silver. The coal on the flanks of Gennargentu is of good enough quality to furnish a valuable fuel, and is found in sufficiently thick seams to be workable if only the means of transport were present, but its situation is such as to render it of no economical importance. In the Tertiary deposits of the southwest there are some veins of manganese ore, and also some beds of lignite which are worked as a source of fuel for local use. The mineral wealth of Sardinia was known in ancient times, and mines were worked both by the Carthaginians and the Romans. During the Middle Ages they were for the most part neglected, but the industry was revived in modern times, and has been greatly developed in recent years. Upwards of 70 mines have now been opened, most of them in the district of which Iglesias is the centre, but a few near the southern part of the east coast, where Muravera is the chief town. The mines are mostly of argentiferous lead, silver, zinc, and iron. The ores are mainly exported in the raw state, only the inferior sorts being smelted in the island. Among other mineral products are building stones (granite, marble, etc.), alabaster, and salt.

The climate of Sardinia is similar to that of the rest of the Mediterranean region, and the southern half of the island shares in the nearly rainless summers characteristic of the southern portions of the Mediterranean peninsulas. At Cagliari there are on an average only seven days on which rain falls during June, July, and August. Throughout the island these months are the driest in the year, and hence vegetation on the lower ground at least is generally at a standstill during that period, and shrubs with broad leathery leaves fitted to withstand the drought (the so-called *maquis*) are as characteristic here as in Corsica and on the mainland. Winter is the rainiest season of the year; but the heat and drought of summer (mean temperature 95° F.) make that the most unpleasant of the seasons, while in the low grounds the prevalence of malaria renders it a most unhealthy one, especially for visitors. Autumn, which is prolonged into December, is the most agreeable season; there is then neither heat nor cold, nor mist nor fever, and at that period birds of passage begin to immigrate in large numbers.

The agricultural products of the island are greatly inferior to what might be expected in view of the natural fertility of the soil. Two causes are assigned for this. The first is the minute subdivision of the land, which, as in Corsica, is carried to such an extent that where an owner has as much as 100 acres his property is divided into 25 or 30 lots surrounded by parcels of land belonging to other owners. In such circumstances it is neither possible to apply adequate capital to the cultivation of the ground, nor for the owners to acquire the requisite capital. The second cause is the malaria which renders certain districts possessed of a fertile soil quite uninhabitable; and this second cause can be remedied only when a remedy has been found for the first, for, as the malaria is undoubtedly one cause of diminished cultivation, it is equally certain that want of cultivation is one of the causes of the malaria. In ancient times Sardinia was one of the granaries of Rome; now cereals take a comparatively unimportant place among the exports, and this export is balanced by a considerable import of the same commodity. The chief products of agriculture are wheat, barley, and beans, the last furnishing an important element of the food of the people. Olives run wild in many places, and are grown in sufficient abundance to meet the local demand. Almonds, oranges, and citrons are also largely cultivated, and the oranges of San Vito, near Muravera, and of Milis, a few miles to the north of Oristano, are noted for their excellence; the white wines of the banks of the Oristano are of good repute; and among other products of the island are mulberries, tobacco, madder, and hemp. Forests of oak, cork-oak, firs, and pines, though greatly reduced in extent, still cover, it is said, about one-fifth of the surface. The rearing of live stock receives more attention than agriculture proper. No artificial pasture-grasses are grown, but the natural pastures beside the numerous rivers yield abundance of food, except during the dry season, when the horses, asses, cattle, sheep, and goats have to content themselves with straw, some dried beans, and a little barley. Most attention is bestowed on horses. At one time the Sardinian government endeavored to keep a stud on the island for rearing horses for the Piedmontese cavalry, but the persons employed (natives of the mainland) were unable to withstand the malaria. There are some large private establishments for the rearing of horses, however, and the tending of live-stock generally forms so important a part of the occupations of the people that animals rank next after minerals among the exports of the island. Of the wild animals, the wild sheep known as the musimon, or European mufflon, formerly an inhabitant of all the mountains of the Mediterranean peninsulas and islands, and now confined to Sardinia and Corsica, is the most in-

teresting. Among the noxious animals are scorpions and tarantulas.

The lagoons near the coast on the south and west abound in mullets, eels, mussels, and crabs, which are caught in great numbers by the natives, while the fisheries round Sardinia, as round Corsica, are in the hands of Italians from the mainland. The anchovy, sardine, and coral fisheries are all lucrative. The coral is said to be of excellent quality, and is exported to the markets of Genoa and Marseilles.

The external commerce of the island has nearly trebled itself in the twenty-five years, 1856–81, the imports and exports each amounting in the latter year to about £1,500,000 [$7,290,000], (about £2, 4s. [or $10.69] per head of population). This increase is chiefly owing to the development of the mining industry, ores making up nearly one-third of the total value of the exports. Live animals make up about a fourth of the total value, and cereals, which come next in order, about one-seventh. The chief imports are cotton and other manufactures and colonial products. The inland trade has been greatly promoted within the last fifty years by the construction of roads and railways. Before 1828 there were no roads at all in the island; the tracks which existed could be traversed only on foot or on horseback. But upwards of 1500 miles of national and provincial roads, all well made and well kept, have since then been constructed. Of railways, introduced since 1870, there are now 265 miles in all (equal to about 1 mile of railway for every 34 square miles of surface).

For administrative purposes Sardinia, like the rest of Italy, is divided into provinces and circles (*circondarii*). The following table gives the names of these divisions with the population according to the last census (end of 1881):

Circles.	Communes.	Population.	Circles	Communes.	Population.
Cagliari	79	153,336	Sassari	24	88,312
Iglesias	24	77,373	Alghero	20	43,624
Lanusei	48	64,816	Nuoro	33	59,794
Oristano	106	125,110	Ozieri	21	41,193
			Tempio	9	28,444
Prov. Cagliari	257	420,635	Prov. Sassari	107	261,367

The whole population of the department is thus 682,002, equal to about 74 to the square mile, Sardinia being the least populous of all the great divisions of the kingdom, in which the average density is 255 to the square mile. The population is, however, increasing at a rather more rapid rate than on the mainland. Between 1871 and 1881 it increased by about 46,000, or 7.18 per cent., while the average rate of increase throughout the kingdom was only 6.16 per cent.

The inhabitants of Sardinia are a hardy race, of about middle height, and of dark complexion. They are little accustomed to hard work, but this is one of the consequences of the backward state of their civilization and of the impediments already indicated to the development of the resources of the island. Education, as in many other parts of Italy, is very far behind, notwithstanding the law which makes elementary education compulsory; but here, as throughout the kingdom, it is rapidly extending. In 1880–81 only 37,197 children, or less than one-eighteenth of the population, were in attendance at the elementary schools, but this number was double what it had been in 1861–62. At Cagliari there is a university, attended by from 300 to 400 students.[1]

The people are lively in their disposition, fond of music and poetry, remarkably hospitable, and strong in their family attachments. With this last trait, however, is connected the chief blot on their character—their addiction to the practice of the *vendetta*, which prevails here as in Corsica, and according to which an outrage on one's honor is wiped out in blood, and the cause of one member of a family is taken up by the rest, so that the death of one victim leads to the sacrifice of many others. But the practice is said to be becoming every day more rare, and never to be resorted to except in case of serious offence.

The capital of the island is Cagliari, but Sassari in the north has an equally large population (about 34,000). The other chief towns are Tempio, Alghero, Iglesias, and Oristano. Cagliari, Alghero, and Castel Sardo are fortified.

The antiquities of the island are numerous and of peculiar interest. The most remarkable of these are the monuments called *nurhags* (variously spelled also *nuraghe*, *nuraghi*, etc.), of which there are upwards of 3000 scattered over the island. They are round structures having the form of truncated cones, and are generally built of the hardest materials the island supplies (granite, basalt, trachyte, limestone, etc.). The stone is roughly hewn into large blocks, which are laid in regular horizontal courses but not cemented. The blocks in the lower courses are sometimes more than three feet in length. Entrance is obtained by a very low opening at the base to an inner chamber; and, when there are two or, as in some cases, three stories, these are connected by means of a spiral staircase. The origin and use of these structures are both matters of speculation. The rarity of human remains in them is against the idea that they were used as tombs, while the absence of any relics pertaining to a religious ceremonial is equally adverse to the supposition that they were used as temples. Next to the nurhags the most interesting of the remains of antiquity are the so-called tombs of the giants, which appear to have been actually used as places of burial, although, as the name given to them indicates, their dimensions are greatly in excess of those of the human body. Besides these there are tombs the structure of which leads to the belief that they must be relics of an Egyptian colony.

History.—According to Prof. Crespi, of the university of Cagliari, the tombs just referred to are not the only signs of an early Egyptian settlement in the island of Sardinia. Various remains are said to prove beyond doubt that Egyptians must have founded at least two colonies in very remote times—one at the ancient town of Tharrus on the small peninsula of San Marco at the northern extremity of the Gulf of Oristano, and the other at Caralis, the present Cagliari. But even before the Egyptians Prof. Crespi believes that the Phœnicians had established a colony on the small island of San Antioco, and had built there the town of Sulcis, the ruins of which are still to be seen near the town of San Antioco. Of Phœnicians and Egyptians, however, there are no trustworthy historical records, and the first settlers whose arrival is historically accredited were the Carthaginians, who succeeded in making themselves masters of the island under Hasdrubal in 512 B.C. The island remained in Carthaginian hands for upwards of two hundred and seventy years, and then passed into those of the Romans, who took advantage of the war in which Carthage was involved with her mercenary troops after the close of the First Punic War to seize the island (238 B.C.). Thenceforward the island remained in possession of the Romans till near the fall of the empire of the West, when Sardinia also began to suffer from the ravages of the northern hordes by which Italy was at that time overrun and the empire of the West overthrown. About the middle of the 5th century the island was occupied by the Vandals under Genseric, but in the first half of the following century these were expelled by Belisarius. Very soon after, however, Goths succeeded the Vandals, and after these had in their turn been driven out by Narses the natives managed to expel the Romans and to achieve their independence (665). The Sardinians thereupon elected the leader in the revolt against Rome king of the island, and by him the island was divided into the four grand-judicatures of Cagliari, Arborea, Torres, and Gallura. The grand-justices or rulers of these four divisions continued to retain a considerable amount of power during a large part of the Middle Ages. But from the early part of the 8th century down to the middle of the 11th their influence was greatly impaired by repeated inroads of the Saracens, who landed now on one coast now on another, and kept the inhabitants in a constant state of alarm. This state of matters was at last put an end to by the Genoese and Pisans, who, acting under the sanction of the pope, despatched a fleet against that of the Saracens. A battle ensued in the Bay of Cagliari; the Saracens were completely defeated, and the allies landed on the island (1050). Very soon the Pisans adroitly managed to rid themselves of the Genoese, and to gain possession of almost the entire island, deposing the grand-justices of Cagliari, Torres, and Gallura. With the Pisans the greater part of the island remained till 1325, when the pope gave Sardinia to the king of Aragon, who combined with the grand-justice of Arborea to drive out the former rulers. But, this being accomplished, war soon broke out between the two, and numerous successes were gained by the grand-justice Marian IV. and his daughter Eleonora acting as regent on behalf of her son Marian V., a minor. The Aragonese seemed to be on the point of being driven out of the island when Eleonora died of the plague (1403), and soon after the whole island became an Aragonese (after the union of the crowns of Aragon and Castile a Spanish) province. It remained Spanish till the treaty of Utrecht in 1713, when it was ceded to the house of Austria, by which, in 1720, it was handed over to Victor Amadeus II., duke of

[1] [For the universities at Cagliari and Sassari with their attendance in 1879, see vol. xiii. p. 471.—AM. ED.]

Savoy, in exchange for the island of Sicily. Shortly before the date of this acquisition the duke of Savoy (see Savoy) had had the title of king conferred upon him, and when the cession of Sardinia took place the title was changed to that of king of Sardinia. With this kingdom the island ultimately became merged in the kingdom of Italy.

See La Marmora, *Voyage en Sardaigne* (Paris, 2d ed., 1837–57); Roissard de Bellet, *La Sardaigne à vol d'oiseau* (Paris, 1884); Robert Tennant, *Sardinia and its Resources* (Lond., 1885). (G. G. C.)

SARDIS (*αἱ Σάρδεις*), the capital of the kingdom of Lydia, the seat of a *conventus* under the Roman empire, and the metropolis of the province Lydia in later Roman and Byzantine times, was situated in the middle Hermus valley, at the foot of Mount Tmolus, a steep and lofty spur of which formed the citadel. It was about 20 stadia (2½ miles) south of the Hermus. The earliest reference to Sardis is in the *Persæ* of Æschylus (472 B.C.); in the *Iliad* the name Hyde seems to be given to the city of the Mæonian (*i.e.*, Lydian) chiefs, and in later times Hyde was said to be the older name of Sardis, or the name of its citadel. It is, however, more probable that Sardis was not the original capital of the Mæonians, but that it became so amid the changes which produced a powerful Lydian empire in the 8th century B.C. The city, but not the citadel, was destroyed by the Cimmerians in the 7th century, by the Athenians in the 6th, and by Antiochus the Great in the 3d century; once at least, under the emperor Tiberius, it was destroyed by an earthquake; but it was always rebuilt, and continued to be one of the great cities of western Asia Minor till the later Byzantine time. Its importance was due, first to its military strength, secondly to its situation on an important highway leading from the interior to the Ægean coast, and thirdly to its commanding the wide and fertile plain of the Hermus. The early Lydian kingdom was far advanced in the industrial arts (see Lydia), and Sardis was the chief seat of its manufactures. The most important of these trades was the manufacture and dyeing of delicate woollen stuffs and carpets. The statement that the little stream Pactolus which flowed through the market-place rolled over golden sands is probably little more than a metaphor, due to the wealth of the city to which the Greeks of the 6th century B.C. resorted for supplies of gold; but trade and the practical organization of commerce were the real sources of this wealth. After Constantinople became the capital of the East a new road system grew up connecting the provinces with the capital. Sardis then lay rather apart from the great lines of communication and lost some of its importance. It still, however, retained its titular supremacy, and continued to be the seat of the metropolitan bishop of the province. It is enumerated as third, after Ephesus and Smyrna, in the list of cities of the Thracesian thema given by Constantine Porphyrogenitus in the 10th century; but in the actual history of the next four centuries it plays a part very inferior to Magnesia ad Sipylum and Philadelphia, which have to the present day retained their preëminence in the district. The Hermus valley began to suffer from the inroads of the Seljuk Turks about the end of the 11th century; but the successes of the Greek general Philocales in 1118 relieved the district for the time, and the ability of the Comneni, together with the gradual decay of the Seljuk power, retained it in the Byzantine dominions. The country round Sardis was frequently ravaged both by Christians and by Greeks during the 13th century. Soon after 1301 the Seljuk emirs overran the whole of the Hermus and Çayster valleys, and a fort on the citadel of Sardis was handed over to them by treaty. Finally in 1390 Philadelphia, which had for some time been an independent Christian city, surrendered to Sultan Bayazid's mixed army of Ottoman Turks and Byzantine Christians, and the Seljuk power in the Hermus valley was merged in the Ottoman empire. The latest reference to the city of Sardis relates its capture (and probably destruction) by Timur in 1402. Its site is now absolutely deserted, except that a tiny village, Sart, merely a few huts inhabited by semi-nomadic Yuruks, exists beside the Pactolus, and that there is a station of the Smyrna and Cassaba Railway a mile north of the principal ruins.

The ruins of Sardis, so far as they are now visible, are chiefly of the Roman time; but probably few ancient sites would more richly reward the excavator with remains of all periods from the early pre-Hellenic time downwards. On the banks of the Pactolus two columns of a temple of the Greek period, probably the great temple of Cybele, are still standing. More than one attempt to excavate this temple, the last by Mr. G. Dennis in 1882, have been made and prematurely brought to an end by lack of funds. The necropolis of the old Lydian city, a vast series of mounds, some of enormous size, lies on the north side of the Hermus, four or five miles from Sardis, a little south of the sacred lake Coloe; here the Mæonian chiefs, sons, according to Homer, of the lake, were brought to sleep beside their mother. The series of mounds is now called Bin Tepe (Thousand Mounds). Several of them have been opened by modern excavators, but in every case it was found that treasure-seekers of an earlier time had removed any articles of value that had been deposited in the sepulchral chambers.

SARDONYX, a name applied to those varieties of onyx, or stratified chalcedony, which exhibit white layers alternating with others of red or brown color. The brown chalcedony is known to modern mineralogists as *sard* and the red as *carnelian*. The simplest and commonest type of sardonyx contains two strata,—a thin layer of white chalcedony resting upon a ground of either carnelian or sard; but the sardonyx of ancient writers generally presented three layers—a superficial stratum of red, an intermediate band of white, and a base of dark brown chalcedony. The sardonyx has always been a favorite stone with the cameo-engraver, and the finest works have usually been executed on stones of five strata. Such, for instance, is the famous Carpegna cameo, in the Vatican, representing the triumph of Bacchus and Ceres, and reputed to be the largest work of its kind ever executed (16 inches by 12). When the component layers of a sardonyx are of fine color and sharply defined, the stone is known in trade as an "Oriental sardonyx"—a term which is used without reference to the geographical source whence the stone is obtained. A famous ancient locality for sard was in Babylonia, and the name of the stone appears to be connected with the Persian word *sered*, "yellowish red," in allusion to the color of the sard. Pliny, relying on a superficial resemblance, derives the name from Sardis, reputed to be its original locality. The sardonyx is frequently stained, or at least its color heightened, by chemical processes. Imitations are fabricated by cementing two or three layers of chalcedony together, and so building up a sardonyx; while baser counterfeits are formed simply of paste. See Onyx, vol. xvii. p. 798.

SARGASSO SEA. See Atlantic, vol. iii. pp. 19, 24.

SARGON, king of Assyria, 722–705 B.C. (Isa. xx. 1). See Babylonia, vol. iii. p. 162, and Isaiah, vol. xiii. p. 388 *sq.*

SARI. See Mazandarán.

SARMATIANS (*Σαυρομάται, Σαρμάται*, Sarmatæ). In the time of Herodotus (iv. 110–117) the steppes between the Don and the Caspian were inhabited by the Sauromatæ, a nomadic horse-riding people, whose women rode, hunted, and took part in battle like the men, so that legend (presumably the legend of the Greek colonists on the Black Sea) represented the race as descendants of the Amazons by Scythian fathers. It is recounted both by Herodotus and by Hippocrates (*De Aer.*, 17) that no maiden was allowed to marry till she had slain a foe (or three foes), after which she laid aside her masculine habits. The Scythians, we are told, called the Amazons *Οἰόρπατα*, which seems to be an Iranian name and to mean "lords of man," and it is reasonable to think that the word was applied to the Sarmatian viragos by the Scythians, who themselves

kept women in great subjection, and thus expressed their surprise at the dominating position of the female sex among their neighbors beyond the Don. But in spite of the difference of their customs in this point Scythians and Sarmatians spoke almost the same language (Herod. iv. 117), and, whatever difficulty still remains as to the race of the Scythians, their language and religion are now generally held to have been of Iranian character (see SCYTHIA). That the Sarmatians, at least, were of Median origin is the express opinion of Diodorus (ii. 43) and Pliny. From their seats east of the Danube the Sarmatians at a later date moved westward into the lands formerly Scythian, one branch, the "transplanted" Iazyges (I. *μεταναστάι*) being settled between the Danube and the Theiss at the time of the Dacian wars of Rome, while other Sarmatian tribes, such as the Maitæ on the eastern shores of Lake Mæotis and the Roxolani between the Don and the Dnieper, ranged over the steppes of southern Russia. The country of Sarmatia, however, as that term is used for example by Ptolemy, means much more than the lands of the Sarmatians, comprising all the eastern European plain from the Vistula and the Dniester to the Volga, whether inhabited by nomad Sarmatians, by agricultural Slavs and Letts, or even by Finns. This Sarmatia was arbitrarily divided into an Asiatic and a European part, east and west of the Don respectively.

SARNO, a city of Italy, in the province of Salerno, 30 miles east of Naples by rail, lies at the foot of the Apennines near the sources of the Sarno, a stream connected by canal with Pompeii and the sea. Besides the cathedral, a basilica erected in 1625 at some distance from the city, Sarno has several interesting churches and the ruins of a mediæval castle. Paper, cotton, silk, linen, and hemp are manufactured. The population of the town in 1881 was 11,445. Previous to its incorporation with the domains of the crown of Naples, Sarno gave its name to a countship held in succession by the Orsini, Cappola, Suttavilla, and Colonna families.

SARPI, PIETRO (1552–1623), was born at Venice, August 14, 1552, and was the son of a small trader, who left him an orphan at an early age. Quiet, serious, devoted to study, endowed with great tenacity of application and a prodigous memory, the boy seemed born for a monastic life, and, notwithstanding the opposition of his relatives, entered the order of the Servi di Maria, a minor Augustinian congregation of Florentine origin, at the age of thirteen. He assumed the name of Paolo, by which, with the epithet *Servita*, he was always known to his contemporaries. In 1570 he sustained no fewer than three hundred and eighteen theses at a disputation in Mantua, with such applause that the duke attached the youthful divine to his service by making him court theologian. Sarpi spent four years at Mantua, applying himself with the utmost zeal to mathematics and the Oriental languages. He there made the acquaintance of Olivo, formerly secretary to a papal legate at the council of Trent, from whom he learned much that he subsequently introduced into his *History*. After leaving Mantua for some unexplained reason, he repaired to Milan, where he enjoyed the protection of Cardinal Borromeo, another authority in the council, but was soon transferred by his superiors to Venice, as professor of philosophy at the Servite convent. In 1579 he was sent to Rome on business connected with the reform of his order, which occupied him several years, and brought him into intimate relations with three successive popes, as well as the grand inquisitor and other persons of influence. The impression which the papal court made upon him may be collected from his subsequent history. Having successfully terminated the affairs entrusted to him, he returned to Venice in 1588, and passed the next seventeen years in quiet study, occasionally interrupted by the part he was compelled to take in the internal disputes of his community. In 1601 he was recommended by the Venetian senate for the small bishopric of Caorle, but the papal nuncio, who wished to obtain it for a protégé of his own, informed the pope that Sarpi denied the immortality of the soul, and had controverted the authority of Aristotle. An attempt to procure another small bishopric in the following year also failed, Clement VIII. professing to have taken umbrage at Sarpi's extensive correspondence with learned heretics, but more probably determined to thwart the desires of the liberal rulers of Venice. The sense of injury, no doubt, contributed to exasperate Sarpi's feelings towards the court of Rome, but a man whose master passions were freedom of thought and love of country could not have played any other part than he did in the great contest which was impending. For the time, however, he tranquilly pursued his studies, writing those notes on Vieta which established his proficiency in mathematics, and a metaphysical treatise now lost, which, if Foscarini's account of it may be relied upon, anticipated the sensationalism of Locke. His anatomical pursuits probably date from a somewhat earlier period. They illustrate his versatility and thirst for knowledge, but are far from possessing the importance ascribed to them by the affection of his disciples. His claim to have anticipated Harvey's discovery rests on no better authority than a memorandum, probably copied from Cæsalpinus or Harvey himself, with whom, as well as with Bacon and Gilbert, he maintained a correspondence. The only physiological discovery which can be safely attributed to him is that of the contractility of the iris. It must be remembered, however, that his treatises on scientific subjects are lost, and only known from imperfect abstracts.

The prudent Clement died in March, 1605; and after one ephemeral succession and two very long conclaves Paul V. assumed the tiara with the resolution to strain papal prerogative to the uttermost. At the same time Venice was adopting measures to restrict it still further. The right of the secular tribunals to take cognizance of the offences of ecclesiastics had been asserted in two remarkable cases; and the scope of two ancient laws of the city of Venice, forbidding the foundation of churches or ecclesiastical congregations without the consent of the state, and the acquisition of property by priests or religious bodies, had been extended over the entire territory of the republic. In January, 1606, the papal nuncio delivered a brief demanding the unconditional submission of the Venetians. The senate having promised protection to all ecclesiastics who should in this emergency aid the republic by their counsel, Sarpi presented a memoir, pointing out that the threatened censures might be met in two ways,—*de facto*, by prohibiting their publication, and *de jure*, by an appeal to a general council. The document was received with universal applause, and Sarpi was immediately made canonist and theological counsellor to the republic. When in the following April the last hopes of accommodation were dispelled by Paul's excommunication of the Venetians and his attempt to lay their dominions under an interdict, Sarpi entered with the utmost energy into the controversy. He prudently began by republishing the anti-papal opinions of the famous canonist Gerson. In an anonymous tract published shortly afterwards (*Risposta di un Dottore in Teologia*) he laid down principles which struck at the very root of the pope's authority in secular things. This book was promptly put upon the *Index*, and the republication of Gerson was attacked by Bellarmine with a severity which obliged Sarpi to reply in an *Apologia*. The *Considerazioni sulle Censure* and the *Trattato dell' Interdetto*, the latter partly prepared under his direction by other theologians, speedily followed. Numerous other pamphlets appeared, inspired or controlled by Sarpi, who had received the further appointment of censor over all that should be written at Venice in defence of the republic. His activity regis-

ters the progress of mankind, and forms an epoch in the history of free discussion. Never before in a religious controversy had the appeal been made so exclusively to reason and history; never before had an ecclesiastic of his eminence maintained the subjection of the clergy to the state, and disputed the pope's right to employ spiritual censures, except under restrictions which virtually abrogated it. In so doing he merely gave expression to the convictions which had long been silently forming in the breasts of enlightened men, and this, even more than his learning and acuteness as a disputant, insured him a moral victory. Material arguments were no longer at the pope's disposal. The Venetian clergy, a few religious orders excepted, disregarded the interdict, and discharged their functions as usual. The Catholic powers refused to be drawn into the quarrel. At length (April, 1607) a compromise was arranged through the mediation of the king of France, which, while salving over the pope's dignity, conceded the points at issue. The great victory, however, was not so much the defeat of the papal pretensions as the demonstration that interdicts and excommunications had lost their force. Even this was not wholly satisfactory to Sarpi, who longed for the toleration of Protestant worship in Venice, and had hoped for a separation from Rome and the establishment of a Venetian free church by which the decrees of the council of Trent would have been rejected, and in which the Bible would have been an open book. But the controversy had not lasted long enough to prepare men's minds for so bold a measure. The republic rewarded her champion with the further distinction of state counsellor in jurisprudence, and, a unique mark of confidence, the liberty of access to the state archives. These honors exasperated his adversaries to the uttermost; and after citations and blandishments had equally failed to bring him to Rome he began to receive intimations that a stroke against him was preparing in that quarter. On October 5 he was attacked by a band of assassins and left for dead, but the wounds were not mortal. The bravos found a refuge in the papal territories. Their chief, Poma, declared that he had been moved to attempt the murder by his zeal for religion, a degree of piety and self-sacrifice which seems incredible in a bankrupt oil-merchant. "Agnosco stylum Curiæ Romanæ," Sarpi himself pleasantly said, when his surgeon commented upon the ragged and inartistic character of the wounds, and the justice of the observation is as incontestable as its wit. The only question can be as to the degree of complicity of Pope Paul V., a good man according to his light, but who must have looked upon Sarpi as a revolted subject, and who would find casuists enough to assure him that a prince is justified in punishing rebels by assassins when they are beyond the reach of executioners.

The remainder of Sarpi's life was spent peacefully in his cloister, though plots against him continued to be formed, and he occasionally spoke of taking refuge in England. When not engaged in framing state papers, he devoted himself to scientific studies, and found time for the composition of several works. A Machiavellian tract on the fundamental maxims of Venetian policy (*Opinione come debba governarsi la repubblica di Venezia*), used by his adversaries to blacken his memory, though a contemporary production, is undoubtedly not his. It has been attributed to a certain Gradenigo. Nor did he complete a reply which he had been ordered to prepare to the *Squitinio della Libertà Veneta*, which he perhaps found unanswerable. In 1610 appeared his *History of Ecclesiastical Benefices*, "in which," says Ricci, "he purged the church of the defilement introduced by spurious decretals." In the following year he assailed another abuse by his treatise on the right of asylum claimed for churches, which was immediately placed on the *Index*. In 1615 a dispute between the Venetian Government and the Inquisition respecting the prohibition of a book led him to write on the history and procedure of the Venetian Inquisition; and in 1619 his chief literary work, the *History of the Council of Trent*, was printed at London under the name of Pietro Soave Polano, an anagram of Paolo Sarpi Veneto. The editor, Marco Antonio de Dominis, has been accused of falsifying the text, but a comparison with a MS. corrected by Sarpi himself shows that the alterations are both unnecessary and unimportant. This memorable book, together with the rival and apologetic history by Cardinal Pallavicini, is minutely criticised by Ranke (*History of the Popes*, appendix No. 3), who tests the veracity of both writers by examining the use they have respectively made of their MS. materials. The result is not highly favorable to either, nor wholly unfavorable; neither can be taxed with deliberate falsification, but both have colored and suppressed. They write as advocates rather than historians. Each had access to sources of information denied to the other; so that, although it may be true in a sense that the truth lies between them, it cannot be attained by taking the middle way between their statements. Ranke rates the literary qualities of Sarpi's work very highly. "Sarpi is acute, penetrating, and sarcastic; his arrangement is exceedingly skilful, his style pure and unaffected. In power of description he is without doubt entitled to the second place among the modern historians of Italy. I rank him immediately after Machiavelli." Sarpi never acknowledged his authorship, and baffled all the efforts of the Prince de Condé to extract the secret from him. He survived the publication four years, dying on January 15, 1623, laboring for his country to the last. The day before his death he had dictated three replies to questions on affairs of state, and his last words were "Esto perpetua." His posthumous *History of the Interdict* was printed at Venice the year after his death, with the disguised imprint of Lyons.

Sarpi's services to mankind are now acknowledged by all except the most extreme Ultramontane partisans; and of his general character it is enough to say that even theological hatred has been unable to fix the least personal imputation upon him. To the highest qualities of the scholar, the statesman, and the patriot he added charity, magnanimity, and disinterestedness. The only point on which his conduct may be thought to require apology is the reserve in which he shrouded his religious opinions. Great light has been thrown upon his real belief and the motives of his conduct by the letters of Christoph von Dohna, envoy of Christian, prince of Anhalt, to Venice, published by Moritz Ritter in the *Briefe und Acten zur Geschichte des dreissigjährigen Krieges*, vol. ii. (Munich, 1874). Sarpi told Dohna that he greatly disliked saying mass, and celebrated it as seldom as possible, but that he was compelled to do so, as he would otherwise seem to admit the validity of the papal prohibition, and thus betray the cause of Venice. This supplies the key to his whole behavior; he was a patriot first and a religious reformer afterwards. He was most anxious to obtain liberty of Protestant worship at Venice, but scarcely proceeded beyond good wishes, partly from prudence, partly from being "rooted" in what Diodati described to Dohna as "the most dangerous maxim, that God does not regard externals so long as the mind and heart are right before Him." "It is of little avail," adds Diodati, "to dispute with him, for all blows fall ineffectually upon the sweetness and maturity of affectious and spirit which raise him above well nigh every emotion." Sarpi had another maxim, which he thus formulated to Dohna: "*Le falsità non dico mai mai, ma la verità non a ognuno.*" It must further be considered that, though Sarpi admired the English prayer-book, he was neither Anglican, Lutheran, nor Calvinist, and might have found it difficult to accommodate himself to any Protestaut church. On the whole, the opinion of Le Courayer, "qu'il était Catholique en gros et quelque fois Protestant en détail," seems not altogether groundless, though it can no longer be accepted as a satisfactory summing up of the question. His discoveries in natural science have been overrated, but his scientific attainments must have been great. Galileo would not have wasted his time in corresponding with a man from whom he could learn nothing; and, though Sarpi did not, as has been asserted, invent the telescope, he immediately turned it to practical account by constructing a map of the moon,

Sarpi's life was written by his enthusiastic disciple, Father Fulgenzio Micanzio, whose work does honor to his heart, but is both meagre and uncritical. Bianchi-Giovini's modern biography (1836) is greatly marred by digressions but is on the whole the most satisfactory extant, though inferior in some respects to that by Miss Arabella Georgina Campbell (1869), a labor of love, enriched by numerous references to MSS. unknown to Bianchi-Giovini. The numerous misprints which disfigure the English edition of this work have been corrected in an Italian translation. T. A. Trollope's *Paul the Pope and Paul the Friar* (1861) is in the main a mere abstract of Bianchi-Giovini, but adds a spirited account of the conclave of Paul V. The incidents of the Venetian dispute from day to day are related in the contemporary diaries published by Enrico Cornet (Vienna, 1859). Giusto Fontanini's *Storia Arcana della Vita di Pietro Sarpi* (1863), a bitter libel, is nevertheless important for the letters of Sarpi it contains, as Griselini's *Memorie Anedote* (1760) is from the author's access to Sarpi's unpublished writings, afterwards unfortunately destroyed by fire. Foscarini's *History of Venetian Literature* is important on the same account. Sarpi's memoirs on state affairs remain in the Venetian archives. Portions of his correspondence have been printed at various times, and inedited letters from him are of frequent occurrence in public libraries. The King's Library in the British Museum has a valuable collection of tracts in the Interdict controversy, formed by Consul Smith. (R. G.)

SARRAZIN, Jacques (1588–1660), French painter, born at Noyon in 1588, was a pupil of the father of Simon Guillain, but he went to Rome at an early age and worked there under a Frenchman named Anguille. Starting thus, Sarrazin speedily obtained employment from Cardinal Aldobrandini at Frascati, where he won the friendship of Domenichino, with whom he afterwards worked on the high altar of St. Andrea della Valle. His return to Paris, where he married a niece of Simon Vouet's, was signalized by a series of successes which attracted the notice of Sublet des Noyers, who entrusted to him the work by which Sarrazin is best known, the decoration of the great portal and dome of the western façade of the interior court of the Louvre. The famous Caryatides of the attic show, especially in the way in which the shadows are made to tell as points of support, the profound and intelligent study of Michelangelo's art to which Sarrazin had devoted all the time he could spare from bread-winning whilst in Rome. He now executed many commissions from the queen and from all the chief personages of the day, devoted much time to painting and was an active promoter of the foundation of the Academy. The mausoleum for the heart of the Prince de Condé in the Jesuit church of the Rue Saint Antoine was his last considerable work (see Lenoir, *Musée des Monuments Français*, v. 5); he died 3d December, 1660, whilst it was in progress, and the crucifix of the altar was actually completed by one of his pupils named Gros.

SARSAPARILLA, a popular alterative remedy, prepared from the long fibrous roots of several species of the genus *Smilax*, indigenous to Central America, and extending from the southern and western coasts of Mexico in the north to Peru in the south. These plants grow in swampy forests seldom visited by European travellers, and, being dicœcious and varying much in the form of leaf in different individuals, they are but imperfectly known to botanists, only two species having been identified as yet with any degree of certainty. These are *Smilax officinalis*, Kth., and *S. medica*, Schlecht. and Cham., which yield respectively the so-called "Jamaica" and the Mexican varieties. The introduction of sarsaparilla into European medicine dates from the middle of the 16th century. Monardes, a physician of Seville, records that it was brought to that city from New Spain about 1536–45, that a better sort soon afterwards came from Honduras, and that an excellent variety of a darker color, and consisting of larger roots, was subsequently imported from Guayaquil. Sarsaparilla must have come into extensive use soon afterwards, for Gerard, about the close of the century, states that it was imported into England from Peru in great abundance.

When boiled in water the root affords a dark extractive matter, the exact nature of which has not been determined; the quantity of extract yielded by the root is used as a criterion of its quality. Boiling alcohol extracts from the root a neutral substance in the form of crystalline prisms, which crystallize in scales from boiling water. This body, which is named *parillin*, is allied to the saponin of quillaia bark, from which it differs in not exciting sneezing. The presence in the root of starch, resin, and oxalate of lime is revealed by the use of the microscope. Sarsaparilla is chiefly used in medicine in the form of decoction and fluid extract. It is regarded by many as a valuable alterative and diaphoretic in chronic rheumatism, syphilis, and various skin diseases, but by others as possessing little if any remedial value. It is frequently prescribed in combination with powerful medicines, such as iodide of potassium or bichloride of mercury.

The varieties of sarsaparilla met with in commerce at present are the following: Jamaica, Lima, Honduras, Guatemala, Guayaquil, and Mexican. Of these the first-named is the most highly esteemed, as yielding the largest amount of extract, viz., from 33 to 44 per cent.; it is the only kind admitted into the British pharmacopœia. On the Continent, and more especially in Italy, the varieties having a white starchy bark, like those of Honduras and Guatemala, are preferred. "Jamaica" sarsaparilla is not produced there, but derives its name from the fact that Jamaica was at one time the emporium for sarsaparilla which was brought thither from Honduras, New Spain, and Peru. Sarsaparilla is grown to a small extent in Jamaica, and is occasionally exported thence to the London market in small quantities, but its orange color and starchy bark are so different in appearance from the thin reddish-brown bark of the genuine drug, that it does not meet with a ready sale. The Jamaica sarsaparilla of trade is collected on the Cordilleras of Chiriqui, in that part of the isthmus of Panama which adjoins Costa Rica, where the plant yielding it grows at an elevation of 4000 to 8000 feet, and is brought down to Boca del Toro on the Atlantic coast for shipment. It is met with in commerce in the form of hanks about 18 inches long and 4 inches in diameter, loosely wound round with a long root of the same drug. The root bark is of a reddish-brown color, thin and shrivelled, and there is an abundance of rootlets, which are technically known by the name of "beard." Lima sarsaparilla resembles the Jamaica kind, but the roots are of a paler brown color, and are formed into cylindrical bundles of similar length, but only about 2½ inches in diameter. Honduras sarsaparilla occurs in the form of cylindrical rolls about 30 inches long and 4 or more in diameter, closely wound round with a long root so as to form a neat bundle. The roots are less wrinkled, and the bark is whiter and more starchy, than in the Jamaica kind. It is exported from Belize to the extent of about 10,000 pounds annually. Guatemala sarsaparilla is very similar to that of Honduras, but has a more decided orange hue, and the bark shows a tendency to split off. Guayaquil sarsaparilla is obtained chiefly in the valley of Alausi, on the western side of the equatorial Andes. The roots are roughly packed in large bales and are not made into separate hanks, and the chump or rootstock is often allowed to remain attached to the roots. The bark is thick and furrowed, and of a pale fawn color internally; the rootlets are few, and the root itself is of larger diameter than in the other kinds. Sometimes there is attached to the rootstock a portion of stem, which is round and not prickly, differing in these respects from that of *Smilax officinalis*, which is square and prickly. Mexican sarsaparilla also is not made up into hanks, but is packed in straight lengths of about 3 feet into bales, the chump and portions of an angular but not square stem being frequently attached to the roots. The latter are slender, shrivelled, and nearly devoid of rootlets. This kind of sarsaparilla is collected on the eastern slope of the Mexican Andes throughout the year, and is the produce of *Smilax medica*, Schlecht. and Cham.

The collection of sarsaparilla root is a very tedious business; a single root takes an Indian half a day or sometimes even a day and a half to unearth it. The roots extend horizontally in the ground on all sides for about 9 feet, and from these the earth has to be carefully scraped away and other roots cut through where such come across them. A plant four years old will yield 16 lb of fresh root, and a well-grown one from 32 to 64 lb, but more than half the weight is lost in drying. The more slender roots are generally left, and the stem is cut down near to the ground, the crown of the root being covered with leaves and earth. Thus treated, the plant continues to grow, and roots may again be cut from it after the lapse of two years, but the yield will be smaller and the roots more slender and less starchy. In some varieties, as the Guayaquil and Mexican, the whole plant, including the rootstock, is pulled up. The Indians are guided in their selection of roots by the num-

bur of stems arising from the roots, by the thinness of the leaves, and the closeness with which the stem is beset with prickles.

In several species of *Smilax* the roots become thickened here and there into large tuberous swellings 4 to 6 inches long, and one or two inches in thickness. These tubers form a considerable article of trade in China, but are used to a limited extent only on the Continent, under the name of China root, although introduced into Europe about the same time as sarsaparilla. China root is obtained both in China and India from *Smilax glabra* and *S. lanceæfolia*, Roxburgh, and *S. China*, L. A similar root is yielded by *S. pseudo-China*, L., and *S. tamnoides* in the United States from New Jersey southwards; by *S. balbisiana*, Kth., in the West Indies, and by *S. Japicanga* and *S. syringoides*, Griseb., and *S. Brasiliensis*, Spreng., in South America. All these are used as an alterative remedy in the localities where they grow. The amount of China root exported to Europe from Canton in 1872 was only 51,200 lb, although in the same year as much as 1,367,733 lb was exported from the city of Hankow to other Chinese ports. In 1882 Bombay imported from China 945 cwts. of the root. The name of Indian sarsaparilla is given to the roots of *Hemidesmus indicus*, R. Br. an Asclepiadaceous plant indigenous to India. These roots are readily distinguished from those of true sarsaparilla by their loose cracked bark and by their odor and taste, recalling those of melilot.

SARTHE, a department of the northwest region of France, formed in 1790 out of the eastern part of Maine, 29 communes of Anjou, and portions of Perche. Situated between 47° 35′ and 48° 30′ N. lat., and between 0° 25′ W. and 0° 55′ E. long., it is bounded N. by the department of Orne, N.E. by Eure-et-Loir, E. by Loir-et-Cher, S. by Indre-et-Loire and Maine-et-Loire, and W. by Mayenne. The Sarthe, a sub-tributary of the Loire, flows in a southwesterly direction through the department; and the Loir, which along with the Sarthe joins the Mayenne to form the Maine above Angers, traverses its southern borders. The general slope of the country is from north to southwest. While the highest point (on the boundary towards Orne) is 1115 feet, the lowest, where the Loir leaves the department, is only 65. The hills that separate the streams rise as they advance northeast into Perche, or northwest into what are magniloquently called the Alpes Mancelles (1080 feet high). The Sarthe flows past Le Mans and Sablé, receiving the Merdereau and the Vègre from the right, and the Orne and the Huisne from the left. The Loir passes La Flèche, and along its chalky banks caves have been hollowed out which, like those along the Cher and the Loire, serve as dwelling-houses and stores. The mean annual temperature differs but slightly from that of Paris. There are in the year 145 days of rain (with 12 of snow), 56 of frost, 180 of fogs, 20 of hail, and 14 of storm. The rainfall is about 24 inches, or rather below the average for France.

Of a total surface of 1,533,760 acres, 982,635 acres in the department are arable, 198,517 underwood, 190,176 in meadows and grass, 42,000 in moors, and 22,284 in vineyards. In 1881 the live stock comprised 61,400 horses, 6524 asses or mules, 182,195 cattle, 49,373 sheep (wool-clip 83 to 84 tons), 79,737 pigs, 24,369 goats, 12,898 hives (76 tons of honey, 21½ tons wax). Poultry (capons, geese, etc.,) form one of the most remunerative products of the department, which sends yearly to Paris 250,000 fowls and 100,000 geese, and consumes or disposes of 10,000,000 eggs. The horses are, like those of Perche (*percherons*), famous for speed combined with strength. There are three distinct districts: the corn lands to the north of the Sarthe and the Huisne: the moorlands, partly planted with pine, between those two streams and the Loir; and the wine-growing country to the south of the Loir. In 1883 the grain crop yielded 2,813,387 bushels of wheat, 951,039 of meslin, 714,248 of rye, 2,317,760 of barley, 1,993,049 of oats, 30,880 of maize, and 59,680 of buckwheat; and there were 9,536,312 bushels of potatoes and 92,521 of beans, pease, etc., 81,644 tons of beetroot, 4794 tons of hemp, and 6 of flax. In 1884 cider was produced to the extent of 15,473,414 gallons (average quantity per annum in previous years 8,628,444 gallons), and wine to 4,347,134 gallons (average quantity 3,883,330). Fodder was grown to the amount of 381,110 tons; and there were considerable supplies of chestnuts and hazel nuts—Château du Loir being the principal market for the former. From the forests, which consist mainly of oaks, witch-elms, chestnut-trees, pines, and beeches, material is drawn to the value of £140,000 [$680,400]. The agriculture of the district has made great progress through the opening up of roads, improvements, draining, and irrigation. Besides mines of anthracite and coal (21,205 tons in 1882), iron-ore, marble, freestone, slate, millstones, clay, marl, lime, tuffeau (a kind of white chalky tuff), magnesia, and peat are all worked. The staple industry is the weaving of hemp and flax (3395 spindles, 4400 looms, 400 being power-looms). The cotton manufacture ranks next (8700 spindles, 185 looms, of which 100 are power-looms), while the woollen manufacture employs only 350 spindles and 161 looms. In the paper-mills 569 workmen are engaged, and the value of the paper and cardboard produced was £180,880 [$879,076.80] in 1881. Iron-foundries, copper and bell foundries, potteries, tile-works, glass-works, and stained glass manufactories, curriers, engine and carriage factories, wire-gauze factories, flour-mills, and distilleries are also carried on; and altogether about 256 steam-engines with 2480 horse-power are employed in those establishments. The commerce of the department is facilitated by 99 miles of navigable river (Sarthe and Loir), 250 miles of national roads, 6707 miles of other roads, and 352 miles of railway.

With its 438,917 inhabitants (1881) Sarthe has exactly the average density of population in France. From 1801 (380,821) to 1866 (465,615) the number was on the increase, but since that date there has been a decline. The department forms the diocese of Le Mans, has its court of appeal at Angers, and its university authorities at Caen, and constitutes part of the territory of the fourth *corps d'armée* with its headquarters at Le Mans. The four arrondissements are named from Le Mans, the chief town; La Flèche (9424 inhabitants), famous for its prytanée militaire; Mamers (6070 inhabitants); and St. Calais (3600). There are 33 cantons and 387 communes. Sablé (6000 inhabitants) contains a castle built for Colbert by Mansart; and hard by was the celebrated Benedictine abbey of Solesmes.

SARTI, Giuseppe (1729–1802), musical theorist and composer, was born at Faenza, Italy, December 1, 1729, educated—according to the best accounts—by Padre Martini,[1] and appointed organist of the cathedral of Faenza before the completion of his nineteenth year. Resigning his appointment in 1750, Sarti devoted himself with ardor to the study of dramatic music, and in 1751 produced his first opera, *Pompeo*, with great success. His next works, *Il Rè Pastore*, *Medonte*, *Demofoonte*, and *L'Olimpiade*, assured him so brilliant a reputation that in 1753 King Frederick V. of Denmark invited him to Copenhagen, with the appointments of hofkapellmeister and director of the opera. In 1765 he travelled to Italy for the purpose of engaging some new singers; and meanwhile the death of King Frederick put an end for the time to his engagement.[2] He was recalled to Copenhagen in 1768, and for some years enjoyed an extraordinary amount of court favor; but, though he carefully abstained from politics, the disasters from which both court and country so cruelly suffered at this critical period gradually undermined his position, and in 1775 he was banished from Denmark in disgrace. During his residence in Copenhagen Sarti composed a great number of operas, most of which were fairly successful, though few survived the epoch of their production. On his return to Italy in 1775 he was appointed director of the Ospedaletto—the most important music school in Venice; this post, however, he relinquished in 1779, when, after severe competition, he was elected maestro di cappella at the cathedral of Milan. Here he exercised his true vocation,—composing, in addition to at least twenty of his most successful operas, a vast quantity of sacred music for the cathedral, and educating a number of clever pupils, the most distinguished of whom was Cherubini, who was never weary of singing his praises as the most accomplished musician and first teacher of the age.

In 1784 Sarti was invited by the empress Catherine

[1] [Gustave Chouquet in Grove's Dictionary of Music says on the authority of Sarti's family that his preceptor was Vallotti, and not Martini as "according to his biographers."—Am. Ed.]

[2] It was probably during this temporary suspension of duty that he made the attempt to establish himself in London, but failed to obtain a hearing at the King's Theatre.

II. to St. Petersburg. On his way thither he stopped at Vienna, where the emperor Joseph II. received him with marked favor, and where he made the acquaintance of Mozart. He reached St. Petersburg in 1785, and at once took the direction of the opera, for which he composed many new pieces, besides some very striking sacred music, including a *Te Deum* for the victory of Otchakoff, in which he introduced the firing of real cannon. He remained in Russia seventeen years; but by the end of that time his health was so broken by the climate that he solicited permission to return. The empress and her successor Paul I. had then been some time dead; but the emperor Alexander dismissed Sarti with all possible honor, and he quitted the country in 1802 with a liberal pension and letters of nobility granted to him by the empress Catherine. His most successful operas in Russia were *Armida* and *Olega*, for the latter of which the empress herself wrote the libretto. Sarti did not live to reach Italy, but died at Berlin, July 28, 1802.

There can be no doubt that Cherubini owed much of his stupendous learning to the judicious teaching of Sarti, who was an accomplished mathematician and physicist as well as a musician, and whose works, if they lack the impress of true genius, show extraordinary talent, and are marked throughout by faultless taste, combined with technical skill of the highest order.

SARTO, Andrea del (1487-1531). This celebrated painter of the Florentine school was born in Gualfonda, Florence, in 1487, or perhaps 1486, his father Agnolo being a tailor (*sarto*); hence the nickname by which the son is constantly designated. The family, though of no distinction, can be traced back into the 14th century. Vannucchi has constantly been given as the surname,—according to some modern writers, without any authority, but it seems rather difficult to accept this dictum. There were four other children of the marriage. In 1494 Andrea was put to work under a goldsmith. This occupation he disliked. He took to drawing from his master's models, and was soon transferred to a skilful woodcarver and inferior painter named Gian Barile, with whom he remained until 1498. Barile, though a coarse-grained man enough, would not stand in the way of the advancement of his promising pupil, so he recommended him to Piero di Cosimo as draughtsman and colorist. Piero retained Andrea for some years, allowing him to study from the famous cartoons of Leonardo da Vinci and Michelangelo. Finally Andrea agreed with his friend Francia Bigio, who was somewhat his senior, that they would open a joint shop; at a date not precisely defined they took a lodging together in the Piazza del Grano. Their first work in partnership may probably have been the Baptism of Christ, done for the Florentine Compagnia dello Scalzo, a performance of no great merit, the beginning of a series, all the extant items of which are in monochrome chiaroscuro. Soon afterwards the partnership was dissolved. From 1509 to 1514 the brotherhood of the Servi employed Andrea, as well as Francia Bigio and Andrea Feltrini, the first-named undertaking in the portico of the Annunziata three frescos illustrating the life of the founder of the order. S. Filippo Benizzi. He executed them in a few months, being endowed by nature with remarkable readiness and certainty of hand, and unhesitating firmness in his work, although in the general mould of his mind he was timid and diffident. The subjects are the Saint Sharing his Cloak with a Leper, Cursing some Gamblers, and Restoring a Girl possessed with a Devil. The second and third works excel the first, and are impulsive and able performances. These paintings met with merited applause, and gained for their author the preëminent title "Andrea senza errori" (Andrew the unerring),—the correctness of the contours being particularly admired. After these subjects the painter proceeded with two others—the Death of St. Philip, and the Children Cured by Touching his Garment,—all the five works being completed before the close of 1510. The youth of twenty-three was already in technique about the best fresco-painter of central Italy, barely rivalled by Raphael, who was the elder by four years. Michelangelo's Sixtine frescos were then only in a preliminary stage. Andrea always worked in the simplest, most typical, and most trying method of fresco—that of painting the thing once and for all, without any subsequent dry-touching. He now received many commissions. The brotherhood of the Servi engaged him to do two more frescos in the Annunziata at a higher price; he also painted, towards 1512, an Annunciation in the monastery of S. Gallo.

The "Tailor's Andrew" appears to have been an easy-going plebeian, to whom a modest position in life and scanty gains were no grievances. As an artist he must have known his own value; but he probably rested content in the sense of his superlative powers as an executant, and did not aspire to the rank of a great inventor or leader, for which, indeed, he had no vocation. He led a social sort of life among his compeers of the art, was intimate with the sculptor Rustici, and joined a jolly dining-club at his house named the Company of the Kettle, also a second club named the Trowel. At one time, Francia Bigio being then the chairman of the Kettle-men, Andrea recited, and is by some regarded as having composed, a comic epic, "The Battle of the Mice and Frogs"—a rechauffé, as one may surmise, of the Greek *Batrachomyomachia*, popularly ascribed to Homer. He fell in love with Lucrezia (del Fede), wife of a hatter named Carlo Recanati; the hatter dying opportunely, the tailor's son married her on 26th December, 1512. She was a very handsome woman, and has come down to us treated with great suavity in many a picture of her lover-husband, who constantly painted her as a Madonna and otherwise; and even in painting other women he made them resemble Lucrezia in general type. She has been much less gently handled by Vasari and other biographers. Vasari, who was at one time a pupil of Andrea, describes her as faithless, jealous, overbearing, and vixenish with the apprentices. She lived to a great age, surviving her second husband 40 years.

By 1514 Andrea had finished his last two frescos in the court of the Servi, than which none of his works was more admired—the Nativity of the Virgin, which shows the influence of Leonardo, Domenico Ghirlandajo, and Fra Bartolommeo, in effective fusion, and the Procession of the Magi, intended as an amplification of a work by Baldovinetti; in this fresco is a portrait of Andrea himself. He also executed at some date a much-praised Head of Christ over the high altar. By November 1515 he had finished at the Scalzo the allegory of Justice, and the Baptist Preaching in the Desert,—followed in 1517 by John Baptizing, and other subjects. Before the end of 1516 a Pietà of his composition, and afterwards a Madonna, were sent to the French Court. These were received with applause; and the art-loving monarch Francis I. suggested in 1518 that Andrea should come to Paris. He journeyed thither towards June of that year, along with his pupil Andrea Sguazzella, leaving his wife in Florence, and was very cordially received, and for the first and only time in his life was handsomely remunerated. Lucrezia, however, wrote urging his return to Italy. The king assented, but only on the understanding that his absence from France was to be short; and he entrusted Andrea with a sum of money to be expended in purchasing works of art for his royal patron. The temptation of having a goodly amount of pelf in hand proved too much for Andrea's virtue. He spent the king's money and some of his own in building a house for himself in Florence. This necessarily brought him into bad odor with Francis, who refused to be appeased by some endeavors which the painter afterwards made to reingratiate himself. No serious punishment, however, and apparently no

grave loss of professional reputation befell the defaulter.

In 1520 he resumed work in Florence, and executed the Faith and Charity in the cloister of Lo Scalzo. These were succeeded by the Dance of the Daughter of Herodias, the Beheading of the Baptist, the Presentation of his Head to Herod, an allegory of Hope, the Apparition of the Angel to Zacharias (1523), and the monochrome of the Visitation. This last was painted in the autumn of 1524, after Andrea had returned from Luco in Mugello,—to which place an outbreak of plague in Florence had driven him, his wife, his step-daughter, and other relatives. In 1525 he painted the very famous fresco named the Madonna del Sacco, a lunette in the cloisters of the Servi; this picture (named after a sack against which Joseph is represented propped) is generally accounted his master-piece. His final work at Lo Scalzo, 1526, was the Birth of the Baptist, executed with some enhanced elevation of style after Andrea had been diligently studying Michelangelo's figures in the sacristy of S. Lorenzo. In the following year he completed at S. Salvi, near Florence, a celebrated Last Supper, in which all the personages seem to be portraits. This also is a very fine example of his style, though the conception of the subject is not exalted. It is the last monumental work of importance which Andrea del Sarto lived to execute. He dwelt in Florence throughout the memorable siege, which was soon followed by an infectious pestilence. He caught the malady, struggled against it with little or no tending from his wife, who held aloof, and died, no one knowing much about it at the moment, on 22d January, 1531, at the comparatively early age of forty-three. He was buried unceremoniously in the church of the Servi.

Various portraits painted by Andrea are regarded as likenesses of himself, but this is not free from some doubt. One is in the London National Gallery, an admirable half-figure, purchased in 1862. Another is at Alnwick Castle, a young man about twenty years of age, with his elbow on a table. Another at Panshanger may perhaps represent in reality his pupil Domenico Conti. Another youthful portrait is in the Uffizi Gallery, and the Pitti Gallery contains more than one. Among his more renowned works not already specified are the following; the Virgin and Child, with St. Francis and St. John the Evangelist and two Angels, now in the Uffizi, painted for the church of S. Francesco in Florence; this is termed the Madonna di S. Francesco, or Madonna delle Arpie, from certain figures of harpies which are decorativly introduced, and is rated as Andrea's masterpiece in oil-painting. The altarpiece in the Uffizi, painted for the monastery of S. Gallo, the Fathers Disputing on the Doctrine of the Trinity—Sts. Augustine, Dominic, Francis, Lawrence, Sebastian, and Mary Magdalene—a very energetic work. Both these pictures are comparatively early—towards 1517. The Charity now in the Louvre (perhaps the only painting which Andrea executed while in France). The Pietà, in the Belvedere of Vienna; this work, as well as the Charity, shows a strong Michelangelesque influence. At Poggio a Caiano a celebrated fresco (1521) representing Julius Cæsar receiving tribute, various figures bringing animals from foreign lands—a striking perspective arrangement; it was left unfinished by Andrea, and was completed by Alessandro Allori. Two very remarkable paintings (1523) containing various incidents of the life of the patriarch Joseph, executed for the Borgherini family. In the Pitti Gallery two separate compositions of the Assumption of the Virgin, also a fine Pietà. In the Madrid Museum the Virgin and Child, with Joseph, Elizabeth, the infant Baptist, and an Archangel. In the Louvre the Holy Family, the Baptist pointing upwards. In the Berlin Gallery a portrait of his wife. In Panshanger a fine portrait named Laura. The second picture in the National Gallery ascribed to Andrea, a Holy Family, is by some critics regarded as the work rather of one of his scholars—we hardly know why. A very noticeable incident in the life of Andrea del Sarto relates to the copy, which he produced in 1523, of the portrait group of Leo X. by Raphael; it is now in the Naples Museum, the original being in the Pitti Gallery. Ottaviano de' Medici, the owner of the original, was solicited by Duke Frederick II. of Mantua to present it to him. Unwilling to part with so great a pictorial prize, and unwilling also to disoblige the duke, Ottaviano got Andrea to make the copy, which was consigned to the duke as being the original. So deceptive was the imitation that even Giulio Romano, who had himself manipulated the original to some extent, was completely taken in; and, on showing the supposed Raphael years afterwards to Vasari, who knew the facts, he could only be undeceived when a private mark on the canvas was named to him by Vasari, and brought under his eye. It was Michelangelo who had introduced Vasari in 1524 to Andrea's studio. He is said to have thought very highly of Andrea's powers, saying on one occasion to Raphael, "There is a little fellow in Florence who will bring sweat to your brow if ever he is engaged in great works."

Andrea had true pictorial style, a very high standard of correctness, and an enviable balance of executive endowments. The point of technique in which he excelled least was perhaps that of discriminating the varying textures of different objects and surfaces. There is not much elevation or ideality in his works—much more of reality. His chiaroscuro is not carried out according to strict rule, but is adjusted to his liking for harmony of color and fused tone and transparence; in fresco more especially his predilection for varied tints appears excessive. It may be broadly said that his taste in coloring was derived mainly from Fra Bartolommeo, and in form from Michelangelo; and his style partakes of the Venetian and Lombard, as well as the Florentine and Roman—some of his figures are even adapted from Albert Dürer. In one way or other he continued improving to the last. In drawing from nature, his habit was to sketch very slightly, making only such a memorandum as sufficed to work from. The scholars of Andrea were very numerous; but, according to Vasari, they were not wont to stay long, being domineered over by his wife; Pontormo and Domenico Puligo may be mentioned.

In our account of Andrea del Sarto we have followed the main lines of the narrative of Crowe and Cavalcaselle, supplemented by Vasari, Lanzi, and others. There are biographies by Biadi (1829) and by Von Reumont. (W. M. R.)

SASANIANS. See Persia.

SASINE. See Seisin.

SASSARI, the chief town of the northern province of the island of Sardinia (Italy), is situated in the midst of orange and olive groves at a height of 650 feet above the sea, 12½ miles from Porto Torres, on the railway to Chilivani, a junction on the main line from Terranova to Cagliari. Till about 1860–65 it was surrounded by a high wall built in the 14th century and strengthened by twenty-six large square towers from 60 to 80 feet high. The castle dates from 1327–1331. Originally built in the first half of the 15th century, when the see of Turris (Porto Torres) was removed to Sassari, the cathedral was restored in 1531 and received a new façade in the 18th century. The city besides contains a municipal palace, rebuilt since 1820, an episcopal palace dating originally from the 13th century, and a university (faculties of law and medicine, with 87 students in 1881–2) founded by Philip III. of Spain in 1617, as well as barracks, law courts, hospitals, and asylums. There is a white marble fountain—Fonte di Rosello—on the east side of the town, surmounted by a statue of St. Gavinus, patron saint of the city, and from this source water is still hawked about the streets, though waterworks have recently been constructed by the municipality at a cost of upwards of £60,000 [$291,600]. Most of the streets are narrow and tortuous, and vehicles are generally drawn by oxen. Sassari is separated by a low and swampy stretch of country from its port at Porto Torres—a village on the site of *Turris Libisonis*, *Colonia Julia*, with a basilica of the 11th century (S. Gavino) and the ruins of a temple of Fortune now called Palazzo del Re Barbaro. The population of the city was 22,945 in 1862, and 31,596 in 1881.

Sassari appears in the archives of the monastery of San Pietro di Silki in 1118 as Tathari, and the local pronunciation is still Tatari. In 1294 the town was declared an independent republic, and a very liberal code of laws was published in 1316 (edited by Don Pasquale Tola, Cagliari, 1850). Sassari was sacked by the French in 1527, and in 1796 the Sardinian popular party seized the city, expelled the viceroy, and dismantled the castle and "palaces."

SÁSSERÁM, a subdivision of the Sháhábád district, Bengal, India, between 24° 31′ and 25° 23′ N.

lat., and between 83° 33′ and 84° 30′ E. long., with an area of 1493 square miles, and a population in 1881 of 519,207 (males 253,757, females 265,450). This subdivision consists of four thanahs or stations, viz., Sásserám, Khargar, Dhangáon, and Dehree. The thanah of Sásserám has an area of 691 square miles, and a population (1881) of 155,760 (75,031 males, 80,729 females). It contains the tomb of the Afghan Sher Shah, who conquered Humayun, and subsequently became emperor of Delhi.

SATALI, ADALIA, or ANDALIYEH, one of the principal towns on the south coast of Asia Minor, giving the name of Gulf of Adalia to the great bay which the ancients styled Mare Pamphylicum. Arranged like a Greek theatre round the harbor, it presents an unusually picturesque appearance against its background of mountains; and it is enclosed by a triple wall of modern construction, strengthened by a ditch and square towers. Several of the mosques and churches, seventeen in number, are of interest, and contain remains of Roman work. The population was estimated by Spratt at 13,000, of whom 3000 were Greeks. Though the physical changes produced on this part of the coast by the tufaceous deposits of the rivers render the ancient descriptions quite inapplicable to the present town, there is little doubt that Satali not only preserves the name but occupies the site of Attaleia, which was founded by Attalus II. Philadelphus, king of Pergamum, and became one of the principal cities of Pamphylia. At an early date it was the see of a Christian bishop.

SÁTÁRA, or SATTARAH, a British district in the central division of the Bombay presidency, India, between 16° 50′ and 18° 10′ N. lat. and 73° 45′ and 75° E. long. It has an area of 4988 square miles, and is bounded on the north by the river Nira and the states of Bhor and Phaltan, on the east by the Sholapur district, on the south by the Varna river separating it from Kolhapur and Sangli states, and on the west by the Sahyádri mountains, which separate it from the Concan districts of Kolabá and Ratnágiri. The Sátára district contains two main systems of hills, the Sahyádri range and its offshoots, and the Mahádeo range and its offshoots; the former runs through the district from north to south, and the Mahádeo range starts about 10 miles north of Mahábaleshwar and stretches east and southeast across the whole breadth of the district. The Mahádeo hills are bold and abrupt, presenting in many cases bare scraps of black rock and looking at a distance like so many hill fortresses. Within the limits of Sátára are two river systems—the Bhima system in a small part of the north and northeast, and the Kistna system throughout the rest of the district. (See KISTNA). The hill forests have a large store of timber and firewood. The whole of Sátára falls within the Deccan trap area; the hills consist of trap intersected by strata of basalt and topped with laterite, while, of the different soils on the plains, the commonest is the black loamy clay containing carbonate of lime. This is a very fertile soil, and when well watered is capable of yielding heavy crops. Sátára district contains some important irrigation works,—including the Kistna Canal, open for 35 miles. In some of the western parts of the district the average annual rainfall exceeds 200 inches; but on the eastern side water is scanty, the rainfall varying from 40 inches in Sátára town to less than 12 inches in some places farther east. There is no railway, but the West Deccan Railway, which is in course of construction, will put the district into communication with Poona and Belgaum, and will run through Sátára for about 100 miles. The tiger, panther, bear, and sambhar deer are found in the west near the Sahyádris, and the hyæna, wolf, leopard, and smaller game in the east.

According to the last census returns (1881) the population of Sátára district was 1,062,350 (532,525 males and 529,825 females). Hindus numbered 1,008,918, Mohammedans 36,712, and Christians 886. Four towns had more than 10,000 inhabitants,—Sátára (see below), Wai 11,676, Karad 10,778, Tasgaon 10,206. About two-thirds of the Hindus consist of Kunbis and Mahrattas, who during the period of Mahratta ascendency furnished the bulk of the armies; and the Mávlás, who formed Shiváji's best soldiers, were drawn from the hill tribes of Sátára district. Agriculture supports more than three-fourths of the people; the soil is fertile, and joar forms the staple food; rice is grown in the western valleys, and in the south and east cotton is raised. In 1882–83, of 1,384,255 acres held for tillage, 270,244 were fallow or under grass, while of the remaining, 1,114,011 acres 39,757 were twice cropped; cereals, consisting chiefly of joar and bajra, occupied 898,206 acres, pulses 159,211 acres, oil-seeds 42,001 acres, and miscellaneous crops the remainder. Besides blankets and coarse cotton cloth the chief exports are grain, tobacco, oil-seeds, chillies, molasses, and a little raw cotton; the imports are piece-goods, hardware, salt, and dates. The gross revenue of the district in 1883–84 amounted to £268,779 [$1,306,265.94], of which the land contributed £228,749 [$1,111,720.14].

On the overthrow of the Jadhav dynasty in 1312 the district passed to the Mohammedan power, which was consolidated in the reign of the Bahmani kings. On the fall of the Bahmanis towards the end of the 15th century each chief set up for himself until the Bijapur kings finally asserted themselves, and under these kings the Mahrattas arose, and laid the foundation of an independent kingdom with Sátára as its capital. Intrigues and dissensions in the palace led to the ascendency of the peshwas, who removed the capital to Poona in 1749, and degraded the raja of Sátára into the position of a political prisoner. The war of 1817 closed the career of the peshwas, and the British then restored the titular raja, and assigned to him the principality of Sátára. In consequence of political intrigues, he was deposed in 1839, and his brother was placed on the throne. This prince dying without male heirs, the state was resumed by the British Government.

SÁTÁRA, chief town and headquarters of the above district, is situated in 17° 41′ 25″ N. lat. and 74° 2′ 10″ E. long., immediately below a remarkably strong hill fort on the summit of a small, steep, rocky hill. It takes its name from the seventeen walls, towers, and gates which the Sátára fort was supposed to possess. With a height of 2320 feet above sea-level, Sátára is about sixty miles from the coast, and 69 miles south of Poona. Since the death of the last raja in 1848 the population has considerably decreased; still Sátára contained in 1881 some 28,601 inhabitants (14,558 males and 14,043 females).

SATIN-WOOD, a beautiful light-colored hard wood having a rich silky lustre, sometimes finely mottled or grained, the produce of a large tree, *Chloroxylon Swietenia*, native of India and Ceylon. A similar wood, known under the same name, is obtained in the West Indies, the tree yielding which is said to be *Maba guianensis*. Satin-wood was in request for rich furniture about the end of the 18th century, the fashion then being to ornament panels of it with painted medallions and floral scrolls and borders. Now it is used for inlaying and small veneers, and most largely in covering the backs of hair and clothes-brushes and in making small articles of turnery.

SATIRE. Satire, in its literary aspect, may be defined as the expression in adequate terms of the sense of amusement or disgust excited by the ridiculous or unseemly, provided that humor is a distinctly recognizable element, and that the utterance is invested with literary form. Without humor, satire is invective; without literary form, it is mere clownish jeering. It is indeed exceedingly difficult to define the limits between satire and the regions of literary sentiment into which it shades. The lofty ethical feeling of a Johnson or a Carlyle borders it on the one hand, the witty sarcasm of a Talleyrand, rancorous or good-natured, on the other; but, however exalted the satirist's aims, or amiable his temper, a basis of contempt or dislike is the groundwork of his art. This feeling may be diverted from the failings of man individual to the feebleness and imperfection of man universal, and the composition may still be a

satire; but if the element of scorn or sarcasm were entirely eliminiated it would become a sermon. That this expression of aversion is of the essence of satire appears from the fact that the literary power which, the more it is exerted upon grave and elevated subjects, removes them further and further from the domain of satire can confer satiric dignity upon the most scurrilous lampoon. The distinction between the intellectual form and the raw material of satire is admirably illustrated by a passage in an accomplished novelist. The clever young lady happening to compare a keen and bright person to a pair of scissors, her unrefined companion is for the moment unable to understand how a human being can resemble a piece of cutlery; but suddenly a light breaks in upon her, and, taking up a broken pair of scissors from the table, she imitates the halting gait of a lame lady, declaring that Mrs. Brown resembles that particular pair of scissors to the life. The first interlocutor could have been satirical if she would, the second would if she could. The nice and delicate perception of the former type of character may be fairly driven into satire by the vulgarity and obtuseness of the second, as in the case of Miss Austen; and it may be added that the general development of civilization, repressing high-handed wrongs against which ridicule is no defence, and encouraging failings which can be effectually attacked in no other manner, continually tends to make satire more congenial to the amiable and refined, and thus exalt its moral tone and purpose.

The first exercise of satire was no doubt sufficiently coarse and boisterous. It must have consisted in gibing at personal defects; and Homer's description of Thersites, the earliest example of literary satire that has come down to us, probably conveys an accurate delineation of the first satirists, the carpers and faultfinders of the clan. The character reappears in the heroic romances of Ireland, and elsewhere; and it is everywhere implied that the licensed backbiter is a warped and distorted being, readier with his tongue than his hands. The verdict of unsophisticated man on satire is clearly that it is the offspring of ill-nature; to redeem and dignify it by rendering it the instrument of morality or the associate of poetry was a development implying considerable advance in the literary art. The latter is the course adopted in the Old Testament, where the few passages approximating to satire, such as Jotham's parable of the bramble and Job's ironical address to his friends, are embellished either by fancy or by feeling. An intermediate stage between personal ridicule and the correction of faults and follies seems to have been represented in Greece by the *Margites*, attributed to Homer, which, while professedly lampooning an individual, practically rebuked the meddling sciolism impersonated in him. In the accounts that have come down to us of the writings of Archilochus, the first great master of satire (about 700 B.C.), we seem to trace the elevation of the instrument of private animosity to an element in public life. Though a merciless assailant of individuals, Archilochus was also a distinguished statesman, naturally for the most part in opposition, and his writings seem to have fulfilled many of the functions of a newspaper press. Their extraordinary merit is attested by the infallible judgment of Quintilian eight hundred years after their composition; and Gorgias's comparison of them with Plato's persiflage of the Sophists proves that their virulence must have been tempered by grace and refinement. Archilochus also gave satiric poetry its accepted form by the invention of the iambic trimeter, slightly modified into the scazonic metre by his successors. Simonides of Amorgus, about a generation later, and Hipponax, a century later still, were distinguished like Archilochus for the bitterness of their attacks on individuals, with which the former combined a strong ethical feeling, and the latter a bright active fancy. All three were restless and turbulent, aspiring and discontented, impatient of abuses and theoretically enamored of liberty: and the loss of their writings, which would have thrown great light on the politics as well as the manners of Greece, is exceedingly to be lamented. With Hipponax the direct line of Greek satire is interrupted; but two new forms of literary composition, exceedingly capable of being rendered the vehicles of satire, almost simultaneously make their appearance. Fable is first heard of in Asiatic Greece about this date; and, although its original intention does not seem to have been satirical, its adaptability to satiric purposes was soon discovered and turned to account. A far more important step was the elevation of the rude fun of rustic merry makings to a literary status by the evolution of the drama from the Bacchic festival. The means had now been found of allying the satiric spirit with exalted poetry, and their union was consummated in the person of a poet who combined humor with imagination in a degree never again to be rivalled until Shakespeare. Every variety of satire is exemplified in the comedies of Aristophanes; and if he does not rank as the first of satirists it is only because he is so much beside. Such affluence of poetical genius could not be perpetual, any more than the peculiar political and social conditions which for a time made such fearless and uncontrolled satire possible. Through the half-way house of mythological parody the comedy of public life passes into the comedy of manners, metrical still, but approximating more closely to prose, and consequently to satire on its own side of the line which it is convenient if not strictly logical to trace between dramatists and ordinary satiric writers. The step from Menander to Lucilius is not a long one, but it was not destined to be taken by a Greek.

A rude form of satire had existed in Italy from an early date in the shape of the Fescennine verses, the rough and licentious pleasantry of the vintage and harvest, which, lasting down to the 16th century, inspired Tansillo's *Vendemmiatore*. As in Greece, these eventually, about 364 B.C., were developed into a rude drama, originally introduced as a religious expiation. This was at first, Livy tells us (vii. 2), merely pantomimic, as the dialect of the Tuscan actors imported for the occasion was not understood at Rome. Verse, "like to the Fescennine verses in point of style and manner," was soon added to accompany the mimetic action, and, with reference to the variety of metres employed, these probably improvised compositions were entitled *Saturæ*, a term denoting *miscellany*, and derived from the *satura lanx*, "a charger filled with the first-fruits of the year's produce, anciently offered to Bacchus and Ceres." The Romans thus had originated the name of satire, and, in so far as the Fescennine drama consisted of raillery and ridicule, possessed the thing also; but it had not yet assumed a literary form among them. Livius Andronicus (240 B.C.), the first regular Latin dramatic poet, appears to have been little more than a translator from the Greek. Satires are mentioned among the literary productions of Ennius (200 B.C.) and Pacuvius (170 B.C.), but the title rather refers to the variety of metres employed than to the genius of the composition. The real inventor of Roman satire is Caius Lucilius (148–103 B.C.), whose *Satiræ* seem to have been mostly satirical in the modern acceptation of the term, while the subjects of some of them prove that the title continued to be applied to miscellaneous collections of poems, as was the case even to the time of Varro, whose "Saturæ" included prose as well as verse, and appear to have been only partially satirical. The fragments of Lucilius preserved are unfortunately very scanty, but the verdict of Horace, Cicero, and Quintilian demonstrates that he was a very considerable poet. It is needless to dwell on compositions so universally known as the *Satires* of Lucilius's successor Horace, in whose hands this class of composition received an entirely new development, becoming genial, playful, and persuasive. "Arch Horace strove to mend."

The didactic element preponderates still more in the philosophical satires of Persius, the propagandist of Stoicism, a writer whose intensity, dramatic gift, obscurity, and abruptness render him, like the Browning and Meredith of our own days, the luxury of the few and the despair of the many. Yet another form of satire, the rhetorical, was carried to the utmost limits of excellence by Juvenal, the first example of a great tragic satirist. Nearly at the same time Martial, improving on earlier Roman models now lost, gave that satirical turn to the epigram which it only exceptionally possessed in Greece, but has ever since retained. The brevity, pregnancy, and polish of the Latin tongue were never more felicitously exemplified than by this gifted writer. About the same time another variety of satire came into vogue, destined to become the most important of any. The Milesian tale, a form of entertainment probably of Eastern origin, grew in the hands of Petronius and Apuleius into the satirical romance, immensely widening the satirist's field and exempting him from the restraints of metre. Petronius's "Supper of Trimalchio" is the revelation of a new vein, never fully worked till our days. As the novel arose upon the ruins of the epic, so dialogue sprang up upon the wreck of comedy. In Lucian comedy appears adapted to suit the exigencies of an age in which a living drama had become impossible. Lucian's position as a satirist is something new, and could not, from the nature of the case, have been occupied by any of his predecessors. For the first time since the origin of civilization society felt apprehensive of impending dissolution, and its fears found an interpreter in the Sophist of Samosata, "the Voltaire of paganism," an universal censor and mocker, devoid of the Christian's hope of general renovation, and unable to foresee the new social order which the barbarian conquest was destined to create. Next to his wit, Lucian's special note is his sturdy love of truth and demand for genuineness in all things. With him antique satire expires as a distinct branch of literature, —though mention should be made of the sarcasms and libels with which the population of Egypt were for centuries accustomed to insult the Roman conqueror and his parasites. An exceedingly curious specimen, a denunciation of the apostate poet Hor-Uta—a kind of Egyptian "Lost Leader"—composed under Augustus, has recently been published by M. Revillout from a demotic papyrus.

It is highly interesting to remark how, after the great deluge of barbarism has begun to retire, one form of satire after another peeps forth from the receding flood, the order of development being determined by the circumstances of time and place. In the Byzantine empire, indeed, the link of continuity is unbroken, and such raillery of abuses as is possible under a despotism finds vent in the pale copies of Lucian published in Ellissen's *Analekten*. The first really important satire, however, is a product of Western Europe, recurring to the primitive form of fable, upon which, nevertheless, it constitutes a decided advance. *Reynard the Fox*, a genuine expression of the shrewd and homely Teutonic mind, is a landmark in literature. It gave the beast-epic a development of which the ancients had not dreamed, and showed how cutting ridicule could be conveyed in a form difficult to resent. About the same time, probably, the popular instinct, perhaps deriving a hint from Rabbinical literature, fashioned Morolf, the prototype of Sancho Panza, the incarnation of sublunar mother-wit contrasted with the starry wisdom of Solomon ; and the *Till Eulenspiegel* is a kindred Teutonic creation, but later and less significant. *Piers Ploughman*, the next great work of the class, adapts the apocalyptic machinery of monastic and anchoritic vision to the purposes of satire, as it had often before been adapted to those of ecclesiastical aggrandizement. The clergy were scourged with their own rod by a poet and a Puritan too earnest to be urbane. Satire is a distinct element in Chaucer and Boccaccio, who nevertheless cannot be ranked as satirists. The mock-heroic is successfully revived by Pulci, and the political songs of the 14th and 15th centuries attest the diffusion of a sense of humor among the people at large. The Renaissance, restoring the knowledge and encouraging the imitation of classic models, sharpened the weapons and enlarged the armory of the satirist. Partly, perhaps, because Erasmus was no poet, the Lucianic dialogue was the form in the ascendant of his age. Erasmus not merely employed it against superstition and ignorance with infinite and irresistible pleasantry, but fired by his example a bolder writer, untrammelled by the dignity of an arbiter in the republic of letters. The ridicule of Ulric von Hutten's *Epistolæ Obscurorum Virorum* is annihilating, and the art there for the first time fully exemplified though long previously introduced by Plato, of putting the ridicule into the mouth of the victim, is perhaps the most deadly shaft in the quiver of sarcasm. It was afterwards used with even more pointed wit though with less exuberance of humor by Pascal, the first modern example, if Dante may not be so classed, of a great tragic satirist. Ethical satire is vigorously represented by Sebastian Brant and his imitator Alexander Barclay ; but in general the metrical satirists of the age seem tame in comparison with Erasmus and Hutten, though including the great name of Machiavelli. Sir Thomas More cannot be accounted a satirist, but his idea of an imaginary commonwealth embodied the germ of much subsequent satire. In the succeeding period politics take the place of literature and religion, producing in France the *Satyre Ménippée*, elsewhere the satirical romance as represented by the *Argenis* of Barclay, which may be defined as the adaptation of the style of Petronius to state affairs. In Spain, where no freedom of criticism existed, the satiric spirit took refuge in the *novela picaresca*, the prototype of Le Sage and the ancestor of Fielding ; Quevedo revived the mediæval device of the vision as the vehicle of reproof ; and Cervantes's immortal work might be classed as a satire were it not so much more. About the same time we notice the appearance of direct imitation of the Roman satirists in English literature in the writings of Donne, Hall, and Marston, the further elaboration of the mock-heroic by Tassoni, and the culmination of classical Italian satire in Salvator Rosa. The prodigious development of the drama at this time absorbed much talent that would otherwise have been devoted to satire proper. Most of the great dramatists of the 17th century were more or less satirists, Molière perhaps the most consummate that ever existed ; but, with an occasional exception like *Les Précieuses Ridicules*, the range of their works is too wide to admit of their being regarded as satires. The next great example of unadulterated satire is Butler's *Hudibras*, and perhaps one more truly representative of satiric aims and methods cannot easily be found. At the same period dignified political satire, bordering on invective, received a great development in Andrew Marvell's *Advices to a Painter*, and was shortly afterwards carried to perfection in Dryden's *Absalom and Achitophel ;* while the light literary parody of which Aristophanes had given the pattern in his assaults on Euripides, and which Shakespeare had handled somewhat carelessly in the *Midsummer Night's Dream*, was effectively revived in the duke of Buckingham's *Rehearsal*. In France Boileau was long held to have attained the *ne plus ultra* of the Horatian style in satire and of the mock-heroic, but Pope was soon to show that further progress was possible in both. The polish, point, and concentration of Pope remain unsurpassed, as do the amenity of Addison and the daring yet severely logical imagination of Swift ; while the *History of John Bull* and the *Pseudologia* place their friend Arbuthnot in the first rank of political satirists. The 18th century was, indeed, the age of satire. Serious poetry had for the time worn itself out ; the most

original geniuses of the age, Swift, Defoe, and Richardson, are decidedly prosaic, and Pope, though a true poet, is less of a poet than Dryden. In process of time imaginative power revives in Goldsmith and Rousseau; meanwhile Fielding and Smollett have fitted the novel to be the vehicle of satire and much beside, and the literary stage has for a time been almost wholly engrossed by a colossal satirist, a man who has dared the universal application of Shaftesbury's maxim that ridicule is the test of truth. The world had never before seen a satirist on the scale of Voltaire, nor had satire ever played such a part as a factor in impending change. The parallel with Lucian is in some respects very close. Toleration was Voltaire's idol, as truth was Lucian's; and thus, aiming more than his predecessor at the practical reformation of manners and institutions, his work was less purely negative. He was nevertheless a destroyer, and as utterly out of sympathy with the positive spirit of science for which he was preparing the way as Lucian could possibly be with Goths or Christians. As a master of sarcastic mockery he is unsurpassed; his manner is entirely his own; and he is one of the most intensely national of writers, notwithstanding his vast obligations to English humorists, statesmen, and philosophers. English humor also played an important part in the literary regeneration of Germany, where, after Liscow and Rabener, direct imitators of Swift and the essayists, Lessing, imbued with Pope but not mastered by him, showed how powerful an auxiliary satire can be to criticism,—a relation which Pope had somewhat inverted. Another great German writer, Wieland, owes little to the English, but adapts Lucian and Petronius to the 18th century with playful if somewhat mannered grace, Kortum's *Jobsiad*, a most humorous poem, innovates successfully upon established models by making low life, instead of chivalry, the subject of burlesque. Goethe and Schiller, Scott and Wordsworth, are now at hand, and as imagination gains ground satire declines. Byron, who in the 18th century would have been the greatest of satirists, is hurried by the spirit of his age into passion and description, bequeathing, however, a splendid proof of the possibility of allying satire with sublimity in his *Vision of Judgment*. Moore gives the epigram a lyrical turn; Béranger, not for the first time in French literature, makes the gay chanson the instrument of biting jest; and the classic type receives fresh currency from Auguste Barbier. Courier, and subsequently Cormenin, raise the political pamphlet to literary dignity by their poignant wit. Peacock evolves a new type of novel from the study of Athenian comedy. Miss Edgeworth skirts the confines of satire, and Miss Austen, the most refined and delicate of all observers of manners, seasons her novels with the most exquisite satiric traits. Washington Irving revives the manner of *The Spectator*, and Tieck brings irony and persiflage to the discussion of critical problems. Two great satiric figures remain,—one representative of his nation, the other most difficult to class. In all the characteristics of his genius Thackeray is thoroughly English, and the faults and follies he chastises are those especially characteristic of British society. Good sense and the perception of the ridiculous are amalgamated in him; his satire is a thoroughly British article, a little over-solid, a little wanting in finish, but honest, weighty, and durable. Posterity will go to him for the humors of the age of Victoria, as they go to Addison for those of Anne's. But Heine hardly belongs to any nation or country, time or place. He ceased to be a German without becoming a Frenchman, and a Jew without becoming a Christian. Only one portrait really suits him, that in Tieck's allegorical tale, where he is represented as a capricious and mischievous elf; but his song is sweeter and his command over the springs of laughter and tears greater than it suited Tieck's purpose to acknowledge. In him the satiric spirit, long confined to established literary forms, seems to obtain unrestrained freedom to wander where it will, nor have the ancient models been followed since by any considerable satirist except the Italian Giusti. The machinery employed by Moore was indeed transplanted to America by Russell Lowell, whose *Biglow Papers* represent perhaps the highest moral level yet attained by satire. In no age has the spirit of satire been so generally diffused as in the 19th century, but many of its eminent writers, while bordering on the domains of satire, escape the definition of satirist. The term cannot be properly applied to Dickens, the keen observer of the oddities of human life; or to George Eliot, the critic of its emptiness when not inspired by a worthy purpose; or to Balzac, the painter of French society; or to Trollope, the mirror of the middle classes of England. If *Sartor Resartus* could be regarded as a satire, Carlyle would rank among the first of satirists; but the satire, though very obvious, rather accompanies than inspires the composition. The number of minor satirists of merit, on the other hand, is legion, and but few can be mentioned here. Poole, in his broadly farcical *Little Pedlington*, has rung the changes with inexhaustible ingenuity on a single fruitful idea; Jerrold's comedies sparkle with epigrams, and his tales and sketches overflow with quaint humor; Mallock has made the most of personal mimicry, the lowest form of satire; Samuel Butler holds an inverting mirror to the world's face with imperturbable gravity; Courthope reproduces the airy grace and sonorous melody of the Attic comedy; and the anonymous writer of the "Barnum" Christmas number of *Truth* has resuscitated with equal effect its reckless fun and personality. One remarkable feature of the age is the union of caricature with literature to a degree inconceivable before the improvements in wood-engraving. All large capitals now have their comic illustrated journals, destined for the most part to be the marvels and stumbling-blocks of posterity. *Punch*, however, has become almost a national institution, and has fostered the genius of two pictorial satirists of the first rank, Leech and Tenniel. The present tendencies of the civilized world seem highly favorable to the influence of satire as a factor in human affairs, but unfavorable to the production of satiric masterpieces. Satire is the inevitable concomitant of freedom of speech, which must continue to prevail and diffuse itself unless checked by military or socialistic despotism. But as the privilege of the many it is less likely to be the resource of the few; and it may happen that the press, dealing with follies of the day as they arise, will more and more forestall the satire that springs from meditation and study. The principal security is the originality and robustness of true satiric genius, which, having defied prisons and scaffolds in the past, may find the means of eluding public impatience and satiety in the future. (R. G.)

SATRAP. See PERSIA, vol. xviii. pp. 581, 595.

SATURN, an ancient Italian god, whom the Romans, and till recently the moderns, identified with the Greek god Cronus.

1. Cronus was the youngest of the Titans, the children of Sky (Uranus) and Earth (Gæa). Besides the Titans, Sky and Earth had other children, the Cyclopes and the Hundred-handers. When the Cyclopes and the Hundred-handers proved troublesome, Sky thrust them back into the bosom of Earth. This vexed Earth, and she called on her sons to avenge her on their father Sky. They all shrank from the deed save Cronus, who waylaid and mutilated his father with a sickle or curved sword. From the drops of blood which fell to the earth sprang the Furies and the Giants. Cronus now reigned in room of Sky. His wife was Rhea, who was also his sister, being a daughter of Sky and Earth. Sky and Earth had foretold to Cronus that he would be deposed by one of his own children, so he swallowed them one after another as soon as they were born. Thus he devoured Hestia,

Demeter, Hera, Hades, and Poseidon. But when Rhea had brought forth Zeus, the youngest,[1] she wrapped up a stone in swaddling clothes and gave it to Cronus, who swallowed it instead of the babe. When Zeus, who had been hidden in Crete, grew up, he gave his father a dose which compelled him to disgorge first the stone and then the children whom he had swallowed. The stone was preserved at Delphi; every day it was anointed and on festivals it was crowned with wool. Zeus and his brothers now rebelled against Cronus, and after a ten years' struggle they were victorious. Cronus and the Titans were thrust down to Tartarus, where they were guarded by the Hundred-handers. According to others, Cronus was removed to the Islands of the Blest, where he ruled over the departed heroes, judging them in conjunction with Rhadamanthus. Plutarch (*De Def. Orac.*, 18) mentions a story that the dethroned monarch of the gods slept on an island of the northern seas guarded by Briarcus and surrounded by a train of attendant divinities. The reign of Cronus was supposed to have been the happiest time of the world, the golden age, when men lived like gods, free from toil and grief and the weakness of old age (for death was like sleep); and the earth too brought forth abundantly without cultivation. There are few traces of the worship of Cronus in Greece. Pausanias, in his description of Greece, mentions only one temple of Cronus; it stood at the foot of the Acropolis at Athens and was sacred to Cronus and Rhea jointly. The Athenians celebrated an annual festival in his honor on the 12th of Hecatombæon. A mountain at Olympia was called after him, and on its top annual sacrifices were offered to him at the spring equinox.

The idea that Cronus was the god of time—an idea which appears in antiquity—seems to have arisen from a simple confusion between the words Cronus and Chronus ("time"). Curtius derives Cronus from the root *kra*, meaning "to accomplish." Cronus may perhaps have been a god of some aboriginal half-savage tribe which the Greeks conquered. Hence the savage traits in his legend, his conquest by Zeus, and the scanty traces of his worship in Greece. The myth of the mutilation of Sky by Cronus may be a particular form of the widespread story of the violent separation of Sky and Earth by one of their children (compare MYTHOLOGY). Other forms of this myth are found in New Zealand, India, and China. Parallels to the swallowing and disgorging incident are to be found in the folk-lore of Bushmen, Kaffres, Basutos, Indians of Guiana, and Eskimo.

2. Saturn and his wife Ops were amongst the oldest deities of ancient Italy. He is said to have had an altar at the foot of the Capitol before Rome was founded. Saturn was a god of agriculture, his name being derived from *serere*, "to sow." The identification of Saturn with Cronus gave rise to the legend that after his deposition by Zeus (Jupiter) Saturn wandered to Italy, where he ruled as king in the golden age and gave the name Saturnia to the country. Janus, another of the most ancient gods of Italy, is said to have welcomed him to Rome, and here he settled at the foot of the Capitol, which was called after him the Saturnian Hill. His temple stood at the ascent from the Forum to the Capitol and was one of the oldest buildings in Rome, but the eight remaining columns of the temple probably formed a portion of a new temple built in the imperial times. The image of Saturn in this temple had woollen bands fastened round its feet all the year through, except at the festival of the Saturnalia; the object of the bands was probably to detain the deity. Similarly there was a fettered image of Enyalius (the War God) at Sparta, and at Athens the image of Victory had no wings, lest she might fly away. The mode of sacrifice at this temple was in so far peculiar that the head of the sacrifice was bare as in the Greek ritual, instead of being covered, as was the usual Roman practice. Legend said that the Greek ritual was introduced by Hercules, who at the same time abolished the human sacrifices previously offered to Saturn. Others said that the rule had been observed by the Pelasgians before. Under or behind the temple was the Roman treasury, in which the archives as well as the treasures of the state were preserved. Dionysius Halicarnensis (*Ant. Rom.*, i. 34) tells that there were many sanctuaries of Saturn in Italy and that many towns and places, especially mountains, were called after him. The oldest national form of verse was known as the Saturnian. Like many other figures in Roman mythology, Saturn is said to have vanished at last from earth. His emblem was a sickle. The substitution of a great scythe for the sickle, and the addition of wings and an hour-glass, are modern. Ops ("plenty"), wife of Saturn, was an earth-goddess, as appears from the custom observed by her suppliants of sitting and carefully touching the earth while they made their vows to her. As goddess of crops and the harvest she was called Consiva, and under this name had a sanctuary at Rome, to which only the Vestals and the priest were admitted. As Saturn was identified in later times with Cronus, so was Ops with Rhea. Another goddess mentioned as wife of Saturn was Lua, a goddess of barrenness. She was one of the deities to whom after a victory the spoils of the enemy were sometimes dedicated and burned.

Saturnalia.—This, the great festival of Saturn, was celebrated on the 19th, but after Cæsar's reform of the calendar on the 17th, of December. Augustus decreed that the 17th should be sacred to Saturn and the 19th to Ops. Henceforward it appears that the 17th and 18th were devoted to the Saturnalia, and the 19th and 20th to the Opalia, a festival of Ops. Caligula added a fifth day, "the day of youth" (*dies juvenalis*), devoted no doubt to the sports of the young. But in popular usage the festival lasted seven days. The time was one of general joy and mirth. The woollen fetters were taken from the feet of the image of Saturn, and each man offered a pig. During the festival schools were closed; no war was declared or battle fought; no punishment was inflicted. In place of the toga an undress garment was worn. Distinctions of rank were laid aside; slaves sat at table with their masters or were actually waited on by them, and the utmost freedom of speech was allowed them. Gambling with dice, at other times illegal, was now permitted and practiced.[2] All classes exchanged gifts, the commonest being wax tapers and clay dolls. These dolls were especially given to children, and the makers of them held a regular fair at this time. Varro thought that these dolls represented original sacrifices of human beings to the infernal god. There certainly was, as we have seen, a tradition that human sacrifices were once offered to Saturn, and the Greeks and Romans gave the name of Cronus and Saturn to a particularly cruel Phœnician Baal, to whom, *e.g.*, children were sacrificed at Carthage. The Cronus to whom human sacrifices are said to have been offered in Rhodes was most probably a Baal, for there are unmistakable traces of Phœnician worship in Rhodes. It may be conjectured that the Saturnalia was originally a celebration of the winter solstice. Hence the legend that it was instituted by Romulus under the name of the Brumalia (*bruma*=winter solstice). The prominence given to candles at the festival points to the custom of making a new fire at this time. The custom of solemnly kindling fires at the summer solstice (Eve of St. John) has prevailed in most parts of Europe, notably in Germany, and there are traces (of which the yule-log is one) of the observance of a similar custom at the winter solstice. In ancient Mexico a new fire was kindled, amid great rejoicings, at the end of every period of fifty-two years.

The designation of the planets by the names of gods is at least as old as the 4th century B.C. The first certain mention of the star of Cronus (Saturn) is in Aristotle (*Metaphysics*, p. 1073b, 35). The name also occurs in the *Epinomis* (p. 987b), a dialogue of uncertain date, wrongly ascribed to Plato. In Latin, Cicero (1st century B.C.) is the first author who speaks of the planet Saturn. The application of the name Saturn to a day of the week (*Saturni dies*, Saturday) is first found in Tibullus (i. 3, 18). (J. G. FR.)

SATYR. In ancient Greek mythology the satyrs were spirits, half-human, half-bestial, that haunted

[1] So Hesiod. But according to Homer Zeus was the eldest of the children of Cronus and Rhea.

[2] It is curious to find a similar rule with a similar exception in Nepal. See H. A. Oldfield, *Sketches from Nepal*, vol. ii. pp. 353 *sq.*

the woods and mountains, companions of Pan and Dionysus. Fancy represented them as strongly built, with flat noses, pointed ears, and the tails of horses or goats. They were a roguish and wanton but faint-hearted folk, lovers of wine and women, ever roaming the wild to the music of pipes and cymbals, castanets and bagpipes, dancing with the nymphs or pursuing them, striking terror into men, whose cattle they killed and whose women they made love to. In the earlier Greek art they appear as old and ugly, much like wild apes; but in later art, especially in works of the Attic school, this savage character is softened into a more youthful and graceful aspect. There is a famous statue supposed to be a copy of a work of Praxiteles, representing a graceful satyr leaning against a tree with a flute in his hand. In Attica there was a species of drama known as the Satyric drama; it parodied the legends of gods and heroes, and the chorus was composed of satyrs. Euripides's play of the *Cyclops* is the only extant example of this kind of drama. The symbol of the shy and timid satyr was the hare. In some districts of modern Greece the spirits known as Calicantsars offer points of resemblance to the ancient satyrs; they have goats' ears and the feet of asses or goats, are covered with hair, and love women and the dance. The herdsmen of Parnassus believe in a demon of the mountain who is lord of hares and goats.

In the authorized version of Isa. xiii. 21, xxxiv. 14 the word "satyr" is used to render the Hebrew *sĕ'îrîm*, "hairy ones." A kind of demon or supernatural being known to Hebrew folk-lore as inhabiting waste places is meant; a practice of sacrificing to the *sĕ'îrîm* is alluded to in Lev. xvii. 7, where E. V. has "devils." They correspond to the "shaggy demon of the mountain-pass" (azabb al-'aḳaba) of old Arab superstition. But the satyrs of the gloomy Semitic deserts, faith in which is not yet extinct, are much more terrible than those of Greece.

SAUL, son of Kish, king of Israel. (See ISRAEL, vol. xiii. p. 413 *sq.*) The name of Saul's father Kish (קִישׁ) seems to be identical with the Arabic proper name and god-name Ḳais.

SAUMAISE. See SALMASIUS.

SAUMAREZ, JAMES SAUMAREZ or SAUSMAREZ, BARON DE (1757–1836), English admiral, was descended from an old family, and was born at St. Peter Port, Guernsey, 11th March, 1757. Many of his ancestors had distinguished themselves in the naval service, and he entered it as midshipman at the age of thirteen. For his bravery at the attack of Charleston in 1775 on board the "Bristol" he was raised to the rank of lieutenant, and he was promoted commander for his gallant services off the Dogger Bank, 5th August, 1781, when he was wounded. In command of the "Russell," he contributed to Rodney's victory over De Grasse, 12th April, 1782. For the capture of "La Réunion," a French frigate, in 1793 he received the honor of knighthood. While in command of a small squadron he was on 5th June, 1794, attacked by a superior French force on the way from Plymouth to Guernsey, but by his seamanship and coolness succeeded in gaining a safe anchorage in the harbor of that island. After being promoted to the "Orion" of 74 guns in 1795, he took part in the defeat of the French fleet off L'Orient, 22d June, distinguished himself in the battle of Cape St. Vincent in February, 1797, and was present at the blockade of Cadiz from February, 1797, to April, 1798, and at the battle of the Nile, 1st August, 1798, where he was wounded. On his return from Egypt he received the command of the "Cæsar," 84 guns, with orders to watch the French fleet off Brest during the winters of 1799 and 1800. In 1801 he was raised to the rank of rear admiral of the blue, was created a baronet, and received the command of a small squadron which was destined to watch the movements of the Spanish fleet at Cadiz. To prevent a fleet of British merchantmen from falling into the hands of the enemy, he engaged the French and Spanish fleets, which outnumbered his own small squadron by two to one, inflicting on them a severe defeat with a loss of 3000 men. Regarding this achievement Lord Nelson remarked that "a greater action was never fought." For his services Saumarez was rewarded with the order of the Bath, and he also received the freedom of the city of London, together with a magnificent sword. In 1803 he received a pension of £1200 [$5832] a year. On the outbreak of the war with Russia in 1809 he was entrusted with the command of the Baltic fleet, and in recognition of his services Charles XIII. of Sweden bestowed on him the grand cross of the military order of the Sword. At the peace of 1814 he attained the rank of admiral; and in 1819 he was made rear-admiral, in 1821 vice-admiral of Great Britain. He was raised to the peerage as Baron de Saumarez in 1831, and died at Guernsey, 9th October, 1836.

See *Memoirs of Admiral Lord de Saumarez*, by Sir John Ross, 2 vols., 1838.

SAUMUR, a town of France, at the head of an arrondissement in the department of Maine-et-Loire, is situated on an island and on the left bank of the Loire, 38 miles southwest of Tours, and 27 miles southeast of Angers. A large metal bridge connects the Tours-Angers railway with that of Montreuil-Bellay by which Saumur communicates with Poitiers and Niort. Two stone bridges (755 and 905 feet long) also unite the town on the island with the two banks of the river. Several of the Saumur churches are interesting. St. Pierre, of the 12th century, has a 17th-century façade and a Renaissance nave; and Notre Dame of Nantilly (often visited by Louis XI.) has a remarkable though greatly damaged façade, a doorway and choir of the 12th century, and a nave of the 11th. Both these churches contain curious tapestries, and in the latter, fixed in the wall, is the copper cross of Gilles de Tyr, keeper of the seals to St. Louis. St. Jean is a charming little building in the Angevine Gothic style. Notre Dame of Ardiliers, of the 16th century, was enlarged in the following century by Richelieu and Madame de Montespan. The town-house is an elegant 16th-century edifice; and the whole town is rich in graceful and interesting examples of the best period of French domestic architecture. The castle, built between the 11th century and the 13th, and remodelled in the 16th, is used as an arsenal and powder magazine. There is also an interesting almshouse, with its chambers in part dug out in the rock. The cavalry school, founded in 1768, and after various interruptions reorganized in 1824 and 1853, has at the present time (1886) 400 pupils, of whom 125 are officers. Other establishments are a public library, a museum of natural history and local Roman and Celtic antiquities, a horticultural garden, with a school of vines in which eight hundred kinds of grapes are cultivated. Saumur carries on a large trade in sparkling white wines grown in the neighborhood, as well as in brandy, grain, flax, and hemp; and it manufactures enamels and rosaries. The population in 1881 was 13,439 (14,186 in the commune).

The Saumur caves along the Loire and on both sides of the valley of the Thouet (a left-hand tributary) must have been occupied at a very remote period. The Tour du Trone (9th century) served as a place of refuge for the inhabitants of the surrounding district during foreign invasions, and became the nucleus of a monastery built by monks escaped from St. Florent le Vieil. On the same site rose the castle of Saumur two hundred years later. The town fell into the hands of Foulques Nerra, duke of Anjou, in 1025, and passed in the 13th century into the possession of the kings of France, to whom it remained constantly faithful. The English failed to capture it during all the course of the Hundred Years' War. After the Reformation the town became the metropolis of Protestantism in France and the seat of a theological seminary, illustrated by many distinguished names. The school of Saumur, as opposed to that of Sedan, represented the more liberal side of French Protestantism (Cameron, Amyraut, etc.). In 1623 the fortifications were dismantled; and the revocation of the edict of Nantes reduced the population from 25,000 to 6000.

SAUNDERSON, Nicholas (1682–1739), mathematician, was born at Thurlstone, Yorkshire, in January, 1682. When about a year old he lost his sight through small-pox; but this did not prevent him from acquiring, by the help of kind friends, a good knowledge of Latin and Greek, and pursuing with assiduity and success the study of mathematics. In his twenty-fifth year he commenced lecturing in Cambridge on the principles of the Newtonian philosophy, and, though he was not a member of any of the colleges, the university authorities placed no impediment in his way. In November, 1711, he was selected to succeed Whiston, the Lucasian professor of mathematics in Cambridge, after having had the degree of master of arts conferred upon him to render him eligible for the appointment. He was created doctor of laws in 1728 by command of George II., and in 1736 was admitted a member of the Royal Society. He died of scurvy on the 19th of April, 1739.

Saunderson possessed the friendship of many of the eminent mathematicians of the time, such as Newton, Halley, De Moivre, Cotes, and for the first of these he entertained a profound veneration. Whether from an inflexible love of truth, or from a motive less exalted, he was accustomed to speak his sentiments regarding persons very freely, and friends as well as enemies were criticised without reserve. As is frequently the case with the blind, his senses of hearing and touch were extraordinarily acute, and he could carry on mentally long and intricate arithmetical or algebraical calculations. He devised for his own use a palpable arithmetic, an account of which is given in his elaborate *Elements of Algebra* (2 vols., 4to., Cambridge, 1740), which he did not live to publish. Of his other writings, prepared for the use of his pupils, the only one which has been published is *The Method of Fluxions* (1 vol., 8vo., London, 1756.) At the end of this treatise there is given, in Latin, an explanation of one of the principal propositions of Sir Isaac Newton's philosophy.

SAURIANS. See Reptiles.

SAURIN, Jacques (1677–1730), one of the group of great French preachers of the 17th century (see France, vol. ix. p. 583) was born at Nîmes on January 6th, 1677, studied at Geneva, settled in London in 1701 as one of the pastors of the Walloon church, and died at The Hague, on December 30, 1730, whither he had gone to defend himself before the synod against a trumped-up charge of heterodoxy. Besides collections of *Sermons*, on miscellaneous texts, he wrote *Discours sur les événements les plus mémorables du Vieux et du Nouveau Testament* (Amsterdam, 1720–28), a work which, as continued by Reausobre and Roques, became popular under the name of *Saurin's Bible*.

SAUROPSIDA. This name was introduced by Huxley in his *Introduction to the Classification of Animals*, 1869, to designate a province of the *Vertebrata* formed by the union of the *Aves* with the *Reptilia*. In his *Elements of Comparative Anatomy*, 1864, he had used the term "Sauroids" for the same province. The five divisions of the *Vertebrata—Pisces*, *Amphibia*, *Reptilia*, *Aves*, and *Mammalia*—are all distinctly definable, but their relations to one another differ considerably in degree. The *Amphibia* are more similar to the *Pisces* than to any of the other divisions, and the *Aves* are closely allied to the *Reptilia*, and thus three provinces—*Ichthyopsida*, *Sauropsida*, and *Mammalia*—are formed.

The characters which distinguish the *Sauropsida*, that is, which are common to birds and reptiles, and not found combined in the other classes, have been thus summarized by Huxley: no branchiæ at any period of existence; a well-developed amnion and allantois present in the embryo; a mandible composed of many bones and articulated to the skull by a quadrate bone; nucleated blood-corpuscles; no separate parasphenoid bone in the skull; and a single occipital condyle. In addition to these principal characters, others exist which are found in all birds and reptiles, but are not exclusively confined to them. The oviduct is always a Müllerian duct separate from the ovary and opening from the body cavity. The adult kidney is a metanephros with separate ureter; the mesonephros and mesonephric duct become in the adult male the efferent duct of the testis. The intestine and the reproductive and urinary ducts open into a common cloaca. There is usually an exoskeleton in the form of scales; in the birds the scales take the form of feathers. There are two aortic arches in reptiles, in birds only one,—the right. The heart is usually trilocular, becoming quadrilocular in crocodiles and birds. In all the eggs are meroblastic and large, possessing a large quantity of yolk; in all the egg is provided in the oviduct with a layer of albumen and outside this with a horny or calcareous shell. In a few cases the egg is hatched in the oviduct, but in these cases there is no intimate connection between the embryo and the walls of the duct. Fertilization takes place internally, occurring at the upper end of the oviduct previously to the deposition of the albuminous layer and egg shell.

Comparative anatomy clearly shows that birds are reptiles which have become specialized in adaptation to the function of flight. This conclusion has been confirmed in the most surprisingly complete manner by the discovery of fossil forms intermediate between birds and reptiles. Two points of specialization in addition to the transformation of the fore limbs into wings are conspicuous in birds,—the reduction of the tail and the absence of teeth. *Archæopteryx* is a flying feathered animal with a long reptilian tail. In the Rocky Mountain region numerous toothed birds have been recently discovered, and have been studied and described in a masterly fashion by Prof. O. C. Marsh. These forms belong to the Mesozoic period. For further details see Reptiles and Birds.

SAUSSURE, Horace Benedict de (1740–1799), one of Switzerland's most celebrated physicists, was born in Geneva on February 17, 1740.[1] His youth was passed at his father's farm, where he early acquired a love for the study of nature. Following the example of his father and of his uncle Charles Bonnet, with whom he was associated in a research on the leaves of plants, he devoted himself at first to botany. Thus he was led to make the acquaintance of Haller, who was not long in discerning and appreciating his rare powers as an observer. In 1762, when only twenty-two years of age, Saussure was elected to the chair of philosophy at Geneva, where, along with another professor, he taught logic and physics alternately. But his natural leanings were all towards the study of external nature; and he took advantage of all available opportunities of travelling to thoroughly explore the mountains, valleys, and lakes of his native land, and to visit those of foreign countries, with the view of widening and deepening his conception of the constitution of the world. The Society of Arts of Geneva was founded by Saussure in 1772, and in 1774, at the invitation of the Government, he elaborated a plan for the reform of the system of teaching in his native town; but this was too radical in its nature to be adopted. In 1786 he resigned his professorship to his friend and fellow-worker Pictet. While honoring his country by his devotion to laborious scientific investigations, he exhibited his patriotism by untiring diligence in the exercise of his duties as a member of the council of Two Hundred, and afterwards of the National Assembly. In consequence of over-exertion in this work his health began to fail in 1794; but, although deprived of the use of his limbs, he continued to revise the concluding volumes of his great work on Alpine physiography, which were published in 1796. Latterly his mind became enfeebled, and when he was offered a chair of philosophy by the French Government in 1798 he had lapsed into a condition of partial imbecility. He died on January 22, 1799, at the age of fifty-nine, leaving two sons and a daughter.

[1] His father, Nicolas de Saussure (1709–90), an agriculturist of unusually liberal opinions and wide sympathies, when a young man had applied himself to literary pursuits, and especially to the study of writings bearing on farming. He resided all his life on his farm of Conches, on the Arve, near Geneva. As a member of the council of Two Hundred he took part in public affairs. Most of his writings were of a practical character, bearing on the growth and diseases of grain and other farm produce. His last work, *On Fire, the Principle of Fecundity in Plants and of Fertility in the Earth*, published in 1782, was more speculative in its nature.

The Alps formed the centre of Saussure's investigations. They forced themselves on his attention as the grand key to the true theory of the earth; but, as year by year his mass of facts assumed ever-growing dimensions, his generalizations became more guarded, until finally he came to consider a simple recording of observations as the only justifiable course. As a young man he had roamed in search of plants through many remote valleys and over the "montagnes maudits," as his unappreciative fellow-dwellers by the lakes called the snow-capped summits around them. It had been his dream, he says, since he was twenty to ascend Mont Blanc; and he accomplished the feat on 3d August, 1787. This was the second time that the ascent of that mountain, until then deemed inaccessible, was made in that year.

Saussure found among the Alps opportunity for studying geology in a manner never previously attempted. The inclination of the strata, the nature of the rocks, the fossils, and the minerals received his closest attention. He acquired a thorough knowledge of the chemistry of the day, watching for the brilliant series of discoveries and the improvements in processes of analysis that brought the science into such dazzling prominence during the last quarter of the eighteenth century; and he applied all to the study of minerals, water, and air. Saussure's geological observations made him a firm believer in the Neptunian theory; he regarded all rocks and minerals as deposited from aqueous solution or suspension, and in view of this he attached much importance to the study of meteorological conditions. He carried barometers and boiling-point thermometers to the summits of the highest mountains, and estimated the relative humidity of the atmosphere at different heights, its temperature, the strength of solar radiation, the composition of air and its transparency. Then, following the precipitated moisture, he investigated the temperature of the earth at all depths to which he could drive his thermometer staves, the course, conditions, and temperature of streams, rivers, glaciers and lakes, even of the sea. He invented a great number of instruments for these purposes, tested them, and investigated the theory of their action. The most beautiful and complete of his subsidiary researches is described in the *Essai sur l'Hygrométrie*, published in 1783. In it he records experiments made with various forms of hygrometer in all climates and at all temperatures, and supports the claims of his hair-hygrometer against all others. He invented and improved many kinds of apparatus, including the magnetometer, the cyanometer for estimating the blueness of the sky, the diaphanometer for judging of the clearness of the atmosphere, the anemometer, and the mountain eudiometer. His modifications of the thermometer adapted that instrument to many purposes: for ascertaining the temperature of the air he used one with a fine bulb hung in the shade or whirled by a string, the latter form being converted into an evaporometer by inserting its bulb into a piece of wet sponge and making it revolve in a circle of known radius at a known rate; for experiments on the earth and in deep water he employed large thermometers wrapped in non conducting coatings so as to render them extremely sluggish, and capable of long retaining the temperature once they had attained it. By the use of these instruments he showed that the bottom water of deep lakes is uniformly cold at all seasons, and that the annual heat wave takes six months to penetrate to a depth of 30 feet in the earth. He recognized the immense advantages to meteorology of high-level observing stations, and whenever it was practicable he arranged for simultaneous observations being made at different altitudes for as long periods as possible. It is perhaps as a geologist that Saussure worked most; he examined all the formations he met with much care and exactness; and although his ideas on matters of theory were in many cases very erroneous, he was instrumental in greatly advancing that science.

Saussure's work is collected and summarized in his four large volumes of *Voyages dans les Alpes*. This book is arranged in the form of a narrative of the author's various journeys, interspersed with accounts of the observations made and descriptions of the apparatus employed. At the end there is a long list of "agenda," or subjects for investigation, which he anticipated would throw light on the theory of the earth. These agenda are of value as exhibiting not only the scope and definite focussing of Saussure's mind but his almost prophetic foresight, since subsequent scientific work has advanced in each department very nearly on the lines there laid down.

His life was written by Senebier in 1801, by Cuvier for the *Biographie Universelle*, and by De Candolle in *Decade Philosophique*, No. xv., translated in the *Philosophical Magazine* [i.], iv. 96.

SAUSSURE, Nicolas Théodore de (1767–1845), eldest son of Horace Benedict de Saussure, was born on October 14, 1767, at Geneva, and is known chiefly for his work on the chemistry of vegetable physiology He was a shy man, who lived quietly and avoided society; yet like his ancestors he was a member of the Genevan representative council, and gave much attention and thought to public affairs. He took a deep interest in the improvement of education, but deprecated the introduction of science teaching into schools, on the ground that it would divert the children's minds from the study of the classical languages and mathematics. He latterly became more of a recluse than ever, and died in April, 1845.

When a young man, Nicolas Théodore accompanied his father in the Alpine journeys and assisted him by the careful determination of many physical constants. He was attracted to chemistry by Lavoisier's brilliant conceptions, but he did not become great as an originator. He took a leading share in the rapid succession of improvements which rendered the processes of ultimate organic analysis trustworthy. He fixed the composition of ethylic alcohol, ether, and some other commonly occurring substances, thereby advancing the knowledge of pure chemistry. He also studied fermentation, the conversion of starch into sugar, and many other processes of minor importance. The greater number of his 36 published papers deal with the chemistry and physiology of plants, the nature of soils, and the conditions of vegetable life. These were published under the title *Recherches Chimiques sur la Végétation*, and were acknowledged to display remarkable ability.

SAVAGE, Richard (1697–1743), a mediocre poet and notorious literary character of the time of Pope, associated with Pope in the publication of the *Dunciad*. He had nearly reached the end of his career when Johnson went up to London, made his acquaintance, and was fascinated by his vivacity and knowledge of the world. After his death, Johnson gave his romantic history of himself in one of the most elaborate and best of the *Lives of the Poets*—a fine example of the great moralist's searching analysis and tolerant judgment of eccentric character. Johnson apparently accepted Savage's account of himself and his strange persecution by his alleged mother, the countess of Macclesfield, without hesitation, describing her as a "wretch who had, without scruple, proclaimed herself an adulteress, and who had first endeavored to starve her son, then to transport him, and afterwards to hang him." Boswell was less credulous, made inquiries in his cautious manner in various quarters, and indicated pretty clearly that he considered Savage an impostor, although he could not explain why, if the unnatural story were not true, the countess could have allowed it be put three times in print unchallenged during her lifetime (see Boswell's *Life*, chap. v.). After Boswell, Malone and Bindley nibbled at the paradox, but it was not subjected to thorough examination till 1858, when Mr. Moy Thomas discovered the original manuscript depositions in the earl of Macclesfield's divorce suit at Doctors' Commons, and also the proceedings in the House of Lords. The results of Mr. Thomas's researches, prosecuted with rare acuteness and industry, appeared in *Notes and Queries*, November and December, 1858. To Johnson's *Life* and these papers the reader may be referred for the strange story and the elaborate and complete exposure of its inconsistencies and improbabilities. The conclusion which Boswell hinted at, but was prevented by his reverence for Johnson from expressing, that Savage was an impostor, is irresistible.

SAVANNAH, a city of the United States, the capital of Chatham county, Georgia, and the largest city in the State, is situated on the right or southern bank of the Savannah river, 12 miles in a straight line and 18 miles by water from the ocean. By rail it is 104 miles southwest of Charleston, S. C. Stretching about three miles along the river, opposite Hutchinson's Island, and extending inland 1½ miles, Savannah has an area of 3⅓ square miles. The site is partly formed by a bold bluff of sand about a mile long, which lies 40 feet above low-water mark, ending ab-

ruptly at either extremity, but "slopes inland for several miles with a very gentle and regular declivity." Though laid out in parallelograms, Savannah has less than usual of the monotony of system, no fewer than twenty-four small public parks or gardens being distributed throughout the city, and most of its streets being well shaded with trees. In the south is Forsyth Park (30 acres), with a fountain after the model of that in the Place de la Concorde, Paris, and a monument to the memory of the Confederate slain. Johnson Square contains a Doric obelisk, in memory of General Nathaniel Greene and Count Pulaski, the corner stone of which was laid by Lafayette in 1825; and in Monterey Square, on the spot where Pulaski fell in 1779, rises a more elaborate monument—a statue of Liberty displaying the national banner, on the top of a marble shaft 55 feet high. The focus of commercial life in Savannah is the so-called Bay, a narrow street built at the foot of the river bluff, with its top stories opening on the higher level behind. Among the more conspicuous buildings are the custom-house and post-office, the city exchange, the court-house, Oglethorpe United States barracks, Chatham academy, St. Andrew's hall, the library hall of the Georgia Historical Society, the Savannah medical college, the Roman Catholic cathedral, and St. John's Episcopal church. Besides being the second cotton port in the States, Savannah has a large trade in rice, timber, resin, and turpentine, the value of its exports being $29,850,275 in 1873, and $21,527,235 in 1880. Planing mills, foundries, and flour-mills are the chief industrial establishments. The harbor has in Tybee Roads a depth of 31 feet and 38 feet at mean low and high water, and the bar 19 and 26 feet. The population, 5195 in 1810, was 15,312 in 1850, 28,235 in 1870, and 30,709 (15,654 colored) in 1880.

Savannah was settled in February, 1733, under General Oglethorpe. A British attack in 1776 was repulsed; but it was captured in 1778, and though the French and American forces made an attempt to recover it in 1779 it was held by the British till July, 1783. The first session of the legislature of the State was held in Savannah in January, 1784. A city charter was granted in 1789. A great fire in 1796 and another in 1820 did damage to the amount of $1,000,000 and $4,000,000 respectively. During the Civil War Savannah was held by the Confederates; but it was ultimately captured by General Sherman on 21st December, 1864.

SAVARY, Anne Jean Marie René (1774–1833), duke of Rovigo, was born at Marcq, in the canton of Grandpré and department of Ardennes, on 26th April, 1774. He was educated at the college of St. Louis in Metz, where he gained a scholarship. When a youth of sixteen he became a volunteer in a cavalry regiment. His first military experiences were with the army of the Rhine under Custine; he distinguished himself under Moreau and Férino, and by 1797 had reached the rank of major. In the next year, under Desaix, he took part in the Egyptian expedition, and he followed the same general in the second Italian campaign, and at the great battle of Marengo (14th June, 1800). He had by this time attracted the favorable notice of Napoleon, who detected not only his soldierly powers but his singular gifts in the region of diplomacy and intrigue. For Savary the plans and will of Napoleon formed a law which obliterated every other, and in presence of which political and moral scruple had no place. So early as 1800, while only twenty-six years of age, he was appointed a colonel and the commander of that legion which was afterwards to form the picked bodyguard of the emperor. In 1803 he was general of brigade, and in 1804 he was charged with the execution of the Duc d'Enghien. Savary in his *Memoirs* (published in Paris in 1828, 8 vols. 8vo) avows that all he did was to convey to Vincennes a letter whose contents he did not know, and early next morning, in obedience to the orders of a superior officer, to have the duke shot. The other side of the story is that he knew all about it,—that of set purpose, and in order to prevent an appeal to Napoleon's clemency, he hastened the execution; and it is certain that, unlike a man merely under orders, he himself went straight to Bonaparte to report the death. Savary was the hand which Napoleon employed in the delicate negotiations with the emperor Alexander about the time of the battle of Austerlitz in 1805. At Jena in 1806 he distinguished himself by his successful pursuit of the retreating Prussians; he rendered signal service by the siege of Hameln, which he forced to capitulate on 20th November; and, finally, the severe defeat which he inflicted upon the Russian forces at Ostrolenka, on 16th February, 1807, was his crowning victory. Among other honors and rewards, he received a pension of 20,000 francs [$3860]. After the peace of Tilsit he was despatched to St. Petersburg; but shortly thereafter—the Napoleonic scheme for the crown of Spain being now apparently complete—he was recalled, was created duke of Rovigo, and started for Madrid. His deceitful intrigue was soon successful, and Joseph Bonaparte ascended the Spanish throne. From 1808 to 1810 he was again beside Napoleon in the many and changing scenes of his exploits; but on the 8th of June of the latter year France itself, now fully alive to the vast and mysterious power he had learned to wield, was startled by his appointment as successor to Fouché in the ministry of police. His administration, however, was not a success. After the overthrow of Napoleon, he desired to accompany his master to St. Helena, but this was refused, and he was imprisoned at Malta. He escaped thence to Smyrna, thereafter wandered about the east of Europe, and finally embarked for England, which he reached in 1819. Three years before he had been condemned to death by default; and, learning this, he proceeded to Paris to clear himself of the sentence, in which he succeeded, being also reinvested with his rank and dignities. He retired to Rome, where he remained till 1831, when he was appointed commander-in-chief of the African army, and entrusted with the administration of Algeria. His duties were successfully performed, but he returned in March, 1833, in weak health to Paris, where he died on the 2d of June.

SAVIGLIANO, a city of Italy, in the province of Cuneo, 31½ miles by rail south of Turin, lies in a plain between the Maira and the Mellea (head-streams of the Po) 1081 feet above the sea. It still retains some traces of its ancient walls demolished in 1707, and has a fine collegiate church (Sant' Andrea, dating at least from the 11th century, but in its present form comparatively modern), a triumphal arch erected in honor of the marriage of Victor Amadeus I. with Christine of France, and in the Taffini palace paintings by the 16th-century local artist Giovanni Mollineri (Mulinari, Il Caraccino). Savigliano has long been a place of considerable industrial activity; its modern manufactures comprise paper, silk, and beer. The population was 9932 in 1881 (commune 17,150).

First mentioned in 981 as Villa Savilliani, Savigliano appears in the 12th century as a member of the Lombard league. Its name perpetually crops up in the history of Piedmont and Savoy. It was besieged and taken by the duke of Savoy in 1347 and again in 1367; and in the 16th and 17th centuries it suffered severely from French garrisons. Charles Emmanuel I. died in 1630 at Savigliano, where the Piedmontese senate had met to escape the pestilence.

SAVIGNY, Friedrich Carl von (1779-1861), was born at Frankfort-on-the-Main on February 21, 1779. He was descended from an ancient family, which figures in the history of Lorraine, and which derived its name from the castle of Savigny near Charmes in the valley of the Moselle. When Lorraine passed into the possession of France, his family attached itself to Germany, and his ancestors filled important official posts in Nassau and other German states. His great-grandfather wrote a work, *La*

Dissolution de la Réunion, as a protest against the conquests of Louis XIV.; his grandfather was "Regierungsdirector" at Zweibrücken, and his father was a noble of the empire and "Kreisgesandter" of several princes of the diet of the circle of the Upper Rhine. His father, Carl Ludwig von Savigny, died in 1791, his mother in 1792, and he was brought up and educated by his guardian, Herr von Neurath, assessor of the Reichskammergericht or imperial chamber at Wetzlar, a master of the "Staatsrecht" of the time.

In 1795 Savigny went to study at Marburg, and derived great advantage, as is gratefully recorded by him, from the teaching and friendship of Professors Weis and Bauer. For six months he studied at Göttingen. It is noted as a curious circumstance that, though Hugo, the great civilian, was there lecturing, Savigny did not attend his course. He suffered much for two or three years from ill-health. Savigny visited, after the fashion of German students, Jena, Leipsic, and Halle; and he returned to Marburg, where, on December 31, 1800, he took his doctor's degree. His inaugural dissertation was entitled *De Concursu Delictorum Formali*.[1] At Marburg he lectured as privat-docent on criminal law, the pandects, the law of succession, obligations, and the methodology of law. In 1803 he published his famous treatise, *Das Recht des Besitzes*, or the right of possession. It was at once hailed by Thibaut as a masterpiece; jurists recognized that the old uncritical study of Roman law was at an end. It quickly obtained a European reputation, and still remains a prominent landmark in the history of jurisprudence. It was the fountain-head of a stream of literature which has not yet ceased to flow. Austin, no partial judge, pronounced it to be "of all books upon law, the most consummate and masterly." In 1804 Savigny married Kunigunde Brentano, the sister of Bettina von Arnim and Clemens Brentano the poet. In that year he visited Paris, chiefly with a view to make researches in the National Library into the life of the jurist Cujas, whom he greatly admired. In a letter to be found in his miscellaneous works he explains the ground of his admiration. "Dans l'histoire de la jurisprudence moderne, il n'y a pas d'époque plus brilliante que celle du 16me siècle. C'est alors que la science du droit eut véritablement un grand et noble caractère qu'elle n'a pas retrouvé depuis." A story not without significance as to his character relates to this period of his life. On his way to Paris, a box containing papers in which were the results of laborious researches was stolen from his carriage. He bore the loss with equanimity, and managed with the assistance of Jacob Grimm, his wife, and one of her sisters to do much to repair the loss.

In 1808 he was appointed by the Bavarian Government ordinary professor of Roman law at Landshut, where he remained a year and a half, and where he left many pleasant memories. In 1810 he was called, chiefly at the instance of William von Humboldt, to Berlin to fill the chair of Roman law, and assist in organizing the new university. One of his services was to create, in connection with the law faculty, a "Spruch-Collegium," or university court, competent to deal with cases remitted to it by the ordinary courts; and he took an active part in its labors. This was the busiest time of his life. He was engaged in lecturing, in the government of the university (of which he was the third rector), and as tutor to the crown prince in Roman, criminal, and Prussian law. Not the least important consequence of his residence in Berlin was his friendship with Niebuhr and Eichhorn. In 1814 appeared his pamphlet *Vom Beruf unserer Zeit für Gesetzgebung und Rechtswissenschaft*. It was a protest against the demand for codification, and in particular against the extension of the Code Napoléon to Germany. Fired with the hope that a day of resurrection for the national life of Germany was at hand, Thibaut had written a pamphlet urging the necessity of forming a code for Germany. Savigny wrote a reply, in which were laid down some principles with which wise advocates of codification might well agree. "I regard," he said, "the law of each country as a member of its body, not as a garment merely which has been made to please the fancy, and can be taken off at pleasure and exchanged for another." He laid stress upon the connection of the present and the past and the consequent limitations of the power of legislation. But in the course of his argument he confounded the errors of codifiers in France, Austria, and Prussia, and especially the defects in the Code Napoléon, with the necessary incidents of codification. Put at its highest, his argument comes to little more than others had before crudely expressed by saying, "We are not wise enough to compose a code."[2]

In 1815 he founded, with Eichhorn and Göschen, the *Zeitschrift für geschichtliche Rechtswissenschaft*, the organ of the new historical school, of which he was the representative. In 1816, while on his way to Rome as envoy of Prussia, Niebuhr made at Verona the celebrated discovery of the lost text of Gaius. He communicated to Savigny the fact, and also his conjecture that it was the work of Ulpian. Savigny made known the discovery to the world in an article in the *Zeitschrift*, and pointed out Gaius as the real author. Göschen, Bekker, and Hollweg actually deciphered the manuscript; but there is some truth in Hugo's saying. "Without Savigny one would not have had Gaius."

The record of the remainder of Savigny's life consists of little else than a list of the merited honors which he received at the hands of his sovereign, and of the works which he published with indefatigable activity.

In 1815 appeared the first volume of his *Geschichte des Römischen Rechts im Mittelalter;* the last did not appear until 1831. This work, to which his early instructor, Weis, had first prompted him, was originally intended to be a literary history of Roman law from Irnerius to the present time. His design was in some respect narrowed; in others it was widened. He saw fit not to continue the narrative beyond the 16th century, when the separation of nationalities disturbed the foundations of the science of law. His treatment of the subject was not merely that of a bibliographer; it was philosophical. It revealed the continuity in the history of Roman law; and it was an emphatic protest against the habit of viewing the law of a nation as an arbitrary creation, not connected with its history and condition. It was the parent of many valuable works which continued Savigny's investigations.[3] In 1817 he was appointed a member of the commission for organizing the Prussian provincial estates, and also a member of the department of justice in the Staatsrath, and in 1819 he became a member of the supreme court of cassation and revision for the Rhine Provinces. In 1820 he was made a member of the commission for revising the Prussian code. In 1822 a serious nervous illness attacked Savigny, and compelled him to seek relief in travel. He always considered that he had benefited much by the homœopathic treatment of Dr. Necker, and he remained a firm believer in homœopathy. In 1835 he began his elaborate work on the modern system of Roman law. The eighth and last volume appeared in 1849.

In March, 1842, he ceased to perform his duties as professor in order to become "Grosskanzler" of Prussia; and in that position he carried out several im-

[1] The object of his investigation is thus described: "Delicta concurrere dicuntur, ubi de pluribus legum violationibus, quarum nonnisi unus est reus, in eodem judicio puniendis agitur."

[2] See Austin's criticisms in *Lectures*, ii. 698.

[3] See Von Mohl's *Staatswissenschaft*, vol. iii. p. 55. For a somewhat less favorable view, see Gans's *Vermischte Schriften*.

portant law reforms in regard to bills of exchange and divorce (a subject on which he had meditated much). He held that office until 1848, when he resigned, not altogether to the regret of his friends, who had seen his energies withdrawn from jurisprudence without being able to flatter themselves that he was a great statesman. In 1850, on the occasion of the jubilee of his obtaining his doctor's degree, appeared in five volumes his *Vermischte Schriften*, consisting of a collection of his minor works published between 1800 and 1844. This event gave rise to much enthusiasm throughout Germany in honor of "the great master" and founder of modern jurisprudence. Professor Scheurl, in his *Einige Worte über Savigny*, notes the fact that on the 31st of October, Luther first revealed to the world the light of evangelical truth, and Savigny on that day began his work as a law reformer. In 1853 he published his treatise on *Obligations*, a supplement to his system of modern Roman law. Savigny died at Berlin on October 25, 1861. His son, Carl Friedrich von Savigny, born September 19, 1814, was Prussian minister of foreign affairs in 1849. He represented Prussia in important diplomatic transactions, especially in 1866, and died February 11, 1875.

In the history of jurisprudence Savigny's great works are the *Recht des Besitzes* and the *Beruf unserer Zeit für Gesetzgebung*. The former marked an epoch in jurisprudence. Prof. Ihering says: "With the *Recht des Besitzes* was the juridicial method of the Romans regained, and modern jurisprudence born." It marked a great advance both in results and method, and it rendered obsolete a large literature. Savigny sought to prove that in Roman law possession had always reference to usucapion or to interdicts, that it is not a right to continue in possession, but to immunity from violence, and that possession is based on the consciousness of unlimited power. These and other propositions were maintained with great acuteness and uncqualled ingenuity in interpreting and harmonizing the Roman jurists. The book also seeks to solve the problem of general interest, common to almost every system of jurisprudence, why possession, rightful or wrongful, as distinguished from property, should be protected. This general problem suffers by being almost solely discussed with reference to Roman law. His leading principle, that every "exercise of force" is illegal, is not incontestible, and if true, it does not clear up the whole problem. The attempt to treat the historical accidents of Roman law as juridicial necessities is the weak side of a work in other respects masterly; and there is a difficulty in understanding Austin's eulogy that it was of all books he knew "the least alloyed with error and imperfection." The controversy which has been carried on in Germany by Ihering, Baron, Gans, and Bruns shows that many of Savigny's conclusions have not been accepted.[1] The *Beruf unserer Zeit* expresses the idea, unfamiliar in 1814, that law is part and parcel of national life, and combats the notion, too much assumed by French jurists, especially in last century, and countenanced in practice by Bentham, that law might be arbitrarily imposed on a country irrespective of its state of civilization and past history. Of even greater value than his services in founding or consolidating "the historical school of jurisprudence" is the emphatic recognition in his works of the fact that the practice and theory of jurisprudence cannot be divorced without injury to both. Writing at a time when the influence of Hegel was in the ascendant, and in a city where he was official philosopher, Savigny was not carried away by metaphysical theories. In all his writings there is not a word betraying acquaintance with the labors of his great contemporary, Bentham; nor had Bentham more than the most superficial knowledge of him (see Gans's *Rückblicke auf Personen*). Perhaps a study of both would do more than anything else to aid in the construction of a true science of jurisprudence, consisting neither of platitudes and logomachies nor of a worthless catalogue of legal curiosities. (J. M†.)

SAVILE. See HALIFAX, vol. xi. p. 345.

SAVILE, SIR HENRY (1549–1622), a learned Englishman, was the second son of Henry Savile, and was born at Over Bradley, near Halifax, Yorkshire, 30th November, 1549. He entered Brasenose College, Oxford, whence he was elected to Merton College in 1561, where he took his degree in Arts and was chosen fellow. After graduating M. A. in 1570, he voluntarily read lectures on mathematics in the university. He was proctor in 1575 and 1576, travelled on the Continent collecting MSS. in 1578, and on his return was tutor to Elizabeth in Greek and mathematics. He was warden of Merton College from 1585 until his death, and in 1596 was chosen provost of Eton College. He was offered preferment by James I. after his accession in 1604, but would accept nothing more than the honor of knighthood. After the death of his son Henry he devoted his fortune to the promotion of learning. In 1619 he founded lectures on mathematics and astronomy at Oxford, and he also made various other benefactions to the university, including the foundation of a mathematical library for the professors, and the gift of several rare MSS. and printed books to the Bodleian. He died at Eton College, 19th February, 1622, and was buried in the chapel there. In recognition of his great services to the university, a public speech and verses were made in his praise, which were soon afterwards published under the title *Ultima Linea Savilii*.

Savile was held in the highest esteem by all the learned of his time. He published *Four Books of the Histories of Cornelius Tacitus, and the Life of Agricola, with Notes*, dedicated to Queen Elizabeth (1581); *A View of Certain Military Matters, or Commentaries concerning Roman Warfare* (1598); *Rerum Anglicarum Scriptores post Bedam* (1596); an excellent edition of Chrysostom, 8 vols. (1613); *Mathematical Lectures on Euclid's Elements* (1621); and *Oratio coram Elizabetha Regina Oxoniæ habita anno* 1592 (1658). In 1618 he published, with a Life, Bradwardin's work *De Causa Dei contra Pelagium et de Virtute Causarum;* and he translated into Latin King James's *Apology for the Oath of Allegiance*. He also left several manuscripts written by order of King James, all of which are in the Bodleian library.

SAVINGS BANKS (Fr. *caisses d'épargne;* Germ. *Sparkassen*) are institutions for the purpose of receiving small deposits of money and investing them for the benefit of the depositors at compound interest. They are, in general, managed by benevolent persons, who seek no remuneration for their services. They originated in the latter part of the 18th century—a period marked by a great advance in the organization of provident habits in general (see FRIENDLY SOCIETIES). They had been, however, one of the many excellent projects suggested by Daniel Defoe in 1697. The earliest institution of the kind in Europe was one established at Brunswick in 1765; it was followed in 1778 by that of Hamburg, which still exists, in 1786 by one at Oldenburg, in 1790 by one at Loire, in 1792 by that of Basel, in 1794 by one at Geneva, which had but a short existence, and in 1796 by one at Kiel in Holstein. In Great Britain, in 1797, Jeremy Bentham revived Defoe's suggestion under the name of "Frugality Banks," and 1799 the Rev. Joseph Smith put it in action at Wendover. This was followed in 1801 by the addition of a savings bank to the friendly society which Mrs. Priscilla Wakefield had established in 1798. Savings banks were shortly after established in London, Bath, Ruthwell in Dumfriesshire, Edinburgh, Kelso, Hawick, Southampton, and many other places. By 1817 they had become numerous enough to claim the attention of the legislature, and Acts of Parliament were passed for their management and control. Their progress in the United Kingdom since that date is shown by the following statement:

Year ending Nov. 20.	Population.	Number of Depositors.	Percentage of Population.	Amount of Deposits.	Per Head of Population.
				£	£ s. d.
1821	20,893,584	Not known	...	4,740,188	0 4 6
1831	24,028,584	429,400	2	14,698,635	0·12 3
1841	26,730,929	841,204	3	24,536,971	0 18 4
1851	27,390,629	1,161,838	4	30,445,568	1 2 3
1861	28,927,485	1,609,102	6	41,542,219	1 8 9

[1] See Windscheid, *Lehrbuch des Pandektenrechts*, i. 439.

From this date the progress of the post office savings banks has also to be brought into account, statistics of which have already been given under POST OFFICE:

Year.	Population.	Number of Depositors.			Percentage of Population.
		Trustee Savings Banks.	Post Office Savings Banks.	Total.	
1871	31,845,379	1,404,078	1,303,492	2,707,570	8½
1881	35,241,482	1,532,486	2,607,612	4,140,098	12
1884	...	1,582,474	3,333,675	4,916,149	...

	Amount of Deposits.			Per Head of Population.			Per Depositor.
	Trustee Savings Banks.	Post Office Savings Banks.	Total.				
	£	£	£	£	s.	d.	£
1871	38,820,458	17,025,004	55,845,462	1	15	0	21
1881	44,137,855	36,194,495	80,332,350	2	5	7	19
1884	45,840,887	44,773,773	90,614,660		...		18

On the 24th April, 1886, the funds in the hands of the National Debt Commissioners on account of trustee savings banks were £46,162,515 [$224,350,012.44], and post office savings banks £49,881,896 [$242,426,-014.56], a total of £96,044,411 [$466,775,837.46].

To these may be added the cash and assets in the hands of the banks and the postmaster-general, which at the beginning of the previous year amounted to £764,804 [$3,716,947.44], and also the following investments in stock on account of depositors: trustee savings bank, £729,522 [$3,545,476.92]; post office savings bank, £2,626,928 [$12,766,870.08]; total, £3,356,450 [$16,312,347]; making the aggregate funds belonging to depositors in savings banks more than £100,000,000 [$486,000,000].

The largest savings bank in the United Kingdom is that at Glasgow, as shown by the following table of the 21 principal banks:

	Deposits on 20th Nov. 1884.	Deposit Accounts Open.	Number of Transactions in the Year.
	£		
Glasgow	3,686,607	127,651	523,322
Liverpool	2,080,788	80,667	336,281
Manchester	1,858,468	68,162	210,828
Edinburgh	1,412,547	59,970	232,375
St. Martin's Place, London	1,351,839	29,999	38,350
Bloomfield Street, London	1,263,577	65,301	104,311
Exeter	1,054,601	34,217	35,230
Sheffield	957,164	32,389	74,150
Finsbury, London	885,195	31,880	97,386
Newcastle-on-Tyne	776,188	21,998	40,952
Preston	653,875	19,561	54,871
Hull	628,903	27,597	82,414
Nottingham	607,708	22,811	40,114
Leeds	572,209	24,322	83,433
Bristol	539,695	14,168	29,286
Devonport	523,154	18,995	23,675
Bloomsbury, London	521,615	23,532	39,438
	19,374,133	703,220	2,046,416
Banks with less capital but a large number of depositors:			
Aberdeen	396,151	32,668	36,380
Dundee	474,089	22,119	81,753
Marylebone, London	301,713	20,895	23,773
Leicester	326,296	18,531	36,141
	20,872,382	797,433	2,224,463

From this table some interesting conclusions may be drawn as to the operations of savings banks in the larger towns. These 21 banks have together more than 50 per cent. of the depositors, more than 45 per cent. of the deposits, and more than 65 per cent. of the transactions of all the 411 savings banks of the United Kingdom.

Organization.

The progress of savings banks and the large amount that the deposits have now reached are evidence of the general fitness of the organization for its purpose. So far as regards trustee savings banks, the provisions of the Acts of 1817 are still to a great extent the same as those by which they are now regulated, though the law has been frequently amended in matters of detail, and twice (1828 and 1863) consolidated. Its main feature is the requirement that the whole of the funds should be invested with the Government through the Commissioners for the Reduction of the National Debt. The local management of the banks has been left entirely to the trustees, who are precluded from receiving any remuneration for their services or making any profit. They are, however, required to furnish the commissioners with periodical returns of their transactions. This blending of private management with state control has had many advantages in knitting together class and class, and in many places the voluntary trustees and managers have been able to render real service to the depositors in various ways. A new savings bank requires for its establishment the consent of the National Debt Commissioners and the certificate of the registrar of friendly societies to its rules; but since the opening of the post office savings banks in 1861 few have been established, and many old savings banks have been closed, not being able to offer to their depositors the same advantages as the new system. The savings banks, which numbered 640 in 1861, have thus been reduced to 411, and their capital has been maintained rather by the accumulation of interest than by fresh deposits.

Interest.

The legislation of 1817, among other inducements to thrift, offered that of a bounty to the savings bank depositor in the shape of a rate of interest in excess of that given to the ordinary public creditor, or—which is the same thing—in excess of that which could be earned by the investment of the deposits in the purchase of Government stock. The interest offered in the first instance was 3d. [6 cts.] per day, or £4, 11s. 3d. [$22.17] per cent. per annum; and that rate continued to be granted until the passing of the Act of 1828 (9 Geo. IV. c. 92). That Act reduced the rate of interest allowed to the trustees of savings banks to 2½d. [5 cts.] per day, or £3, 16s. 0½d. [$18.48] per annum, and prohibited them from allowing more to their depositors than 2¼d [4½ cts.] per day, or £3, 8s. 5¼d. [$16.63] per annum, requiring them to pay the surplus, if any, into a separate fund held by the National Debt Commissioners, but bearing no interest. In 1844 the interest to trustees was further reduced to 2d. [4 cts.] per day, or £3, 5s. [$15.80] per cent., the maximum to be allowed to depositors being fixed at £3, 0s. 10d. [$14.78]. Finally, in 1880 the interest to trustees has been reduced to £3 [$14.58], and that to depositors to £2, 15s. [$13.36].

The result of the bonus on thrift offered by the earlier statutes was a loss to the state, which ought to have been made good by an annual vote. Between 1817 and 1828 the difference between the interest credited and that earned amounted to £744,363 [$3,617,604.18]; and this led to the reduction in the rate of interest effected by the Act of the latter year. The deficiency, instead of being paid off, was allowed still to accumulate, and as the price of stock rose and the deposits increased fresh deficiencies arose, so that by 1844 the deficiency, which would have been 1½ millions by the mere accumulation of interest on the previous £744,-363 [$3,617,604.18], had become £3,179,930 [$15,454,459.80]. The reduction of interest in 1844 was about enough to make the fund self-supporting, though savings banks are always, as Mr. Scratchley clearly shows, liable to loss from the fact that deposits are in excess when the funds are high and withdrawals when they are low; but the past deficiency was still allowed to accumulate, and it was not till 1880 that the plan was adopted of voting the deficiency every year. Had the accumulated deficiency been then liquidated, there would have been no necessity for an annual vote. The bad

political economy of the legislators of 1817 has left us this legacy of annual deficits. Had they provided the bounty at their own expense instead of that of their descendants, there would have been little to be said against it.

Limitation of deposits.

The offer of a bonus on thrift was of necessity accompanied by provisions to guard against its being used by others than the classes it was intended to encourage. This was done by limiting the amount that each depositor should be permitted to pay in. In the first instance, in England the limit was fixed at £100 [$486] for the first year, and £50 [$243] a year afterwards. In 1824 these limits were reduced to £50 [$243] for the first year, £30 [$145.80] a year afterwards, and £200 [$972] in the whole. In 1828 the limit was adopted which still remains in force of £30 [$145.80] a year or £150 [$729] in the whole, allowed by addition of interest to increase to £200 [$972] but no further. Attempts have been always frequently made to raise the annual limit to £50 [$243] but have been defeated. This is to be regretted, for the limit is of doubtful utility, now that the rate of interest has been so reduced as to prevent loss to the state. It is within the common experience of savings banks managers that persons come to deposit an amount exceeding £30 [$145.80] and are disappointed when they find they cannot do so. The act of 1882, permitting investment in Government stock, may diminish the mischief.

Occupation of depositors.

With the view of showing to what extent savings banks are used by the classes for which they were intended, a return was published for the year 1852, showing (as nearly as could be ascertained) the number of depositors belonging to various occupations, and the amount of their deposits, as follows:

	Depositors.	Deposits.	Average.
		£	£
Tradesmen and their assistants, small farmers, clerks, mechanics, and artisans not described as journeymen, and their wives	296,407	8,144,206	27
Domestic servants, charwomen, nurses, and laundresses	257,711	6,907,388	27
Minors having accounts in their own names, including apprentices	182,636	2,426,195	13
Laborers, farm servants, journeymen mechanics, and their wives	152,057	4,354,080	29
Females described only as married women, widows, or spinsters	138,858	4,037,458	29
Dressmakers, milliners, shopwomen, and female artisans	24,859	580,202	23
Trust accounts (principally for minors), including all joint accounts	22,347	417,786	19
Soldiers, sailors, boatmen, fishermen, policemen, letter carriers, revenue officers, pensioners, railway men, and their wives	21,525	739,248	34
Persons engaged in education, male and female	10,497	327,795	31
Gentlemen, persons of independent means, professional men, and their wives	20,961	579,528	28
Miscellaneous, and persons without any given description	60,289	1,394,351	23
Total	1,188,147	29,908,237	25

Not two per cent. of the deposits, therefore, either in number or amount, are made by classes whom it may be supposed it was the intention of the legislature to exclude.

Depositor's declaration.

When a person comes with his first deposit to a savings bank he is required to sign a declaration, setting forth his name, address, and occupation, that he desires to become a depositor on his own account, and that he has no money in any other savings bank. If this declaration is not true, the deposits are liable to be forfeited; but it is to be feared that few depositors take the trouble to read what they are signing, or think much about the meaning of it. If the depositor cannot write, the actuary of the savings bank will usually ask him a few questions, such as his age, mother's maiden name, etc., which may tend to identify him, or defeat any attempt to personate him for the purpose of withdrawal. The enactment that deposits are to be forfeited if the declaration be false was qualified in 1863 by a provision that the forfeiture should not be enforced unless in the opinion of the appointed barrister (now the solicitor to the treasury) the deposits had been made with a fraudulent intention.

Fraudulent deposits.

The consequence of the determination by the solicitor to the treasury that the deposits have been made with the "fraudulent" intention which the Act contemplates is out of all proportion to the nature of the offence committed, being in fact the forfeiture of all the deposits. The prohibition of double deposits arose when the state was granting a rate of interest greater than that which is earned upon the investment of the money, and it has now ceased to have any real reason whatever, the rate of interest being less than earned. The intention to "defraud" now means merely the intention to evade a restriction that has ceased to be necessary, not an intention to deprive anybody of anything that belongs to him. If it be thought desirable to sanction by the infliction of a penalty the law that these institutions should be used only for the savings of the poorer classes, the loss of interest would be a sufficient if not an extravagant penalty, without forfeiture of the principal. Indeed, the present excessive penalty has, in one remarkable case, defeated itself. This was the case of a depositor in an Irish savings bank, who invested in fictitious names the sum of £2000 [$9720]. The solicitor to the treasury felt compelled to declare that these deposits were made with a fraudulent intention. The registrar in Ireland felt bound to act on this determination, and refused to award payment of the deposit. The High Court of Justice and the Court of Appeal refused to grant a mandamus, for the law would not assist a wrongdoer. But parliament itself voted £1000 [$4860] or half the amount of the forfeiture, the legislature thus providing a remedy for an injustice it had itself committed. Another curious case was that of a young woman, the daughter of a postmaster, who in order that her father might be provided with funds to meet business claims as they became due, purloined money from him and invested it in false names in the post office savings bank kept at his house. In this case, the postmaster himself not being the guilty party, no forfeiture took place.

Settlement of disputes.

Among the benefits conferred by the legislature upon depositors in savings banks has been that of exemption from the jurisdiction of the ordinary courts of law in cases of dispute with the trustees. By the Acts of 1817 disputes were to be settled by arbitration. By that of 1828 the barrister appointed to certify the rules of the savings bank (then and until his death in 1870 Mr. John Tidd Pratt) was made umpire in case of difference of opinion between the arbitrators. By that of 1844 the arbitrators were abolished, and an original and final jurisdiction was conferred upon the barrister. By an Act of 1876 the functions of the barrister in this respect were conferred upon the registrar of friendly societies. This in effect makes no change in the law, for the offices of barrister and registrar have been always held by the same persons. As early as 1832 it was determined in the case of Crisp *v.* Sir Henry Bunbury that the effect of these enactments is to oust the jurisdiction of all the superior courts of law and equity, and the authority of that decision has never been shaken or even doubted.

Jurisdiction of registrar.

Since 1876 the registrar of friendly societies has made 147 awards in cases of disputes with savings banks, in addition to 169 on disputes with the post office savings bank. As the writer of the present article is one of the two persons in whom this jurisdiction is vested for England, he hopes he may be excused for expressing the opinion that its exercise has been highly beneficial to depositors in savings banks. The costs of the award are limited by treasury warrant to a few shillings, never exceeding £1 [$4.86]. The procedure is simple and elastic, and the results are believed to be satisfactory. The central office, acting as registrar, determines law and fact, and adjusts all the equities of each case. Reference to the index to the registrar's decisions appended to the chief registrar's report for 1883, or to Mr. Forbes's useful work, will show that many interesting questions of law have had to be determined with regard to so small a matter as the ownership of a savings bank deposit.

Other provisions.

Questions between husband and wife as to property including deposits in savings banks are now, under the Married Women's Property Act, settled by the judges of county courts. Where a depositor, as often happens, is of illegitimate birth, a special provision is made by the Savings Bank Act in favor of his relatives, to whom the solicitor to the treasury may award his deposits. It is open to any depositor to nominate a person to whom the amount due to him at his death shall be payable, provided it does not exceed £100 [$486] and the nominee is not an officer or servant of the bank, unless indeed such officer or servant is related to the depositor. This privilege, derived from

the Provident Nominations and Small Intestacies Act passed in 1883, is not yet sufficiently known to the bulk of depositors, and has not yet been used to any large extent, but may be expected in time to become very valuable. It is an extension of a privilege enjoyed by members of friendly societies since 1855, and also by industrial and provident societies and trade unions.

Frauds by actuaries.

A painful chapter in the history of savings banks is that occupied by the frauds of actuaries, which have caused losses to depositors of not less than £150,000 [$729,000]. It too often happens that, where the only supervision is that of honorary officers, a paid servant may commit frauds unchecked over a long period of time. In the case of a savings bank at Rochdale, £71,715 [$348,534.90] was stolen by the actuary, and £37,433 [$181,924.38] of this loss had to be borne by the depositors. In one at Dublin the loss was £56,000 [$272,160] and in one at Tralee £36,000 [$174,960]. These unhappy events must have greatly discouraged the poor, and checked the progress of savings banks. There is, however, the compensating fact that the savings made by the people of Rochdale since 1849, when the savings bank there was closed, have taken the more favorable direction of promoting the great coöperative enterprises of that town. Savings banks, valuable and important as their benefits are, are still only elementary teachers of providence, and it is well for the workman to learn not merely to save money but to employ his savings to advantage. The stringent legislation as to audit of 1863 has diminished frauds on savings banks, and they are now rarely heard of.[1]

Penny banks.

In connection with savings banks, and as auxiliaries to them, are penny banks. An ordinary savings bank will not accept a deposit of less than 1s. [24.3 cts.] (or in some cases 5s. [or $1.21]) on account of the expense of management. It seems to have occurred to Dr. Chalmers to supplement the work of the Edinburgh Old Savings Bank by establishing in a Free Church congregation in Edinburgh a bank, managed entirely by voluntary agency, in which a deposit of 1d. [2 cts.] or 6d. [12 cts.], or any sum not exceeding 10s. [$2.43], would be received. When the deposit amounted to £1 [$4.86], the owner was requested to transfer it to the savings bank, and the funds were invested with the savings bank to the extent of £100 [$486] a year or £300 [$1458] in the whole. Similar banks, called "territorial savings banks," were established in other congregations. An organization of penny banks has existed in Glasgow for thirty years, and another has been set on foot in Liverpool by the exertions of Mr. T. Banner Newton, the able actuary of the savings bank there. On 20th November, 1885, there were 173 such banks open in Liverpool, with 17,492 depositors. When a deposit reaches £1 [$4.86] it is transferred to the depositor's credit in the Liverpool Savings Bank. The amounts thus transferred were £56,122 [$272,752.9], and £8432 [$40,979.52] remained to the credit of depositors in the penny banks. The transactions of the year numbered 677,686 and amounted to £42,194 [$205,062.84]. Penny banks require no certificate from the registrar or other legal organization, but if they desire to deposit more than the limit above mentioned the permission of the National Debt Commissioner must first be obtained.

Army and navy savings banks.

Savings banks for the army were established in 1842, and are now regulated by Acts of Parliament—22 and 23 Vict. c. 20 (1859), 26 and 27 Vict. c. 12 (1863), for the Royal Navy and Marines by 29 and 30 Vict. c. 43 (1866), and for seamen generally by 17 and 18 Vict. c. 104, § 180 (1854), 18 and 19 Vict. c. 91, § 817 (1855), and 19 and 20 Vict. c. 41 (1856). Into these, or indeed into any trustee or post office savings bank, seamen's wages may be paid under allotment notes by 43 and 44 Vict. c. 16, § 3 and sch. 1 (1880). The amounts in the hands of the National Debt Commissioners belonging to depositors in savings banks of these various classes at 23d September, 1885,[2] were:

Military savings banks	£285,631	[$1,388,166.66]
Naval savings banks	175,445	[852,662.70]
Seamen's savings banks	138,816	[674,645.76]
Total	£599,892	[$2,915,475.12]

Private savings banks.

Voluntary savings banks, unconnected with the Government, have also been established, the most important of which are the Yorkshire Penny Bank and the National Penny Bank. The depositors in these rely solely on the character of the persons by whom they are managed, and in some institutions of the kind have met with severe disappointment in consequence. As they are under no responsibility to the state, these institutions make no returns to parliament, and no trustworthy information as to the extent of their operations can be given.

Railway savings banks.

The railway companies, which are private corporations empowered by special Acts of Parliament, have in several cases availed themselves of these Acts to take power for establishing savings banks for the benefit of their servants. The Manchester, Sheffield, and Lincolnshire Railway Savings Bank has been established 25 years, and has 2443 depositors, whose accounts amounted on 31st March, 1885, to £249,282 [$1,211,510.52]; its transactions for the year were: £66,702 [$324,171.72] deposits, £33,756 [$164,054.16] withdrawals, in number 26,596. Six other railway companies have submitted the rules of their savings banks to the registrar of friendly societies in pursuance of their private Acts, and the aggregate of their annual returns for the year 1884–5 is as follows:

Deposits during the year	£171,246	[$ 832,255.56]
Repayments	£111,399	[$ 541,399.14]
Balance due to depositors	£661,177	[$3,213,320.22]
Number of depositors	8,729	
Increase during the year	749	
Number of transactions (estimated)	61,621	
Interest credited	£24,033	[$116,800.38]

In addition, five other banks had been established by railway companies without reference to the registrar, and these in 1876 received £72,505 [$352,374.30] deposits and had 4120 depositors. The total depositors in railway savings banks may therefore be estimated at a million sterling.

Australasia.

British Colonies.—The thirteen savings banks in the colony of Victoria had on the 3d December, 1882, a capital of £1,970,855 [$9,578,355.30]. In the following year, however, the withdrawals exceeded the deposits, reducing the deposits to £1,785,990 [$8,679,911.40]. The number of depositors, however, has steadily increased from 24,187 in 1873 to 70,354 in 1883. Of these 39,404 were males and 30,950 females; 1618 depositors had balances over £200 [$972], amounting to £407,932 [$1,982,549.52]. The transactions of the year 1883 were—deposits, £1,357,678 [$6,598,315.08]; withdrawals, £1,610,576 [$7,827,399.36]. The deposits in the post office savings banks of Victoria also reached their highest amount in 1882, when they were £1,150,391 [$5,590,900.26], falling in 1883 to £1,032,132 [$5,016,161.52]. In them also the number of depositors has steadily increased from 34,360 in 1873 to 65,735 in 1883. Their transactions for the year 1883 were: deposits, £724,028 [$3,518,776.08]; withdrawals, £842,288 [$4,093,519.68]. Taking the two classes of savings banks together, the number of depositors on 31st December, 1883, was 136,089, the amount of capital £2,818,122 [$13,696,072.92], and the average for each depositor £20, 14s. [$100.60]. The number of depositors per cent. of the population was 15. The rate of interest given to depositors is 4 per cent. The savings bank of Melbourne alone had, on the 30th June, 1885, deposits amounting to £1,225,753 [$6,102,959.58], belonging to 58,129 depositors. The transactions averaged 1073 per diem.

In New South Wales the depositors in June, 1883, were 66,604 or 8 per cent. of the population, and the deposits £2,805,856 [$13,636,480.16], or £42 [$204.12] per depositor, the rate of interest being 4 per cent. in the post office savings bank and 5 and 6 per cent. in other banks.

In Queensland the depositors were 26,642 or 10 per cent. of the population, and the deposits £1,086,685 [$5,281,289.10] or £41 [$199.26] per depositor, the rates of interest being 4 and 5 per cent.

In South Australia the depositors were 46,388 or nearly 16 per cent. of the population, and the deposits £1,500,249 [$7,291,210.14] or £32 [$155.52] per depositor, the rate of interest being 4½ per cent.

In Western Australia, on the 31st December, 1882, there were 1904 depositors or 6 per cent. of the population, having £24,838 [$120,712.68] deposits or £13 [$63.18] each.

In Tasmania the depositors in June, 1883, were 17,231 or 14 per cent. of the population, and their deposits £380,313 [$1,848,466.98] or £22 [$106.92] each, the rate of interest being 3½ per cent. in the postal banks, and slightly higher in the general savings bank.

In New Zealand the depositors were 69,966 or 13 per cent. of the population; and their deposits £1,687,739 [$8,202,411.54] or £24 [$116.64] each. The rate of interest is from 4 to 5 per cent.

The general total for the Australian colonies is 365,828 depositors or 12 per cent. of the population, and £10,304,145 [$50,078,144.70] deposits, which is £28 [$136.08] on the average for each depositor.

[1] Since the above was written the disclosure of frauds of long standing in the Cardiff savings bank has taken place.

[2] For this information we are indebted to the authorities of the National Debt office.

In the Dominion of Canada, according to a paper read at the Montreal meeting of the British Association by Mr. J. C. Stewart, the old established savings banks in the cities of Montreal and Quebec have £2,000,000 [$9,720,000] sterling, belonging to 42,297 depositors; the post office savings banks established in 1868 have £2,650,000 [$12,879,000], belonging to 66,682 depositors; and the chartered banks also receive deposits on the savings bank system. Canada.

United States.—According to the report for 1884 of Mr. Henry W. Cannon, comptroller of the currency, there were on the 30th November, 1882, in the United States of America forty-two savings banks, with capital amounting to £800,000 ($5 = £1) [$4,000,000] and having £8,700,000 [$43,500,000] deposits, and 625 savings banks without capital having £192,000,000 [$960,000,000] deposits. In the six years 1876–82 the number of savings banks with capital had increased from twenty-six to forty-two, but their capital had diminished 20 per cent., while their deposits had increased 16 per cent. On the other hand, the number of savings banks without capital had diminished from 691 to 625, but their deposits had increased 14 per cent. Of the aggregate deposits, the 422 savings banks in the New England States held £87,500,000 [$437,500,000], the 179 in the Middle States £98,500,000 [$492,500,000], the 9 in the Southern States £660,000 [$3,300,000], and the 57 in the Western States and Territories £14,000,000 [$70,000,000]. In the latter two groups the banks with and without capital are nearly equal in number and in the amounts of deposits; in the former two groups banks with capital are the exception, being only one in sixty of the whole. United States.

Savings banks in the United States differ from those in the United Kingdom in the manner in which their funds are invested, not being limited to Government securities. Thus, of the 200 millions sterling of deposits only 46 millions was invested in United States bonds, viz., New England, £6,900,000 [$34,500,000]; Middle States, £35,800,000 [$179,000,000]; Western States, £400,000 [$2,000,000]; Pacific States and Territories, £2,900,000 [$14,500,000].

A statement of the aggregate resources and liabilities of 636 savings banks in 1884 (£236,000,00 or $1,180,000,000) is furnished, showing:

Deposits	£215,000,000	[$1,075,000,000]
Surplus fund	17,000,000	[85,000,000]
Undivided profits	3,000,000	[15,000,000]
Other liabilities	1,000,000	[5,000,000]

Provided for as follows:

Loans on real estate	£72,000,000	[$360,000,000]
Loans on personal and collateral security	28,000,000	[140,000,000]
United States bonds	39,000,000	[195,000,000]
State, municipal, and other bonds and stocks	44,000,000	[220,000,000]
Railroad bonds and stocks	10,000,000	[50,000,000]
Bank stock	8,000,000	[40,000,000]
Real estate	7,000,000	[35,000,000]
Other assets	14,000,000	[70,000,000]
Due from banks	11,000,000	[55,000,000]
Cash	3,000,000	[15,000,000]

According to the report of the comptroller for 1885 (which has reached us since the above was written) the deposits have increased during the year to £220,000,000 [$1,100,000,000], and the total assets to £240,000,000 [$1,200,000,000].

State.	Depositors.	Deposits.	Average.
		£	£
Maine	106,000	6,500,000	62
New Hampshire	121,000	8,700,000	72
Vermont	39,000	2,200,000	57
Massachusetts	826,000	52,500,000	63
Rhode Island	116,000	10,200,000	88
Connecticut	252,000	18,100,000	71
New York	1,165,000	87,400,000	75
New Jersey	87,000	4,800,000	55
Pennsylvania	136,000	7,000,000	52
Maryland	78,000	5,700,000	73
District of Columbia	7,000	100,000	20
Ohio	35,000	2,500,000	62
Indiana	9,000	400,000	48
Minnesota	12,000	600,000	53
California	82,000	11,700,000	142
	3,071,000	218,400,000 [$6,092,000,000]	71 [$355,000]

In New England the depositors number 36 in every 100 of the population, and the average amount of each account is £66 [$330], or £24 [$120], for each individual if distributed over the entire population. In New York State the deposits would give £17 [$85] per head if distributed in like manner.

The preceding table gives for each State the number of depositors, and the amount and average of deposits, in 1885.

Brazil.—The savings banks of the empire of Brazil have been made instruments in the gradual extinction of slavery in that country. Since 1871 each slave is allowed certain hours a week to labor for his own benefit, and when his earnings deposited in the savings bank amount to a given sum the remainder of the price of his emancipation is provided by the state out of public funds. The children of slave mothers, who since 1871 have been born free, are also encouraged to place their earnings in school savings banks. By a law passed on the 14th August, 1885, immediate enfranchisement at the cost of the state is conferred upon slaves employed in agricultural establishments, upon condition of their remaining with the master at fixed wages for five years and paying half the wages into the savings bank towards repayment of the price paid for their freedom. Brazil.

Continent of Europe.—In several of the countries of Europe savings banks have been established and are flourishing. In Prussia the first savings bank was founded by the municipality of Berlin in 1828. In 1838 they were taken under the supervision of the Government. Their formation has been much aided by an association called the "Central Union" for the good of the industrious classes. A great variety of investments is permitted. In 1874 there were 979 banks, having 2,059,000 depositors and £49,315,000 [$239,670,900] of deposits, being a little over £2 [$9.72] per head of the population. Besides savings banks, there are the credit banks established by the late Herr Schultz-Delitzsch, which perform a similar function. Prussia.

In France 79 per cent. of the deposits are invested in the public debt, on which interest at the rate of 4 per cent. is guaranteed, but the savings banks are private institutions; 19 per cent. are invested in mortgages and 2 per cent. on municipal securities. Post office savings banks also exist. The average amount of each deposit account is smaller than in England, 79 per cent. of the deposits being under £20 [$97.20] as against 63 per cent. The following statement shows the progress of savings banks in France since their first regulation by law in 1835: France.

Date.	Number of Banks including Branches.	Number of Depositors.	Per cent. of Population.	Amount of Deposits.	Per Head of Population.
				£	s. d.
31st Dec. 1840..	430	351,808	1	7,695,293	4 6
" 1850..	540	565,995	2	5,572,738	3 1
" 1860..	638	1,218,122	3	15,054,184	8 3
" 1870..	1121	2,079,141	5	25,280,000	...
" 1878..	1320	3,173,721	9	40,646,656	22 0

The depositors now number nearly five millions. Savings banks were greatly affected by the Revolution of 1848 and by the Franco-German War. Previous to the former event, the deposits had risen on 31st December, 1845, to £15,822,164 [$76,895,717.04], falling on 31st December, 1849, as low as £2,965,802 [$14,413,797.72]. In the early part of 1870 they had risen to £28,800,000 [$139,968,000] or 15s. [$3.64] for every individual of the population. The separation of Alsace and Lorraine reduced the deposits. Postal savings banks were established in 1875, but only as auxiliaries of the ordinary savings banks; school savings banks, mainly through the enlightened exertions of M. de Malarce, were commenced in 1874. These are now established in 23,222 schools, have 488,674 depositors and £451,402 [$2,193,813.72] deposits. A national postal savings bank was instituted on 9th April, 1881, and was extended to Corsica on 1st March, 1882, and to Algeria and Tunis from 1st April, 1884. On 31st December, 1883, it had already 374,970 depositors and £3,097,200 [$15,052,392] deposits. The Paris savings bank had on 31st December, 1882, 440,728 depositors and £3,513,433 [$17,075,284.38] deposits.

In Italy, at the end of 1872, 282 savings banks were in existence, of which 142 were principal banks and the rest branches. With two exceptions, all are managed without profit to the promoters or guarantors. In 1825 there were 11 saving banks in which £108,000 [$524,880] had been deposited; in 1850 the deposits amounted Italy.

to £1,600,000 [$7,776,000], and in 1872 to £17,860,000 [$86,799,600], belonging to 676,327 depositors. Of these funds, 21 per cent. was invested on mortgage, 10 per cent. only in the public debt, 11 per cent. in obligations of local authorities, 12 per cent. in shares and bouds of companies, 16 per cent. in bills of exchange, 15 per cent. in loans on public funds and commercial securities, 11 per cent. in current accounts, and 4 per cent. otherwise. The average rate of interest allowed to depositors is 4½ per cent. The transactions of the year were: deposits £7,911,000 [$38,447,460], withdrawals, £6,514,000 [$31,658,040]. The system of school savings banks has been adopted in many communes. In addition, deposits are made in popular banks and other establishments of credit, and post office savings banks have also been established.

Denmark.

In Denmark savings banks are private institutions, but must not be managed for profit, nor invest in foreign securities; and they are required to make annual returns to Government. In 1860 the amount of deposits was £3,221,000 [$15,654,060]; by 1871 it had increased to £6,651,031 [$32,324,010.66], and by 31st March, 1881, to £12,707,521 [$61,758,552.06]. The savings banks have increased in number during the ten years from 188 to 446, and the depositors from 285,991 to 492,296. Twenty-six banks have more than £100,000 [$486,000] deposits. The oldest and largest is that of Copenhagen, established 1st May, 1820, having £2,320,892 [$11,279,535.12] deposited, which has increased from £832,874 [$4,047,767.64] in the ten years. The number of depositors has increased from one in six to one in four of the population, and the deposits from £3, 14s. 8d. [$18.14] to £6 9s. [$31.34] per head of the population. The transactions of the year ending 31st March, 1881, were—deposits £8,141,627 [$39,568,307.22]; withdrawals £6,702,470 [$32,574,004.20]. Of the deposit accounts, 74 per cent. are under £23 [$111.78] and 15 per cent. above £23 [$111.78] and under £43 [$208.98]. One-half of the funds are invested on mortgage. The reserve funds of the banks had increased in ten years from £226,329 [$1,099,958.94] to £665,597 [$3,234,801.42].

Other European countries.

The following are statistics of savings banks in other European countries as published by the Italian Government a few years ago:

Country.	Population.	Number of Banks.	Number of Deposit Accounts on 1st January.	Amount of Deposits on 1st January.
				£
Belgium (1874)	5,336,000	10	132,000	2,510,000
Austria (1874) (Cis-Leithan provinces)	21,366,000	275	1,269,000	53,931,000
Hungary (1873)	15,417,000	282	...	15,209,000
Saxony (1872)	2,556,000	156	517,000	11,445,000
Thuringia (1873)	899,000	7	33,000	1,897,000
Mecklenburg (1872)	557,000	31	91,000	1,072,000
Hamburg (1874)	370,000	8	81,000	1,616,000
Bremen (1873)	135,000	4	48,000	1,404,000
Lübeck (1873)	52,000	2	14,000	138,000
Bavaria (1859)	4,824,000	260	279,000	2,490,000
Würtemberg (1874)	1,818,000	121	...	2,766,000
Baden (1874)	1,461,000	99	141,000	4,142,000
Alsace and Lorraine (1872)	1,549,000	...	41,000	283,000
Holland (1872)	3,579,000	240	99,000	1,127,000
Sweden (1873)	4,297,000	271	563,000	6,035,000
Norway (1873)	1,750,000	262	220,000	5,201,000
Switzerland (1872)	2,669,000	312	542,000	11,581,000
Russia (1872) (certain governments only)	56,408,000	...	71,000	735,000
Finland (1872)	1,838,000	36	18,000	346,000
	126,881,000	2376	4,159,000	123,928,000 [$602,290,080]

Aggregate.

M. de Malarce has obtained for the *Dictionnaire des Finances* some more recent statistics, the details of which have not yet reached us, but from information he has been so good as to communicate we infer an increase in deposits during the last 10 years in twelve European states of £123,000,000 [$597,780,000]—making the aggregate of savings bank deposits for all countries, as far as ascertained, £725,000,000 [$3,523,500,000]. (E. W. B.)

SAVOIE, a department of southeastern France, formed in 1860 of the districts of Upper Savoy, Savoy proper, Tarentaise, and Maurienne, which formed the southern part of the province of Savoy in the kingdom of Sardinia. Situated between 45° 5′ and 45° 55′ N. lat. and between 5° 37′ and 7° 5′ E. long., it is bounded N. by the department of Haute-Savoie, N.W. by Ain, W. by Isère, S. by Hautes-Alpes, and S.E. and E. by Piedmont (Italy), the limits for the most part consisting of ridges of the Alps, and on the N.W. being determined by the Rhone and its affluents the Fier and the Guier. The highest point in the Vanoise group of mountains is 12,668 feet above the sea, while the Rhone leaves the department at a height of 695 feet, and the Isère about 800. Some details in regard to the orography will be found under Alps (*q.v.*). The Isère flows east and west through the Tarentaise valley by Bourg St. Maurice, Moutiers, Albertville, and Montmelian; its principal tributary the Are flows along the Maurienne valley used by the Mont Cenis Railway. The lake of Bourget discharges into the Rhone by the Savières canal. The climate of the department varies according to altitude and exposure. At Chambéry and Aix-les-Bains the average temperature is a little lower than that of Paris, but the rainfall is about 65 inches per annum, and this amount goes on increasing as the higher regions are reached.

With a total area of 1,423,254 acres, Savoy comprises 434,921 acres of uncultivated ground, 239,700 acres of arable, 205,105 in forests, 172,980 in meadows, 27,183 in vineyards. More than the half of the inhabitants (194,704 out of 266,438) are engaged in agriculture. In 1881 there were in the department 97,487 cows, 19,328 oxen, 2570 horses, 3156 asses, 4207 mules, 98,826 sheep (40 tons of wool), 19,428 pigs, 25,527 goats. About 1,870,000,000 gallons of milk are produced and 2463 tons of butter, and 5911 tons of cheese are manufactured, of a total value of £500,000 [$2,430,000]. From the 19,600 beehives were obtained in 1881 87 tons of honey and 16 of wax. The grape ripens up to an altitude of 2625 feet, and is cultivated to an altitude of 3940. Several growths of Savoy are in great repute and the vineyards were (before the invasion of the phylloxera) one of the most important products of the department. Tobacco is also cultivated. In 1883 the crops comprised wheat, 404,665 bushels; meslin, 104,500; rye, 679,668; barley, 212,883; buckwheat, 20,641; maize, 245,245; oats, 722,067; potatoes, 1,244,603; pulse, 54,120; chestnuts, 72,036; beetroot, 14,040 tons; tobacco, 350 tons; hemp, 585 tons; colza-seed, 284 tons; hemp-seed, 195 tons; wine, 3,895,496 gallons (annual average 4,128,520 gallons); cider, 137,258 gallons (average 69,058 gallons). Notwithstanding deplorable clearances, Savoy still possesses considerable woods of pine, larch, beech, etc. The chestnut, of which the finest specimens are in the neighborhood of Aix-les-Bains, is found, as also the walnut and hazel, at a height of 3600 feet, the oak at 3900, the elm and the ash at 4250, the fir at 4900, and the pine at 7200. The department contains one of the richest deposits of spathic iron in Europe, and the Creusot Company employs 700 hands in working it. Argentiferous lead and copper have also been occasionally worked. The Maurienne and the Tarentaise are rich in anthracite, and yielded in 1882 16,687 tons of fuel. Peat covers 1413 acres, with a thickness varying from 8 inches to 8 feet, and there are rich beds of different kinds of marble, fifty-two quarries of building stone, and quarries of limestone, plaster, cement, and slate, as well as deposits of black lead, jet, asbestos, talc, mica, ochre, sulphate of baryta, zinc, antimony, arsenic, manganese, titanium, sulphur. The department is particularly rich in mineral waters, and the most famous, those of Aix-les-Bains (hot-sulphurous) were frequented in the time of the Romans. The waters at Marlioz in the neighborhood are sulphurous or alkaline (iodine, bromine). Those of Challes near Chambéry rank among the most powerful of the natural sulphurous waters. The Salins-Moutiers waters in the Tarentaise are hot, saline, and rich in various minerals; the hot springs of Brides-les-Bains in the same region are rich in the sulphates of soda and calcium. Silk is the leading object of industry in the department (31 tons of cocoons in 1883). The winding of the cocoons, the milling of the silk (3500 "tavalles" and spindles), and the weaving of the silk-fabrics (803 looms, 55 being hand-looms) employ more than 1700 workmen, and the goods manufactured are valued at £380,000 [$1,846,800]. Chambéry produces 71,000 yards of high-class gauze, 3000 yards of velvet, 13,000 yards of handkerchiefs, and some 800,000 yards of taffetas and various other silk stuffs. Linen manufactures employ 400 looms, woollen manufactures 1850 spindles. The peasants manufacture about 125,000 yards of coarse woollen stuffs from their home-grown wool. The blast-furnaces and iron-works produced in 1881 176 tons of manufactured iron. Tanneries, paper-mills, paper-pulp factories, brick-works, saw-mills, flour-mills, etc., are all of some importance in the department, which counts altogether sixty-one establishments with steam-engines of (aggregate) 271 horse power. The number of inhabitants engaged in

industrial pursuits is 24,482, in commeree 14,016. Coal, skins, cotton, provisions are imported; eattle, eheese, butter, wool, stones, and various building materials, mineral waters, silk stuffs, tanned leather, and paper are exported. There are 204 miles of national roads, 2518 miles of other roads, and 150 miles of railroad. The population was 266,438 in 1881. The department forms the three dioceses of Chambéry (archbishopric), Moutiers, and St. Jean-de-Maurienne; the court of appeal and university academy are at Chambéry, and the headquarters of the corps d'armée to which it belongs (the 14th) are at Grenoble. There are four arrondissements,—Chambéry (16,000 inhabitants in the town), Albertville (5000), Moutiers (2000), St. Jean-de-Maurienne (3000),—29 cantons, and 328 communes. Aix-les-Bains (4741), owing to its hot springs, is the most important place in the department.

SAVOIE, Haute-, a frontier department of France, formed in 1860 from the old provinces of Genevois, Chablais, and Faucigny, which constituted the northern half of the duchy of Savoy in the kingdom of Sardinia. Situated between 45° 40′ and 46° 25′ N. lat. and between 5° 50′ and 7° 2′ E. long., it is bounded N. by the Lake of Geneva, E. by the Valais canton, S.E. by the Duchy of Aosta (Italy), S. and S.W. by the department of Savoie, W. by the department of Ain, from which it is separated by the Rhone, and N.W. by the canton of Geneva. Almost everywhere except in the last direction the boundaries are natural. The greater portion of the department is occupied by mountains usually under 8000 feet in height; but it includes Mont Blanc (15,781 feet), while the confluence of the Fier with the Rhone is only 950 feet above the sea. The streams are torrential, and they all join the Rhone either directly or by the Lake of Geneva or the Isère. Most important is the Arve which crosses the department from southeast to northwest from Mont Blanc to Geneva by Chamonix, Sallanches, and Bonneville, receiving from the right the Giffre and from the left the Borne. The Dranse falls into the Lake of Geneva between Evian and Thonon. Direct tributaries of the Rhone are the Usses and the Fier, the outflow of the Lake of Annecy. Passing Mégève, to the southwest of Chamonix, the Arly goes to the Isère. A remarkable variety of climate is produced by the differences of altitude and exposure; it is mildest on the banks of the Lake of Geneva. Annecy has a moderate temperature, lower than that of Paris; but some parts of the shores of the lake, well sheltered and having a good exposure, form health resorts even in winter. The rainfall on the Lake of Geneva hardly exceeds 24 inches; it is three times as heavy in the mountains.

Of the total area of 1,066,229 acres 345,959 acres are arable, 214,990 woodland, 132,206 uncultivated, 95,880 pasturage, 91,432 meadows, 21,252 vineyards. The live stock in 1880 comprised 9774 horses, 93,171 cows or heifers, 11,272 calves, 18,769 pigs, 25,331 goats, 33,000 sheep (wool-clip 41 tons), 21,525 hives (104 tons of honey, 38 of wax). Cheese is produced to the value of £220,000 [$1,069, 200], and butter to £132,000 [$641,520]. The harvest in 1883 included—wheat, 1,472,381 bushels; meslin, 196,510; rye, 190,503. For 1880 the returns were—barley, 136,043 bushels; buckwheat, 88,178; maize, 10,928; oats, 793,721; potatoes, 3,730,800; pulse, 42,507, chestnuts, 66,462; besides beetroot, hemp, flax, and colza. In 1883 the vintage was 3,221,834 gallons, the average for 1873–1882 being 3,199,570, and cider was produced to the amount of 757,922 gallons (average 742,808). Tobacco is successfully grown in a part of the department (Rumilly). Though much of the wood has been cut down, Haute-Savoie still contains fine pine forests below 7200 feet of altitude, and fir, larch, and beech woods below 5000 feet, the limit of the elm and ash being 4250, and that of the oak 4000. Splendid walnuts and chestnuts are to be found as high up as 2950 feet and hazels as high as 3600. Argentiferous lead ores and copper, iron, and manganese ores exist, but are not much worked. About 1000 tons of anthracite and lignite were raised in 1882, and 12,405 tons of asphaltic limestone. Jasper and other beautiful marble, freestone largely used in the buildings of Lyons and Chambéry, limestone, and slates are all quarried. Mineral waters of various kinds abound (Amphion and Evian, chalybeate; St. Gervais at the foot of Mont Blanc, hot, sulphurous, and chalybeate; Menthon, sulphurous; La Caille, hot, sulphurous). Cotton manufacture is carried on at Annecy, where one establishment has 20,000 spindles, 600 power-looms, and 100 hand-looms, employing 500 workers. Some 500,000 or 600,000 yards of silk stuffs are woven throughout the department by some 850 workers; and wool-spinning and wool manufactures are also carried on. In the iron industry 1921 tons of cast-iron and 1956 tons of malleable iron were manufactured in 1882. Clock-making, taught in two special schools, employs 2000 hands. Tanneries, paper-mills, tile-works, and flour-mills are numerous. About two-thirds of the cantons have the advantage of belonging to the neutral customs zone—that is, have the right of introducing foreign goods duty free, with the exception of powder and tobacco. Coal, cotton, metals, and provisions are imported; cheese, cattle, timber, leather, asphalt, building stone, and calico are exported. The national roads make a total of 193 miles, other roads 3100 miles, and the railways—Annecy to Aix-les-Bains and to Annemasse, on the line from Bellegarde to Evian—96 miles. With its 274,087 inhabitants (1881), who all speak French and are almost exclusively Roman Catholics, Haute-Savoie is only about one-tenth below the average density of France. It forms the diocese of Annecy; the court of appeal and the university academy are at Chambéry, and the department is included in the 14th corps d'armée district (Grenoble). There are 4 arrondissements—Annecy (population of town 11,000), Bonneville (2270), St. Julien (1500), and Thonon (5440),—28 cantons, and 314 communes.

SAVONA, a city of Italy, in the province of Genoa, 25½ miles west of that town, and 91 miles south of Turin by rail, is after Genoa and Nice the most important of the cities of the Riviera. The greater part of the town is now modern, consisting of handsome gardens, boulevards, and well-paved broad streets lined with massive arcades and substantial houses, built in enormous square blocks from four to five stories high. It is surrounded with green-clad hills and luxuriant orange groves. On the Rock of St. George stands the castle built by the Genoese in 1542, now used as a military prison. The cathedral (1589–1604) is a late Renaissance building with a dome of modern construction. In the Cappella Sistina stands the magnificent tomb erected by Sixtus IV. to his parents. Facing the cathedral is the Della Rovere palace erected by Cardinal Giulio della Rovere (Julius II.) as a kind of university, and now occupied by the prefecture, the post-office, and the courts. San Domenico (or Giovanni Battista) built by the Dominicans, occupies the site of the very ancient church of Sant' Antonio Abate. Several of the churches have paintings of some merit, and there is a municipal picture-gallery occupying part of the extensive buildings of the civil hospital of St. Paul. The Teatro Chiabrera, erected in 1853 in honor of the lyric poet Chiabrera, who was born in Savona, and is buried there in the church of San Giacomo, has its façade adorned with statues of Alfieri, Goldoni, Metastasio, and Rossini. The town-house (with the public library founded by the bishop of Savona, Maria di Mari, in 1840), the episcopal palace, and the harbor tower surmounted by a colossal figure of the Virgin also deserve mention. As early as the 12th century, the Savonese built themselves a sufficient harbor; but in the 16th century their rivals the Genoese, fearing that Francis I. of France intended to make it a great seat of Mediterranean trade, rendered it useless by sinking at its mouth vessels filled with large stones. The modern harbor, dating from 1815, has since 1880 been provided with a dock excavated in the rock, 986 feet long 460 wide and 23 feet deep; and other extensions are in progress. In 1884 1012 vessels (349,462 tons) entered and 988 (346,337 tons) cleared—the steamers being respectively 298 (273,237 tons) and 294 (270,953). The opening of the railway to Bra (1878) at once gave Savona an advantage over Genoa as a port for supplying Turin and Piedmont. A large import trade has since grown up, especially in coals (300,000 tons from Great Britain and France), which can be loaded directly from the ship into the trucks. The exports are confined to the products of the local industries, fruit, hoop-staves, etc. The potteries which have been long established at Savona export their earthenware to all parts of Italy; and their are glass-

works, soap-works, and one of the largest iron-foundries in North Italy. Shipbuilding is also carried on. The population of the commune, which includes the suburbs of Fornaci, Lavagnola, Legino and Zinola, and San Bernardo, was 19,611 in 1861 and 29,614 in 1881, that of the city at the latter date being 19,120.

Savona is the *Savo* where, according to Livy, Mago stored his booty in the Second Punic War. In 1191 it bought up the territorial claims of the Marquises Del Carretto. Its whole history is that of a long struggle against the preponderance of Genoa. In 1746 it was captured by the king of Sardinia, but it was restored to Genoa by the treaty of Aix-la-Chapelle. Columbus, whose ancestors came from Savona, gave the name of the city to one of the first islands he discovered in the West Indies.

SAVONAROLA, Girolamo (1452–1498). The roll of Italian great men contains few grander names than that of Savonarola, and the career of this patriot-priest, reformer, and statesman is one of the strangest pages of Italy's history. Amid the splendid corruptions of the Italian Renaissance he was the representative of pure Christianity, the founder and ruler of an ideal Christian republic, and, when vanquished by the power of Rome, suffered martyrdom for the cause to which his life had been dedicated. His doctrines have been the theme of interminable controversies and contradictory judgments. He has been alternately declared a fanatic bent on the revival of mediæval barbarism and an enlightened precursor of the Reformation, a true Catholic prophet and martyr and a shameless impostor and heretic. It is enough to say here that his best biographers and critics give satisfactory proofs that he was chiefly a reformer of morals, who, while boldly denouncing Papal corruptions, preserved an entire belief in all the dogmas of the Roman Catholic Church.

Girolamo Savonarola was born at Ferrara 21st September, 1452, the third child of Michele Savonarola and his wife Elena Bonaccossi of Mantua. His grandfather, Michele Savonarola, a Paduan physician of much repute and learning, had settled in Ferrara at the invitation of the reigning marquis, Nicholas III. of Este, and gained a large fortune there. The younger Michele was a mere courtier and spendthrift, but Elena Savonarola seems to have been a woman of superior stamp. She was tenderly loved by her famous son, and his letters prove that she retained his fullest confidence through all the vicissitudes of his career.

Girolamo was a grave precocious child, with an early passion for learning. He was guided in his first studies by his wise old grandfather the physician; and, in the hope of restoring their fallen fortunes, his parents intended him for the same profession. Even as a boy he had intense pleasure in reading St. Thomas Aquinas and the Arab commentators of Aristotle, was skilled in the subtleties of the schools, wrote verses, studied music and design, and, avoiding society, loved solitary rambles on the banks of the Po. Grass-grown Ferrara was then a gay and bustling town of 100,000 inhabitants, its prince Borso d'Este a most magnificent potentate. To the mystic young student all festivities were repulsive, and although reared in a courtier-household he early asserted his individuality by his contempt for the pomp and glitter of court life. At the age of nineteen, however, he had as yet no thought of renouncing the world, for he was then passionately in love with the child of a friendly neighbor, a Strozzi exiled from Florence. His suit was repulsed with disdain; no Strozzi, he was told, might stoop to wed a Savonarola. This blow probably decided his career, but he endured two years of misery and mental conflict before resolving to abandon his medical studies and devote himself to God's service. He was full of doubt and self-distrust; disgust for the world did not seem to him a sufficient qualification for the religious life, and his daily prayer was, "Lord! teach me the way my soul should walk." But in 1474 his doubts were dispelled by a sermon heard at Faenza, and his way was clear. Dreading the pain of bidding farewell to his dear ones, he secretly stole away to Bologna, entered the monastery of St. Domenico and then acquainted his father with his reasons for the step. The world's wickedness was intolerable, he wrote; throughout Italy he beheld vice triumphant, virtue despised. Among the papers he had left behind at Ferrara was a treatise on "Contempt of the World," inveighing against the prevalent corruption and predicting the speedy vengeance of Heaven. His novitiate was marked by a fervor of humility. He sought the most menial offices, and did penance for his sins by the severest austerities. According to contemporary writers he was worn to a shadow.

All portraits of this extraordinary man are at first sight almost repulsively ugly, but written descriptions tell us that his gaunt features were beautified by an expression of singular force and benevolence. Luminous dark eyes sparkled and flamed beneath his thick, black brows, and his large mouth and prominent nether lip were as capable of gentle sweetness as of power and set resolve. He was of middling stature, dark complexion, had a nervous system of exceeding delicacy and the sanguineo-bilious temperament so often associated with genius. His manners were simple, his speech unadorned and almost homely. His splendid oratorical power was as yet unrevealed; but his intellectual gifts being at once recognized his superiors charged him with the instruction of the novices, instead of the humbler tasks he had wished to fulfil. He passed six quiet years in the convent, but his poems written during that period are expressive of burning indignation against the increasing corruptions of the church and profoundest sorrow for the calamities of his country.

In 1482 he reluctantly accepted a mission to Ferrara, and, regarding earthly affections as snares of the evil one, tried to keep aloof from his family. His preachings attracted slight attention there, no one—as he later remarked—being a prophet in his own land. An outbreak of hostilities between Ferrara and Venice, fomented by Pope Sixtus IV., soon caused his recall to Bologna. Thence he was despatched to St. Mark's in Florence, the scene of his future triumph and downfall.

Lorenzo the Magnificent was then (1482) at the height of his power and popularity, and the Florentines, dazzled by his splendor and devoted to pleasure and luxury, were docile subjects to his rule. At first Savonarola was enchanted with Florence. Fresh from the gloom of Bologna, sickened by the evils wrought on Italy by the scandalous nepotism of the pope, and oppressed by some natural human anxiety as to his reception in a strange city, the gayety and charm of his novel surroundings lifted a weight from his soul. His cloister, sanctified by memories of St. Antonine and adorned with the inspired paintings of Frà Angelico, seemed to him a fore-court of heaven. But his content speedily changed to horror. The Florence streets rang with Lorenzo's ribald songs (the "canti carnascialeschi)"; the smooth, cultured citizens were dead to all sense of religion or morality; and the spirit of the fashionable heathen philosophy had even infected the brotherhood of St. Mark. In 1483 Savonarola was Lenten preacher in the church of St. Lorenzo, but his plain, earnest exhortations attracted few hearers, while all the world thronged to Santo Spirito to enjoy the elegant rhetoric of Frà Mariano da Genazzano. Discouraged by this failure in the pulpit, Savonarola now devoted himself to teaching in the convent, but his zeal for the salvation of the apathetic townsfolk was soon to stir him to fresh efforts. Convinced of being divinely inspired, he had begun to see visions, and discovered in the Apocalypse symbols of the heavenly vengeance about to overtake this sin-laden people. In a hymn to the Saviour composed at this time he gave vent to his prophetic dismay. The papal chair was now filled by Innocent VIII., whose rule

was even more infamous than that of his predecessor Sixtus IV.

Savonarola's first success as a preacher was gained at St. Gemignano (1484–85), but it was only at Brescia in the following year that his power as an orator was fully revealed. In a sermon on the Apocalypse he shook men's souls by his terrible threats of the wrath to come, and drew tears from their eyes by the tender pathos of his assurances of divine mercy. A Brescian friar relates that a halo of light was seen to flash round his head and the citizens remembered his awful prophecies when in 1512 their town was put to the sack by Gaston de Foix.

Soon, at a Dominican council at Reggio, Savonarola had occasion to display his theological learning and subtlety. The famous Pico della Mirandola was particularly impressed by the friar's attainments, and is said to have urged Lorenzo de' Medici to recall him from Lombardy. When Savonarola returned to Florence in 1490, his fame as an orator had gone there before him. The cloister garden was too small for the crowds attending his lectures, and on the 1st August, 1490, he gave his first sermon in the church of St. Mark. To quote his own words, it was "a terrible sermon," and legend adds that he foretold he should preach for eight years.

And now, for the better setting forth of his doctrines, to silence pedants, and confute malignant misinterpretation, he published a collection of his writings. These proved his knowledge of the ancient philosophy he so fiercely condemned, and showed that no ignorance of the fathers caused him to seek inspiration from the Bible alone. *The Triumph of the Cross* is his principal work, but everything he wrote was animated by the ardent spirit of piety evidenced in his life. Savonarola's sole aim was to bring mankind nearer to God.

In 1491 he was invited to preach in the cathedral, Sta Maria del Fiore, and his rule over Florence may be said to begin from that date. The anger and uneasiness of Lorenzo de' Medici gave testimony to his power. Five of the leading men of Florence were sent to urge him to moderate his tone, and in his own interest and that of his convent to show more respect to the head of the state. But Savonarola rejected their advice. "Tell your master," he said in conclusion, "that, albeit I am a humble stranger, and he the Lord of Florence, yet I shall remain and he depart." Afterwards, in the presence of many witnesses, he foretold that stupendous changes impended over Italy, —that Lorenzo, the pope, and the king of Naples were all near unto death.

In the July of the same year he was elected prior of St. Mark's. As the convent had been rebuilt by Cosimo, and enriched by the bounty of the Medici, it was considered the duty of the new superior to present his homage to Lorenzo. Savonarola, however, refused to conform to the usage. His election was due to God, not Lorenzo; to God alone would he promise submission. Upon this the sovereign angrily exclaimed: "This stranger comes to dwell in my house, yet will not stoop to pay me a visit." Nevertheless, disdaining to recognize the enmity of a mere monk, he tried various conciliatory measures. All were rejected by the unbending prior, who even refused to let his convent profit by Lorenzo's donations. The Magnifico then sought to undermine his popularity, and Frà Mariano was employed to attack him from the pulpit. But the preacher's scandalous accusations missed their mark and disgusted his hearers without hurting his rival. Savonarola took up the challenge; his eloquence prevailed, and Frà Mariano was silenced. But the latter, while feigning indifference, was thenceforth his rancorous and determined foe.

In April, 1492, Lorenzo de' Medici was on his deathbed at Careggi. Oppressed by the weight of his crimes, he needed some assurance of divine forgiveness from trustier lips than those of obsequious courtiers, and summoned the unyielding prior to shrive his soul. Savonarola reluctantly came, and, after hearing the agitated confession of the dying prince, offered absolution upon three conditions. Lorenzo asked in what they consisted. First, "You must repent and feel true faith in God's mercy." Lorenzo assented. Secondly, "You must give up your ill-gotten wealth." This too Lorenzo promised, after some hesitation; but upon hearing the third clause, "You must restore the liberties of Florence," Lorenzo turned his face to the wall and made no reply. Savonarola waited a few moments and then went away. And shortly after his penitent died unabsolved.

Savonarola's influence now rapidly increased. Many adherents of the late prince came over to his side, disgusted by the violence and incompetency of Piero de' Medici's rule. All state affairs were mismanaged, and Florence was fast losing the power and prestige acquired under Lorenzo. The same year witnessed the fulfilment of Savonarola's second prediction in the death of Innocent VIII. (July, 1492); men's minds were full of anxiety, and the scandalous election of Cardinal Borgia to the papal chair heralded the climax of Italy's woes. The friar's utterances became more and more fervent and impassioned. Patriotic solicitude combined with close study of Biblical prophecies had stirred him to a pious frenzy, in which he saw visions and believed himself the recipient of divine revelations. It was during the delivery of one of his forcible Advent sermons that he beheld the celebrated vision, recorded in contemporary medals and engravings, that is almost a symbol of his doctrines. A hand appeared to him bearing a flaming sword inscribed with the words: "Gladius Domini supra terram cito et velociter." He heard supernatural voices proclaiming mercy to the faithful, vengeance on the guilty, and mighty cries that the wrath of God was at hand. Then the sword bent towards the earth, the sky darkened, thunder pealed, lightning flashed, and the whole world was wasted by famine, bloodshed, and pestilence. It was probably the noise of these sermons that caused the friar's temporary removal from Florence at the instance of Piero de' Medici. He was presently addressing enthusiastic congregations at Prato and Bologna. In the latter city his courage in rebuking the wife of Bentivoglio, the reigning lord, for interrupting divine service by her noisy entrance nearly cost him his life. Assassins were sent to kill him in his cell; but awed, it is said, by Savonarola's words and demeanor they fled dismayed from his presence. At the close of his last sermon the undaunted friar publicly announced the day and hour of his departure from Bologna; and his lonely journey on foot over the Apennines was safely accomplished. He was rapturously welcomed by the community of St. Mark's, and at once proceeded to reëstablish the discipline of the order and to sweep away all abuses. For this purpose he obtained, after much difficulty, a papal brief emancipating the Dominicans of St. Mark from the rule of the Lombard vicars of that order. He thus became an independent authority, no longer at the command of distant superiors. Thoroughly reorganizing the convent, he relegated many of the brethren to a quieter retreat outside the city, only retaining in Florence those best fitted to aid in intellectual labor. To render the convent self-supporting, he opened schools for various branches of art, and promoted the study of Oriental languages. His efforts were completely successful; the brethren's enthusiasm was fired by their superior's example; religion and learning made equal progress; St. Mark's became the most popular monastery in Florence, and many citizens of noble birth flocked thither to take the vows.

Meanwhile Savonarola continued to denounce the abuses of the church and the guilt and corruption of mankind, and thundered forth predictions of heavenly wrath. The scourge of war was already at hand, for in 1494 the duke of Milan demanded the aid of

France, and King Charles VIII. brought an army across the Alps. Piero de' Medici, maddened with fear, and forgetting that hitherto Florence had been the firm friend of France, made alliance with the Neapolitan sovereign whose kingdom was claimed by Charles. Then, repenting this ill-judged step, he hurried in person to the French camp at Pietra Santa, and humbled himself before the king. And, not content with agreeing to all the latter's demands, he further promised large sums of money and the surrender of the strongholds of Pisa and Leghorn.

This news drove Florence to revolt, and the worst excesses were feared from the popular fury. But even at this crisis Savonarola's influence was all-powerful, and a bloodless revolution was effected. Piero Capponi's declaration that "it was time to put an end to this baby government" was the sole weapon needed to depose Piero de' Medici. The resuscitated republic instantly sent a fresh embassy to the French king, to arrange the terms of his reception in Florence. Savonarola was one of the envoys, Charles being known to entertain the greatest veneration for the friar who had so long predicted his coming and declared it to be divinely ordained. He was most respectfully received at the camp, but could obtain no definite pledges from the king, who was bent on first coming to Florence. During Savonarola's absence Piero de' Medici had reentered the city, found his power irretrievably lost, and been contemptuously but peaceably expelled. It is a proof of the high esteem in which Savonarola's convent was held that, although the headquarters of the victorious popular party, Piero's brother, Cardinal Medici, entrusted to its care a large share of the family treasures.

Returning full of hope from Pietra Santa, Savonarola might well have been dismayed by the distracted state of public affairs. There was no Government, and revolted Pisa was secretly favored by the monarch who was knocking at the gates of Florence. Nevertheless, with the aid of Capponi, he guided the bewildered city safely through these critical days. Charles entered Florence on the 17th November, 1494, and the citizens' fears evaporated in jests on the puny exterior of the "threatened scourge." But the exorbitance of his demands soon showed that he came as a foe. All was agitation; disturbances arose, and serious collision with the French troops seemed inevitable. The signory resolved to be rid of their dangerous guests; and, when Charles threatened to sound his trumpets unless the sums exacted were paid, Capponi tore up the treaty in his face and made the memorable reply: "Then we will ring our bells." The monarch was cowed, accepted moderate terms, and, yielding to Savonarola's remonstrances, left Florence on the 24th November.

The city was now free but in the utmost disorder, its commerce ruined, its treasury drained. After seventy years' subjection to the Medici it had forgotten the art of self-government, and felt the need of a strong guiding hand. So the citizens turned to the patriot monk whose words had freed them of King Charles, and Savonarola became the lawgiver of Florence. The first thing done at his instance was to relieve the starving populace within and without the walls; shops were opened to give work to the unemployed; all taxes, especially those weighing on the lower classes, were reduced; the strictest administration of justice was enforced, and all men were exhorted to place their trust in the Lord. And, after much debate as to the constitution of the new republic, Savonarola's influence carried the day in favor of Soderini's proposal of a universal or general government, with a great council on the Venetian plan, but modified to suit the needs of the city. The Florentines' love for their great preacher was enhanced by gratitude on this triumphant defence of their rights. The great council consisted of 3200 citizens of blameless reputation and over twenty-five years of age, a third of the number sitting for six months in turn in the hall of the Cinquecento expressly built for the purpose. There was also an upper council of eighty, which in conjunction with the signory decided all questions of too important and delicate a nature for discussion in the larger assembly. These institutions were approved by the people, and gave a fair promise of justice. Savonarola's programme of the new government was comprised in the following formula: (1) fear of God and purification of manners; (2) promotion of the public welfare in preference to private interests; (3) a general amnesty to political offenders; (4) a council on the Venetian model, but with no doge. At first the new machinery acted well; the public mind was tranquil, and the war with Pisa—not as yet of threatening proportions—was enough to occupy the Florentines and prevent internecine feuds.

Without holding any official post in the commonwealth he had created the prior of St. Mark's was the real head of the state, the dictator of Florence, and guarded the public weal with extraordinary political wisdom. At his instance the tyrannical system of arbitrary imposts and so-called voluntary loans was abolished, and replaced by a tax of ten per cent. (la decima) on all real property. The laws and edicts of this period read like paraphrases of Savonarola's sermons, and indeed his counsels were always given as addenda to the religious exhortations in which he denounced the sins of his country and the pollution of the church, and urged Florence to cast off iniquity and become a truly Christian city, a pattern not only to Rome but to the world at large. His eloquence was now at the flood. Day by day his impassioned words, filled with the spirit of the Old Testament, wrought upon the minds of the Florentines and strung them to a pitch of pious emotion never before—and never since—attained by them. Their fervor was too hot to be lasting, and Savonarola's uncompromising spirit roused the hatred of political adversaries as well as of the degraded court of Rome. Even now, when his authority was at its highest, when his fame filled the land, and the vast cathedral and its precincts lacked space for the crowds flocking to hear him, his enemies were secretly preparing his downfall.

Pleasure-loving Florence was completely changed. Abjuring pomps and vanities, its citizens observed the ascetic régime of the cloister; half the year was devoted to abstinence and few dared to eat meat on the fasts ordained by Savonarola. Hymns and lauds rang in the streets that had so recently echoed with Lorenzo's dissolute songs. Both sexes dressed with Puritan plainness; husbands and wives quitted their homes for convents; marriage became an awful and scarcely permitted rite; mothers suckled their own babes; and persons of all ranks—nobles, scholars, and artists—renounced the world to assume the Dominican robe. Still more wonderful was Savonarola's influence over children, and their response to his appeals is a proof of the magnetic power of his goodness and purity. He organized the boys of Florence in a species of sacred militia, an inner republic, with its own magistrates and officials charged with the enforcement of his rules for the holy life. It was with the aid of these youthful enthusiasts that Savonarola arranged the religious carnival of 1496, when the citizens gave their costliest possessions in alms to the poor, and tonsured monks, crowned with flowers, sang lauds and performed wild dances for the glory of God. In the same spirit, and to point the doctrine of renunciation of carnal gauds, he celebrated the carnival of 1497 by the famous "burning of the vanities" in the Piazza della Signoria. A Venetian merchant is known to have bid 22,000 gold florins [$55,880] for the doomed vanities, but the scandalized authorities not only rejected his offer but added his portrait to the pile. Nevertheless the artistic value of the objects consumed has been greatly exaggerated by some writers. There is no proof that any book or painting of real merit was sacrificed, and

Savonarola was neither a foe to art nor to learning. On the contrary, so great was his respect for both that, when there was a question of selling the Medici library to pay that family's debts, he saved the collection at the expense of the convent purse.

Meanwhile events were taking a turn hostile to the prior. Alexander VI. had long regretted the enfranchisement of St. Mark's from the rule of the Lombard Dominicans, and now, having seen a transcript of one of Savonarola's denunciations of his crimes, resolved to silence this daring preacher at any cost. Bribery was the first weapon employed, and a cardinal's hat was held out as a bait. But Savonarola indignantly spurned the offer, replying to it from the pulpit with the prophetic words: "No hat will I have but that of a martyr, reddened with my own blood."

So long as King Charles remained in Italy Alexander's concern for his own safety prevented all vigorous measures against the friar. But no Borgia ever forgot an enemy. He bided his time, and the transformation of skeptical Florence into an austerely Christian republic claiming the Saviour as its head only increased his resolve to crush the man who had wrought this marvel. The potent duke of Milan, Ludovico Sforza, and other foes were laboring for the same end, and already in July, 1495, a papal brief had courteously summoned Savonarola to Rome. In terms of equal courtesy the prior declined the invitation, nor did he obey a second, less softly worded, in September. Then came a third, threatening Florence with an interdict in case of renewed refusal. Savonarola disregarded the command, but suspending his sermons went to preach for a while in other Tuscan cities. But in Lent his celebrated sermons upon Amos were delivered in the duomo, and again he urged the necessity of reforming the church, striving by ingenious arguments to reconcile rebellion against Alexander with unalterable fidelity to the Holy See. All Italy recognized that a mortal combat was going on between a humble friar and the head of the church. What would be the result? Savonarola's voice was arousing a storm that might shake even the power of Rome! Alive to the danger, the pope knew that his foe must be crushed, and the religious carnival of 1496 afforded a good pretext for stronger proceedings against him. The threatened anathema was, for some reason, deferred, but a brief uniting St. Mark's to a new Tuscan branch of the Dominicans now deprived Savonarola of his independent power. However, in the beginning of 1497 the Piagnoni were again in office, with the prior's stanch friend, Francesco Valori, at their head. In March the aspect of affairs changed. The Arrabbiati and the Medicean faction merged political differences in their common hatred to Savonarola. Piero de' Medici's fresh attempt to reënter Florence failed; nevertheless his followers continued their intrigues, and party spirit increased in virulence. The citizens were growing weary of the monastic austerities imposed on them, and Alexander foresaw that his revenge was at hand.

A signory openly hostile to Savonarola took office in May, and on Ascension Day his enemies ventured on active insult. His pulpit in the duomo was defiled, an ass's skin spread over the cushion, and sharp nails fixed in the board on which he would strike his hand. The outrage was discovered and remedied before the service began; and, although the Arrabbiati half filled the church and even sought to attempt his life, Savonarola kept his composure and delivered a most impressive sermon. But the incident proved the bitterness and energy of his foes, and the signory, in feigned anxiety for the public peace, besought him to suspend his discourses. Shortly afterwards the threatened bull of excommunication was launched against him, and Frà Mariano was in Rome stimulating the pope's wrath. Savonarola remained undaunted. The sentence was null and void, he said. His mission was divinely inspired; and Alexander, elected simoniacally and laden with crimes, was no true pope. Nevertheless the reading of the bull in the duomo with the appropriate, terrifying ceremonial made a deep impression on the Florentines. And now, the Arrabbiati signory putting no check on the Compagnacci, the city returned to the wanton license of Lorenzo's reign. But in July Savonarola's friends were again in power and did their best to have his excommunication removed. Meanwhile party strife was stilled by an outbreak of the plague. The prior of St. Mark's used the wisest precautions for the safety of his two hundred and fifty monks, sustained their courage by his own, and sent the younger men to a country retreat out of reach of contagion. During this time Rome was horror-struck by the mysterious murder of the young duke of Gandia, and the bereaved pope mourned his son with the wildest grief. Savonarola addressed to the pontiff a letter of condolence, boldly urging him to bow to the will of Heaven and repent while there was yet time.

The plague ended, Florence was plunged in fresh troubles from Medicean intrigues, and a conspiracy for the restoration of Piero was discovered. Among the five leading citizens concerned in the plot was Bernardo del Nero, a very aged man of lofty talents and position. The gonfalonier, Francesco Valori, used his strongest influence to obtain their condemnation, and all five were put to death. It is said that at least Bernardo del Nero would have been spared had Savonarola raised his voice, but, although refraining from any active part against the prisoners, the prior would not ask mercy for them. This silence proved fatal to his popularity with moderate men, gave new adherents to the Arrabbiati, and whetted the fury of the pope, Sforza, and all potentates well disposed to the Medici faction. He was now interdicted from preaching even in his own convent and again summoned to Rome. As before, the mandate was disobeyed. He refrained from public preaching, but held conferences in St. Mark's with large gatherings of his disciples, and defied the interdict on Christmas Day by publicly celebrating mass and heading a procession through the cloisters.

The year 1498, in which Savonarola was to die a martyr's death, opened amid seemingly favorable auspices. The Piagnoni were again at the head of the state, and by their request the prior resumed his sermons in the duomo, while his dearest disciple, Frà Domenico Buonvicini, filled the pulpit of St. Lorenzo. Scaffoldings had to be erected to accommodate Savonarola's congregation, and the Arrabbiati could only vent their spite by noisy riots on the piazza outside the cathedral. For the last time the carnival was again kept with strange religious festivities, and many valuable books and works of art were sacrificed in a second bonfire of "vanities." But menacing briefs poured in from Rome; the pope had read one of Savonarola's recent sermons on Exodus; the city itself was threatened with interdict, and the Florentine ambassador could barely obtain a short delay. Now too the Piagnoni quitted office; the new signory was less friendly, and the prior was persuaded by his adherents to retire to St. Mark's. There he continued to preach with unabated zeal; and, since the women of Florence deplored the loss of his teachings, one day in the week was set apart for them. The signory tried to conciliate the pope by relating the wonderful spiritual effects of their preacher's words, but Alexander was obdurate. The Florentines must either silence the man themselves, or send him to be judged by a Roman tribunal.

Undismayed by personal danger, Savonarola resolved to appeal to all Christendom against the unrighteous pontiff, and despatched letters to the rulers of Europe adjuring them to assemble a council to condemn this antipope. The council of Constance, and the deposition of John XXIII., were satisfactory precedents still remembered by the world. One of these letters being intercepted and sent to Rome by the duke of Milan (it is said) proved fatal to the friar. The papal

threats were now too urgent to be disregarded, and the cowed signory entreated Savonarola to put an end to his sermons. He reluctantly obeyed, and concluded his last discourse with the tenderest and most touching farewell. Perhaps he foresaw that he should never again address his flock from the pulpit.

The Government now hoped that Alexander would be appeased and Florence allowed to breathe freely. But although silenced the prophet was doomed, and the folly of his disciples precipitated his fate. A creature of the Arrabbiati, a Franciscan friar named Francesco di Puglia, challenged Savonarola to prove the truth of his doctrines by the ordeal of fire. At first the prior treated the provocation with merited contempt, but unfortunately his too zealous disciple Frà Domenico accepted the challenge. And, when the Franciscan declared that he would enter the fire with Savonarola alone, Frà Domenico protested his willingness to enter it with any one in defence of his master's cause. So, as Savonarola resolutely declined the trial, the Franciscan deputed a convert, one Giuliano dei Rondinelli, to go through the ordeal with Frà Domenico. There were long preliminary disputes. Savonarola, perceiving that a trap was being laid for him, discountenanced the "experiment" until overpersuaded by his disciple's prayers. Perhaps because it was a mere *reductio ad absurdum* of his dearest beliefs, he was strangely perplexed and vacillating with regard to it. With his firm conviction of the divinity of his mission he sometimes felt assured of the triumphant issue of the terrible ordeal. Alternately swayed by impassioned zeal and the promptings of reason, his calmer judgment was at last overborne by the fanaticism of his followers. Aided by the signory, which was playing into the hands of Rome, the Arrabbiati and Compagnacci passed the matter on, and the way was now clear for Savonarola's destruction.

On the 7th April, 1498, an immense throng gathered in the Piazza della Signoria to enjoy the barbarous sight. Two thick banks of combustibles forty yards long, with a narrow space between, had been erected in front of the palace, and five hundred soldiers kept a wide circle clear of the crowd. Some writers aver that the piles were charged with gunpowder. Not only the square but every window, balcony, or housetop commanding a glimpse of it was filled with eager spectators. The Dominicans from one side, the Franciscans from the other, marched in solemn procession to the Loggia dei Lanzi, which had been divided by a hoarding into two separate compartments. The Dominicans were led by Savonarola carrying the host, which he reverently deposited on an altar prepared in his portion of the loggia, and when Frà Domenico was seen to kneel before it the Piagnoni burst into a song of praise. The magistrates signalled to the two champions to advance. Frà Domenico stepped forward, but neither Rondinelli nor Frà Francesco appeared. The Franciscans began to urge fantastic objections. The Dominican's vestments might be bewitched, they said. Then, when he promptly changed them for a friar's robe, they pretended that his proximity to Savonarola had probably renewed the charm. He must remove the cross that he wore. He again complied,—was ready to fulfil every condition in order to enter the fire. But fresh obstacles were suggested by the Franciscans, and, when Savonarola insisted that his champion should bear the host, they cried out against the sacrilege of exposing the Redeemer's body to the flames. All was turmoil and confusion, the crowd frantic. And, though Rondinelli had not come, the signory sent angry messages to ask why the Dominicans delayed the trial. Meanwhile the Arrabbiati stirred the public discontent and threw all the blame on Savonarola. Some Compagnacci assaulted the loggia in order to kill him, but were driven back by Salviati's band. The foreign soldiery, fearing an attack on the palace, charged the excited mob, and the tumult was temporarily checked. It was now late in the day, and a storm shower gave the authorities a pretext for declaring that heaven was against the ordeal. The crafty Franciscans slipped away unobserved, but Savonarola raising the host attempted to lead his monks across the piazza in the same solemn order as before. On this the popular fury burst forth. Defrauded of their bloody diversion, the people were wild with rage. Frà Girolamo's power was suddenly at an end. These Florentines who had worshipped him as a saint turned on him with rabid hate. Neither he nor his brethren would have lived to reach St. Mark's but for the devoted help of Salviati and his men. They were pelted, stoned, and followed with the vilest execrations. Against the real culprits, the dastardly Franciscans, no anger was felt; the zealous prior, the prophet and lawgiver of Florence, was made the popular scapegoat. Notwithstanding the anguish that must have filled his heart, the fallen man preserved his dignity and calm. Mounting his own pulpit in St. Mark's, he quietly related the events of the day to the faithful assembled in the church, and then withdrew to his cell, while the mob on the square outside was clamoring for his blood.

The next morning, the signory having decreed the prior's banishment, Francesco Valori and other leading Piagnoni hurried to him to concert measures for his safety. Meanwhile the Government decided on his arrest, and no sooner was this made public than the populace rushed to the attack of the convent. The doors of St. Mark's were hastily secured, and Savonarola discovered that his adherents had secretly prepared arms and munitions and were ready to stand a siege. The signory sent to order all laymen to quit the cloister, and a special summons to Valori. After some hesitation the latter obeyed, hoping by his influence to rally all the Piagnoni to the rescue. But he was murdered in the street, and his palace sacked by the mob. The monks and their few remaining friends made a most desperate defence. In vain Savonarola besought them to lay down their arms. Frá Benedetto the painter and others fought like lions, while some hurled tiles on the assailants below. When the church was finally stormed, Savonarola was seen praying at the altar, and Frà Domenico, armed with an enormous candlestick, guarding him from the blows of the mob. Profiting by the smoke and confusion a few disciples dragged their beloved master to the inner library and urged him to escape by the window. He hesitated, seemed about to consent, when a cowardly monk, one Malatesta Sacramoro, cried out that the shepherd should lay down his life for his flock. Thereupon Savonarola turned, bade farewell to the brethren, and, accompanied by the faithful Domenico, quietly surrendered to his enemies. Later, betrayed by the same Malatesta, Frà Silvestro was also seized. Hustled, insulted, and injured by the ferocious crowd, the prisoners were conveyed to the Palazzo Vecchio, and Savonarola was lodged in the tower cell which had once harbored Cosimo de' Medici.

Now came an exultant brief from the pope. His well-beloved Florentines were true sons of the church, but must crown their good deeds by despatching the criminals to Rome. Sforza was equally rejoiced by the news, and the only potentate who could have perhaps saved Savonarola's life, Charles of France, had died on the day of the ordeal by fire. Thus another of the friar's prophecies was verified, and its fulfilment cost him his sole protector.

The result of the trial was a foregone conclusion. The signory refused to send their prisoners to Rome, but they did Rome's behests. Savonarola's judges were chosen from his bitterest foes. Day after day he was cruelly tortured, and in his agony, with a frame weakened by constant austerity and the mental strain of the past months, he made every admission demanded by his tormentors. But directly he was re-

leased from the rack he always withdrew the confessions uttered in the delirium of pain. And, these being too incoherent to serve for a legal report, a false account of the friar's avowals was drawn up and published instead of his real words.

Though physically unable to resist torture, Savonarola's clearness of mind returned whenever he was at peace in his cell. So long as writing materials were allowed him he employed himself in making a commentary on the Psalms, in which he restated all his doctrines. His doom was fixed, but some delay was caused by the pope's unwillingness to permit the execution in Florence. Alexander was frantically eager to see his enemy die in Rome. But the signory remained firm, insisting that the false prophet should suffer death before the Florentines whom he had so long led astray. The matter was finally compromised. A second mock trial was held by two apostolic commissioners specially appointed by the pope. One of the new judges was a Venetian general of the Dominicans, the other a Spaniard. Meanwhile the trial of Brothers Domenico and Silvestro was still in progress. The former remained nobly faithful to his master and himself. No extremity of torture could make him recant or extract a syllable to Savonarola's hurt; he steadfastly repeated his belief in the divinity of the prior's mission. Frà Silvestro on the contrary gave way at mere sight of the rack, and this seer of heavenly visions owned himself and master guilty of every crime laid to their charge.

The two commissioners soon ended their task. They had the pope's orders that Savonarola was to die "even were he a second John the Baptist." On three successive days they "examined" the prior with worse tortures than before. But he now resisted pain better, and, although more than once a promise to recant was extorted from him, he reasserted his innocence when unbound, crying out, "My God, I denied Thee for fear of pain!" On the evening of May 22 sentence of death was pronounced on him and his two disciples. Savonarola listened unmoved to the awful words, and then quietly resumed his interrupted devotions. Frà Domenico exulted in the thought of dying by his master's side; Frà Silvestro, on the contrary, raved with despair.

The only favor Savonarola craved before death was a short interview with his fellow victims. This, after long debate, the signory unwillingly granted, and meanwhile a monk was sent to shrive all the three. The memorable meeting took place in the hall of the Cinquecento. During their forty days of confinement and torture each one had been told that the others had recanted, and the false report of Savonarola's confession had been shown to the two monks. The three were now face to face for the first time. Frà Domenico's loyalty had never wavered, and the weak Silvestro's enthusiasm rekindled at sight of his chief. Savonarola prayed with the two men, gave them his blessing, and exhorted them by the memory of their Saviour's crucifixion to submit meekly to their fate. Midnight was long past when Savonarola was led back to his cell. Jacopo Niccolini, one of a religious fraternity dedicated to consoling the last hours of condemned men, remained with him. Spent with weakness and fatigue he asked leave to rest his head on his companion's lap, and quickly fell into a quiet sleep. As Niccolini tells us, the martyr's face became serene and smiling as a child's. On awaking he addressed kind words to the compassionate brother, and then prophesied that dire calamities would befall Florence during the reign of a pope named Clement. The carefully recorded prediction was verified by the siege of 1529.

The execution took place the next morning. A scaffold, connected by a wooden bridge with the magistrates' rostrum, had been erected on the spot where the piles of the ordeal had stood. At one end of the platform was a huge cross with fagots heaped at its base. As the prisoners, clad in penitential haircloth, were led across the bridge, wanton boys thrust sharp sticks between the planks to wound their feet. First came the ceremonial of degradation. Sacerdotal robes were thrown over the victims, and then roughly stripped off by two Dominicans, the bishop of Vasona and the prior of Sta Maria Novella. To the bishop's formula, "I separate thee from the church militant and the church triumphant," Savonarola replied in firm tones, "Not from the church triumphant; that is beyond thy power." By a refinement of cruelty Savonarola was the last to suffer. His disciples' bodies already dangled from the arms of the cross before he was hung on the centre beam. Then the pile was fired. For a moment the wind blew the flames aside, leaving the corpses untouched. "A miracle," cried the weeping Piagnoni; but then the fire leapt up and ferocious yells of triumph rang from the mob. At dusk the martyrs' remains were collected in a cart and thrown into the Arno.

Savonarola's party was apparently annihilated by his death, but, when in 1529–30 Florence was exposed to the horrors predicted by him, the most heroic defenders of his beloved if ungrateful city were Piagnoni who ruled their lives by his precepts and revered his memory as that of a saint.

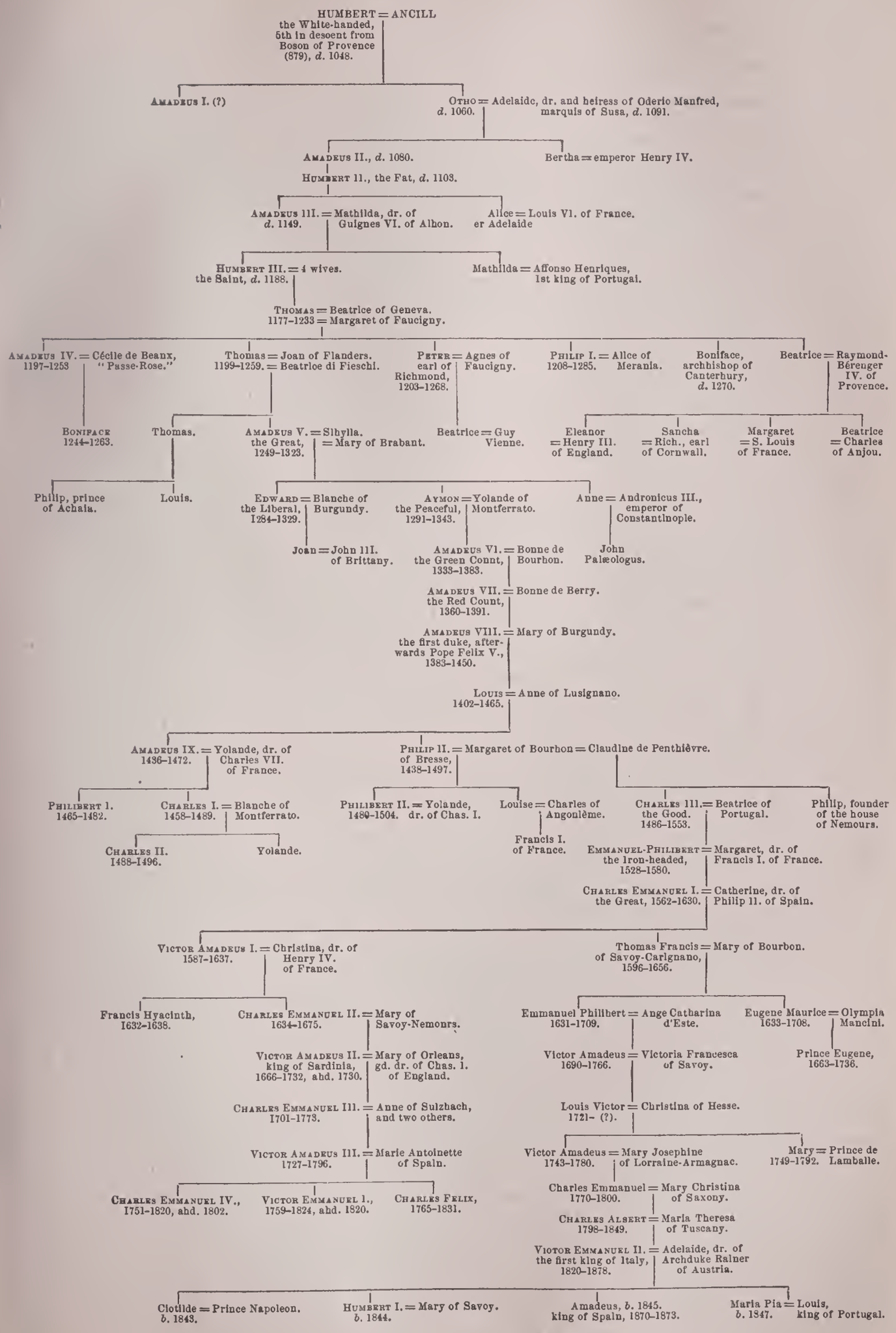
Savonarola's writings may be classed in three categories: (1) numerous sermons, collected mainly by Lorenzo Violi, one of his most enthusiastic hearers; (2) an immense number of devotional and moral essays and some theological works, of which *Il Trionfo della Croce* is the chief; (3) a few short poems and a political treatise on the government of Florence. Although his faith in the dogmas of the Roman Catholic Church never swerved, his strenuous protest against papal corruptions, his reliance on the Bible as his surest guide, and his intense moral earnestness undoubtedly connect Savonarola with the movement that heralded the Reformation.

See Rudelbach, *Hieronymus Savonarola und seine Zeit, aus den Quellen dargestellt* (1835); Karl Meier, *Girolamo Savonarola, aus grossentheils handschriftlichen Quellen dargestellt* (1836), Padre Vincenzo Marchese, *Storia di S. Marco di Firenze* (1855); F. T. Perrens, *Jérôme Savonarola, sa vie, ses prédications, ses écrits* (1853); R. R. Madden, *The Life and Martyrdom of Girolamo Savonarola, etc.* (1854); Bartolommeo Aquarone, *Vita di Frà Geronimo Savonarola* (1857); Pasquale Villari, *La Storia di Girolamo Savonarola e dè suoi tempi* (1882). (L. V.)

SAVOY. The history of the house of Savoy shows in a striking manner how the destinies of a nation may depend on the fortunes of a princely family. During eight centuries, and through all changes of fortune, the princes of Savoy have kept one end steadily in view, and, in the words of Charles Emmanuel III., have "treated Italy as an artichoke to be eaten leaf by leaf." The ambitions of princes and the interests of the people have fortunately tended in the same direction, and their work is now perfected in the glory of their house and the freedom of the state.

The descent of HUMBERT the Whitehanded, the founder of the family, is uncertain, but he was most probably a son of Amadeus, the great-grandson of that Boso of Provence (879) who was father of the emperor Louis the Blind. In reward for services rendered to Rudolph III. of Arles, Humbert obtained from him in 1027 the counties of Savoy and Maurienne, and from the emperor Conrad the Salic Chablais and the Lower Valais. His territories, therefore, all lay on the northwestern slopes of the Alps. On his death in 1048 he was succeeded perhaps by his eldest son AMADEUS I., but eventually by his fourth son OTHO, who, by his marriage with Adelaide, sole heiress of the marquis of Susa, obtained the counties of Turin and the Val d'Aosta, and so acquired a footing in the valley of the Po. His wife's rank, too, as marchioness made the family guardians of the frontier by authority of the king of Italy, as they had been before by possession of territory, and was the foundation of their subsequent power as "warders" of the Alps. Otho was succeeded in 1060 by his son AMADEUS II., who maintained a judicious neutrality between his brother-in-law the emperor Henry IV. and the pope. In reward for his mediation between them he obtained from the

Genealogical Table of the House of Savoy.



former after Canossa the province of Bugey. The accession of his son HUMBERT II. 1080 brought fresh increase of territory in the valley of the Tarantaise, and in 1091 this prince succeeded to the dignities of his grandmother Adelaide, when he assumed the title of prince of Piedmont. AMADEUS III. came to the throne in 1103, and in 1111 his states were created counties of the empire by Henry V. On his way home from the crusades in 1149 Amadeus died at Nicosia, and was succeeded by his son HUMBERT III. This prince did not follow the example of Amadeus II., but took the part of the pope against Barbarossa, who accordingly ravaged his territories until Humbert's death in 1188. The guardians of his son THOMAS acted more discreetly, and reconciled their ward and the emperor. He remained Ghibelline all his life, and received from Henry VI. accessions of territory in Vaud, Bugey, and Valais, with the title of imperial vicar in Piedmont and Lombardy. He was followed in 1233 by AMADEUS IV., whose wife was the beautiful Cecilia of Beaux, surnamed Passe Rose. A campaign against the inhabitants of Valais ended in the annexation of their district, and his support of Frederick II. against the pope caused the erection of Chablais and Aosta into a duchy. In 1253 his son BONIFACE succeeded to his states at the age of nine, but, after giving proofs of his valor by defeating the troops of Charles of Anjou before Turin, he was taken prisoner and died of grief (1263).

The Salic law now came into operation for the first time, and PETER, the uncle of Boniface, was called to the throne. This prince, on the marriage of his nieces Eleanor and Sancha of Provence with Henry III. of England and Richard, earl of Cornwall, had visited England, where he had been created earl of Richmond, and built a palace in London afterwards called Savoy House. His brothers Boniface and William were also appointed, the former to the see of Canterbury, and the latter to the presidency of the council. In return he recognized the claims of Richard to the imperial throne, and received from him Kyburg in the diocese of Lausanne, conveniently near to the county of Geneva, which had been willed to him by the last count. But this increase of territory only brought new anxieties, for Peter's short reign was occupied in reducing refractory vassals to obedience. At his death in 1268 he was succeeded by his brother PHILIP I., who died in 1285, when their nephew AMADEUS V. came to the throne. This prince, surnamed the Great united Baugé and Bresse to his states in right of his wife Sibylla, and later on Lower Faucigny and part of Geneva. For his second wife he married Mary of Brabant, sister of the emperor Henry VII., from whom, in reward for his services in North Italy, he received the seignenry of Aosta. His life was passed in continual and victorious warfare, and one of his last exploits was to force the Turks to raise the siege of Rhodes. In commemoration of his victory it is said that he substituted for the eagles in his arms the letters F.E.R.T. (*Fortitudo ejus Rhodum tenuit*). He died in 1323 while making preparations for a campaign in aid of his nephew, the emperor of the East. His son EDWARD succeeded him, and, dying in 1329, was followed by his brother AYMON. This prince died in 1343, when his son AMADEUS VI. ascended the throne. His reign was, like his grandfather's, a series of petty wars from which he came out victorious and with extended territory, until, accompanying Louis of Anjou on his expedition against Naples, he died there of the plague (1383). The reign of his son AMADEUS VII. promised to be as glorious as those of his ancestors, but it was cut short by a fall from his horse in 1391. Before his death, however, he had received the allegiance of Barcelonnette, Ventimiglia, Villafranca, and Nice, so gaining access to the Mediterranean.

His son AMADEUS VIII. now came to the throne, under the guardianship of his grandmother Bonne de Bourbon. On attaining his majority he first directed his efforts to strengthening his power in the outlying provinces, and in this he was particularly successful. The states of Savoy now extended from the Lake of Geneva to the Mediterranean, and from the Saône to the Sesia. Its prince had therefore considerable power, and Amadeus threw all the weight of this on the side of the emperor. Sigismond was not ungrateful, and in 1416 erected the counties of Savoy and Piedmont into duchies. At this time too the duke recovered the fief of Piedmont, which had been granted to Philip, prince of Achaia, by Amadeus V., and his power was thus thoroughly consolidated. The county of Vercelli afterwards rewarded him for joining the league against the duke of Milan, but in 1434 a plot against his life made him put into execution a plan he had long formed of retiring to a monastery. He accordingly made his son Louis lieutenant-general of the dukedom, and assumed the habit of the knights of S. Maurice, a military order he had founded at the priory of Ripaille. But he was not destined to find the repose he sought. The prelates assembled at the council of Basel voted the deposition of Pope Eugenius IV., and elected Amadeus in his place. Felix V., as he was now called, then abdicated his dukedom definitively, but without much gain in temporal honors, for the schism continued until the death of Eugenius in 1447, shortly after which it was healed by the honorable submission of Felix to Nicholas V. The early years of LOUIS'S reign were under the guidance of his father, and peace and prosperity blessed his people; but he afterwards made an alliance with the dauphin which brought him into conflict with Charles VII. of France, though a lasting reconciliation was soon effected. His son AMADEUS IX. succeeded in 1465, but, though his virtues led to his beatification, his bodily sufferings made him assign the regency to his wife Yolande, a daughter of Charles VII. He died in 1472, when his son PHILIBERT I. succeeded to the throne and to his share in the contests of Yolande with her brother and brothers-in-law, who tried to deprive their nephew of his rights. His reign lasted only ten years, when he was succeeded by his brother CHARLES I. This prince raised for a time by his valor the drooping fortunes of his house, but he died in 1489 at the age of thirty-one, having inherited from his aunt, Charlotte of Lusignano, her pretensions to the titular kingdoms of Cyprus, Jerusalem, and Armenia. He was succeeded by his son CHARLES II., an infant, who, dying in 1496, was followed by PHILIP II., brother of Amadeus IX. He died in 1497, leaving PHILIBERT II., who succeeded him, and CHARLES III., who ascended the throne on his brother's death in 1504. In spite of himself Charles was drawn into the wars of the period, for in the quarrel between Francis I. and the pope he could not avoid espousing the cause of his nephew. But the decisive victory of Francis at Marignano gave the duke the opportunity of negotiating the conference at Bologna which led to the conclusion of peace in 1516. So far well, but Charles was less fortunate in the part he took in the wars between Francis I. and Charles V., the brother-in-law of his wife. He tried to maintain a strict neutrality, but his attendence at the emperor's coronation at Bologna in 1530 was imperative in his double character of kinsman and vassal. The visit was fatal to him, for he was rewarded with the county of Asti, and this so displeased the French king that, on the revolt of Geneva to Protestantism in 1532, Francis sent help to the citizens. Bern and Freiburg did likewise, and so expelled the duke from Lausanne and Vaud. Charles now sided definitely with the emperor, and Francis at once raised some imaginary claims to his states. On their rejection the French army marched into Savoy, and, finding the pass of Susa unfortified, descended on Piedmont and seized Turin (1536). Charles V. came to the aid of his ally, and invested the city, but, being himself hard pressed, was obliged

to make peace. France kept Savoy, and the emperor occupied Piedmont, so that only Nice remained to the duke. On the resumption of hostilities in 1541 Piedmont again suffered. In 1544 the treaty of Crespy restored his states to Charles, but the terms were not carried out and he died of grief in 1553. His only surviving son EMMANUEL PHILIBERT succeeded to the rights but not the domains of his ancestors. Since 1536 he had attached himself to the service of the emperor, and had already given promise of a brilliant career. On the abdication of Charles V. the duke was appointed governor of the Low Countries, and in 1557 the victory of St. Quentin marked him as one of the first generals of his time. Such services could not go unrewarded, and the peace of Cateau-Cambresis restored him his states, with certain exception still to be held by France and Spain. One of the conditions of the treaty also provided for the marriage of the duke with the lovely and accomplished Margaret of France, sister of Henry II. The evacuation of the places held by them was faithfully carried out by the contracting powers, and Emmanuel Philibert occupied himself in strengthening his military and naval forces, until his death in 1580 prevented the execution of the ambitious designs he had conceived. His son CHARLES EMMANUEL I., called the Great, being prevented by Henry III. from retaking Geneva, threw in his lot with Spain, and in 1590 invaded Provence and was received by the citizens of Aix. His intention was doubtless to revive the ancient kingdom of Arles, but his plans were frustrated by the accession of Henry IV. to the throne of France. After effecting with Henry an exchange of Bresse and Bugey for the marquisate of Saluzzo he kept up an intermittent war with him until 1609, when, disgusted with the behavior of Spain, he made a treaty with France against Philip. But he could not remain faithful for long, and, siding first with one and then with the other, he found himself in almost the same straits as his grandfather, when death put an end to his ambitions and failures in 1630. The first care of his son VICTOR AMADEUS was to free himself from the double burden of his enemy and his ally, so he concluded peace in 1631. In 1635, however, Richelieu determined to drive the Spaniards out of Italy, and offered the duke the alternatives of war or Milan. He gave but a half-hearted assent to the schemes of France, and, without gaining Milan, died in 1637, leaving by his wife Christina of France, Francis Hyacinth, a minor, who only survived till the following year, and CHARLES EMMANUEL II., whose legitimacy was unfortunately rather doubtful. The regency of Christina resembled that of Yolande in the same need for guarding her son's interests against the pretensions of his uncles, Louis XIII. and the princes of Savoy. But fortune favored her, and on the duke's reaching his majority in 1648 the wars of the Fronde occupied all the attention of Mazarin. The brunt of the conflict with Spain consequently fell upon Savoy, and was borne not ingloriously until the conclusion of peace. Charles Emmanuel occupied the remaining part of his reign in repairing the ravages caused by twenty-four years of warfare, and died in 1675, leaving an only son, VICTOR AMADEUS II., whose minority was as peaceful as his father's had been the reverse. He married Mary of Orleans, the daughter of Henrietta of England, and consequently the legitimate heiress to the English crown on the death of Anne and on the exclusion of the Pretender. For a time he united with Louis XIV. in persecuting the Protestants, but the overbearing behavior of his ally made him join the coalition of Augsburg in 1690. His campaign against Louis was carried on with varying results until 1695, when he accepted proposals of peace. This defection led to the peace of Ryswick in 1697, and in reward he received from Louis the territories then occupied by France. In 1700 he sided with France against Austria, but, an extension of territory in the Milanese not being granted by Louis, he went over to the enemy in 1703. The generalship of his relative Prince Eugene proved too much for the French, and in 1706 they were defeated before Turin and driven across the frontier. The peace of Utrecht afterwards confirmed the duke in the possession of the places granted on his joining the coalition, including the long-coveted Montferrato, and endowed him besides with the crown of Sicily. Austrian influences now replaced Spanish in the peninsula, and Charles VI. persuaded him to exchange his kingdom for that of Sardinia. This was accordingly effected in 1720 by the treaty of Madrid, and afterwards proved the very salvation of the house of Savoy. In 1730 the king abdicated in favor of his son, in order to marry the countess of San Sebastian, at whose instigation he afterwards tried to regain the crown, but he died in 1732.

CHARLES EMMANUEL III. continued his father's intrigues to obtain possession of Milan, and joined the league of France and Spain against Austria in 1732. But he used the victories of the allied forces over the imperialists in such a half-hearted way that it seemed as if he did not wish to break finally with Austria. In the end he only gained from the treaty, which he signed in 1739, the Novarese and Tortona, instead of Milan. The death of Charles VI. in 1740 gave him the chance of expelling the Austrians from Italy, but, though he at first claimed Milan from Maria Theresa, he ended in 1742 by espousing her cause. The complete defeat of the French in 1747 led to the treaty of Aix-la-Chapelle, by which Charles Emmanuel received the Upper Novarese and Vigevano, after which he remained at peace until his death in 1773. His son VICTOR AMADEUS III. succeeded him, and devoted the early years of his reign to the improvement of the administration and the reorganization of his army. The time soon came for him to use the weapon he had created, and on the outbreak of the Revolution in France he headed the coalition of Italian princes against her. The house of Savoy thus assumed the headship of Italy, but for the time without much gain, for Napoleon's brilliant victories of 1796 ended in the peace of Paris, by which Savoy, along with Nice, was given to France. Victor Amadeus died shortly afterwards, and was succeeded by his son CHARLES EMMANUEL IV. The fever of the Revolution spread to Piedmont, and in 1798 nothing was left to the king but to retire to Sardinia. In 1802 he abdicated in favor of his brother, VICTOR EMMANUEL I., who, in his island kingdom, protected by the English fleet, became the symbol of the coalition against France. The king returned to Turin in 1814, and in the following year took possession again of Savoy. The anti-revolutionary measures which were adopted by the Italian princes on their return caused a spirit of rebellion to spring up among their subjects. The freedom of the individual and the unity of the nation thus came to be considered objects to be attained at one and the same time. The influence of Austria was paramount in the Peninsula, but an insurrection broke out at Turin in 1820 demanding war with her, and, rather than embroil himself both with his people and with Austria, Victor Emmanuel abdicated in favor of his brother, CHARLES FELIX. The general insurrection was suppressed, and for the next few years Italy suffered everything possible at the hands of various petty princes, whose fears and weakness left them no weapon but persecution. In 1831 Charles Felix died without issue, and in him the elder branch of the family ended. He was succeeded by CHARLES ALBERT, of the line of Savoy-Carignano, which was founded by Thomas Francis, son of Charles Emmanuel the Great, and grandfather of Prince Eugene. The first care of Charles Albert was to reorganize his military and naval forces in readiness for the conflict with Austria which he foresaw. At the same time he put down the conspiracies which would

have forced his hand, among which the most famous was that of Mazzini and Ramorino in 1834. The French revolution of 1848 fanned the embers of Italian patriotism, and Charles Albert, without any aid, began the War of Independence. Victory at first followed his arms, but he was defeated at last by the Austrians at Custozza. In the next year he was again driven into war with the Austrians, and, after his defeat at Novara, he abdicated in favor of his son, Victor Emmanuel II. From this point the history of the house of Savoy has been told in the article Italy (vol. xiii. pp. 499 *sq.*). (H. B. B.)

SAVOY. For the French departments of Savoy and Upper Savoy see Savoie and Savoie, Haute-.

SAW. See Saws.

SÁWANTWÁRI, or Sawuntwarrie, a native state forming the southern part of the Concan division of the Bombay presidency, India, and lying between 15° 37′ and 16° 16′ N. lat. and between 73° 36′ and 74° 21′ E. long. It has a total area of about 900 square miles, and is bounded on the north and west by Ratnagiri district, on the east by the Sahyádri Mountains, and on the south by the Portuguese territory of Goa. The general aspect of the country is strikingly picturesque. Its surface is broken and rugged, interspersed with densely-wooded hills; in the valleys are gardens and groves of cocoa-nut and betel-nut palms. Sáwantwári has no rivers of any considerable size; the chief streams are the Karli on the north and the Terekhol on the south, both navigable for small craft. The climate is humid and relaxing, with an average annual rainfall of over 130 inches. The forests and wooded slopes of the Sahyádris contain large numbers of wild animals, including the tiger, panther, leopard, bear, hyæna, etc. Snakes and other reptiles also abound. The state possesses no railway; but there is an excellent trunk road through the territory.

The census of 1881 returned the population of Sawantwári at 174,433 (males 86,061, females 88,372); Hindus numbered 166,080, Mohammedans 3970, and Christians 4213. Agriculture supports the greater part of the population. The staple product is rice, but excepting rice none but the coarsest grains and pulses are raised, both soil, which is stony, and climate being against the cultivation of wheat and other superior grains; oil seeds, hemp, and pepper are also grown. The gross revenue of the state in 1883–84 amounted to about £34,000 [$165,240]. Before the establishment of Portuguese power (1510) Sáwantwári was the highway of a great traffic; but during the 16th and 17th centuries trade suffered much from the rivalry of the Portuguese, and in the disturbances of the 18th century it almost entirely disappeared. Since the establishment of order under the British (1819), trade has considerably developed. The present chief being a minor, the administration has been in the hands of the British since 1869.

SAW-FISH. See Ray, vol. xx. p. 311–12.

SAW-FLIES (*Tenthredinidæ*). This subdivision of the *Hymenoptera* is characterized by possessing a sessile abdomen which hides the base of the posterior legs. The antennæ vary in their structure and in the number of their joints. The Ovipositor is modified to form two saws, which when at rest lie in a sheath formed of two valves. The larvæ resemble caterpillars, but may be distinguished by their greater number of legs; usually 9 to 11 pairs are present. When alarmed they have the habit of rolling themselves up in a spiral fashion; some also discharge a thin fluid from lateral pores situated above the spiracles. The females place their eggs in small incisions made by means of their saws in the soft parts of leaves. Usually one egg is placed in each slit. Some species merely attach their eggs in strings to the exterior of the leaves. With each incision a drop of fluid is usually excreted, which serves to excite a flow of sap to the wounded part. The egg is said to absorb this sap, and so to increase in size. One genus (*Nematus*) alone forms galls. These occur in the young leaves of the willow, a tree which the true gall-flies do not attack. *Nematus ventricosus* resembles the bees and wasps in the fact that the parthenogenetic ova produce only males; as a rule in the animal kingdom the absence of fertilization results in the production of females.

The injury which the saw-flies inflict upon crops or young trees is almost entirely brought about by the voracious habits of the larvæ. These possess well-developed mouth-appendages, by means of which they gnaw their way out of the leaf in which they have been

Turnip Saw-Fly (*Athalia spinarum*). Saw-Fly (magnified with lines to left showing natural size), caterpillars, pupa, and pupa-case.

hatched, and then eat it. In this way the Turnip Saw-Fly (*Athalia spinarum*), not to be confused with the Turnip Fly (*Phyllotreta nemorum*), attacks the leaves of the turnip, often completely consuming the leafage of acres at a time. The Pine Saw-Fly (*Lophyrus pini*) causes great damage to plantations of young Scotch firs, devouring the buds, the leaves, and even the bark of the young shoots. Other species infest currant and gooseberry bushes, consuming the soft parts of the leaves, and leaving only the tough veins. The only effectual remedy in most cases is to collect and kill the larvæ when they first appear. Syringing the affected parts with hot water or tobacco water is also recommended.

SAWS. Blades of steel with serrated edges have been used from time immemorial to rend or divide substances of various kinds, including metals and stone; but the principal modern use of the saw is to divide wood. Modern saws are of the finest steel, but the ancients used bronze saws, and among uncivilized nations saws have been made with flakes of flint imbedded in a wooden blade, and held in place by means of bitumen (see Grimshaw, *History, etc., of Saws*), while obsidian has been used by the Mexicans, and shark's teeth and even notched shells form the saws of certain savage islanders. The pyramid-builders in Egypt cut granite and other hard stones by means of bronze saws set with jewels (see vol. xx. p. 130.)

Space would fail to describe minutely the various adaptations of the saw to mechanical uses. It is indispensable to the carpenter, the furniture-manufacturer, the watchmaker, and manipulator of metals. It is one of the most trustworthy tools of the surgeon's case, while without it the dentist would of necessity drop back to the barbarous customs of a past century. Iron, horn, pearl, india-rubber, and the thousand and one conveniences of civilized life are dependent upon this useful instrument, which is but an exaggeration after all of the sharpest of knives, whose edge when examined under the microscope exhibits an array of saw teeth so minute as to present a smooth plane to the unassisted eye. As the chief use of the tool is to saw wood, the enormous timber industry of America has given an impetus to the improvement of the saw and its manufacture, which has no parallel elsewhere.

Saws may be classified as (1) straight (reciprocating in action), having a flat blade and straight edge, making a plane cut, or (2) circular or disk-like, cutting at right angles to the motion, or (3) cylindrical or barrel-shaped, with a convex edge cutting parallel to its axis, or (4) band-saws,

being a continuous ribbon or band running upon an upper and lower pulley, making a plane or curved cut, with a straight edge parallel to the axis of motion. The oldest and commonest, with the widest range of adaptability, is the straight saw, with reciprocating rectilinear blade. In this class is included the ordinary hand-saw with its varying range of uses from fine to coarse and from rip to cross-cut, and with teeth of forms as various as are the different duties which it is calculated to perform. The teeth are long or short, cutting one way or both ways according to the "pitch" or "set" which may be given, and which should be adapted to both the kind and character of the timber to be sawn. The "pitch" of a saw-tooth is the angle of the point with reference to the blade, and is found by subtracting the back angle from the front, 60° being the generic angle of saw-teeth, which, however, may be variously placed. From the smallest hand-saw to the largest "mill-saw" the same general rules apply. In the largest saws of this class may be named the "pit-saw," used in the earliest manufactures of lumber or timber, and worked by one person standing over the log and drawing upward while another in the pit below follows with the downward or cutting thrust. From the pit-saw we advance to the "gate-saw" used in the earlier adaptation of motive power to the cutting of timber, thence to the "muley-saw,"[1] suspended without strain upon a pitman beneath, having its upper end hung in slides pendent from a heavy beam above. These saws must of necessity be thick, to sustain the heavy thrusts which they are expected to endure, and are consequently of "heavy gauge," this being based upon the different sizes of wire, the largest gauge representing the thinner blade; *e.g.*, a 4-gange saw is much thicker than an 8-gauge, etc. From the necessity for more rapid production grew the "gang-saw," a modification of the gate, differing from it only in length and thickness (less than one-third the thickness of the ordinary gate-saw and but about two-thirds its length). A large number of these varying from 2 to 40, are strained in a gate or frame, at such distances apart as the thickness of lumber demands, and the log is wholly made into boards in one operation. Of the reciprocating class of saws is the "cross-cut," used for cutting across the grain of the timber or wood to be converted into shorter lengths. The length, breadth, "pitch," and "set" of saws vary according to the use which is to be made of them and the kind of timber which is to be manipulated. In a cross-cut saw the cutting edge strikes the fibre at right angles to its length, and while its pitch is but slight (if any) it must sever from each side before dislodging the sawdust. "A slitting or ripping saw has the cutting edge about at a right angle to the fibre of the wood, severing it in one piece—the throat of the tooth wedging out the piece." In slitting saws the "rake" is all in front, in the cross-cut on the side.

The circular saw is of comparatively recent origin, its introduction dating from 1790, when Brunel first announced the principle. At first only circular saws of small diameter were used; but, from the small "buzz-saw" of the watchmaker and fine metal worker, or the ripping saw of the planing-mill or carpenter shop, where small diameters have to be divided, the circular saw has passed to the saw-mill, where, in diameters of from 12 to 30 inches, it is the needful instrument for edging or ripping the lumber which drops from the log in an imperfect condition, requiring finer manipulation to prepare it for market; or in diameters of from 40 to 84 inches it may be found as the main saw of the mill for rending the logs as they come from the forest into shapes and sizes adapted for the various purposes of the builder. It is capable of dividing logs into boards one inch thick or upwards at as high a rate as 60,000 superficial feet in a day of twelve hours, while a straight (muley or gate) saw would give only 5000 to 8000 feet. In the chief lumber sections of the United States saws of 60 inches diameter are in most common use; upon the Pacific coast saws of 8 feet diameter are not unknown. Attempts to work large circular saws in nests or gangs have not hitherto proved successful, but three, four, or five saws of 30 inches diameter hung on a single shaft or "arbor" may be used to trim and divide the boards or planks thrown off from a log.

Barrel saws, for the manufacture of staves for barrels, pails, or tubs, are in the form of a straight-sided barrel with both heads removed, and the stave ends of one head serrated.

For the manufacture of veneers, where valuable timber is to be economically manipulated, we have the segment-saw, constructed by bolting segments of saw-blades upon the outer rim of a cast-iron centre, forming a circular saw of the desired diameter, but with a cutting edge of so light a gauge as to waste but little of the valuable timber to be sawed, the cast-iron centre insuring the requisite stiffness and strength. With these saws veneers scarcely thicker than a sheet of paper may be cut, the width being according to the size of the log; such saws are often from 80 to 100 inches in diameter.

Circular saws of the larger size are often constructed with "inserted" teeth. A disk of steel of suitable size, having slots cut in its periphery of the exact size and shape of the tooth which is to be inserted, may have these teeth removed as often as the wear upon them may require, without reducing the diameter of the plate. The teeth of lumber saws have to be sharpened with the file at least three or four times in twelve hours' work, and a saw of five feet in diameter is rapidly reduced in size with a great loss of efficiency. In the insert tooth plate new teeth cost only about three cents (1½d.) each, and the saw plate remains of its original diameter. Inserted teeth are of various forms and shapes, from that of the ordinary saw tooth, held in place by a rivet at the root of the tooth, to a "chisel point" held by an ingenious system of wedging.

Band-saws have for many years been used for continuous and rapid cutting in the planing mill or other wood-working establishment, where scrolls or fancy lines and curves were to be followed, requiring great flexibility of the saw-blade. Of late, and notably within the past two years (1884–85), successful endeavors have been made to adapt them to lumber manufacture. The band-saw is a continuous blade or ribbon running over pulleys above and below, forming a "steel belt" whose serrated edge is always "in the cut." These saws are usually from a half inch in width (for shop work) to six and eight inches wide for the heavier work of the saw-mill, and in the latter have a cutting capacity of from 30,000 to 40,000 superficial feet in twelve hours. They are extremely thin (usually 16-gauge), and the kerf produced is so much less than that of the upright or the circular that a saving of at least 20 per cent. of timber is claimed in their use.

Saws used by surgeons, butchers, and in all branches of manufacture are but modifications of one of the varieties above described, and do not demand more extended description.

Saw-Mills are factories for the conversion of forest trees into lumber and timber. The earliest form of saw-mill was unquestionably the saw-pit, still found in a modified form in shipbuilders' yards, the log being raised on trestle horses instead of one of the sawyers being sunk in the pit. Saws were run by windmill-power as early as the 13th century; and the use of water-power soon followed. The primitive water saw-mill consisted of a wooden pitman attached to the shaft of the water-wheel, the log to be sawed being placed on rollers sustained by a framework over the wheel, and being fed forward on the rollers by means of levers worked by hand. Good authorities mention saw-mills running by water-power in Germany as early as 1322. In 1663 an attempt to establish a mill in England was abandoned owing to the opposition of the sawyers, and no further attempt was made till 1768, when a mill was erected at Limehouse, but was soon destroyed by a mob. North America, with its vast forests, may be aptly termed the home of saw-mills. As early as 1634 a saw-mill was erected at the falls of the Piscataqua, near the line dividing Maine from New Hampshire. This was no doubt the pioneer of the vast array of mills which subsequently made Maine famous as a lumber-producing State for many years. From about the same date several mills were erected along the Atlantic coast of America, a description of one being that of all. In these mills the saw was attached by a long pitman from the wheel shaft to a ponderous gate, running in wooden slides upon two heavy posts, crossed above by a beam connecting the two sides of the mill-frame. The mill-carriage on which the log lay was pushed towards the saw by a rack and pinion, etc., moved by a feed-wheel. The daily capacity of these mills was from 500 to 1500 superficial feet. The first great improvement upon this class of mills was in the

Saw-mills.

[1] According to some writers the term "muley" (or mulay) is derived from the German "Mühlsäge," mill-saw, but, as this form of saw, when introduced, differed only from the ordinary mill-saws long in use in the manner in which it was hung (free from strain), the name may have been given to signify "hornless," indicating the absence of the ponderous gate which was the essential feature of strained saws.

introduction of two or more saws to the gate, the general character of the methods remaining the same. With the demand for more rapid production came improvements in the "gang" feature, and the wonder of the age was the "Yankee gang," so arranged, by placing half the saws facing in one direction and the other half in the opposite, that two logs were worked up in one movement of the carriage, or, as in the "slabbing" gang, the outsides or slabs were cut from one log, which was then turned upon its flattened sides to the other set of saws which cut it into boards. The "stock" gang, "pony" gang, "slabbing" gang, and "Yankee" gang are favorites with saw-mill proprietors, because of the uniform character of the lumber produced, and the saving of timber realized from the use of saws of scarcely one-third the thickness of the gate, muley, or circular.

Gang-saws are seldom thicker than 14-gauge, and are successfully worked at 18-gauge, making a saw-kerf or waste of but $\frac{1}{8}$ inch, whereas the ordinary gate, muley, or circular takes $\frac{7}{16}$ inch. The muley was introduced later than the gang, and was received with great favor, entering into more general use because of its comparative cheapness and adaptability where the sawyer had not to deal with large quantities of lumber. The muley mill dispensed with the ponderous gate and heavy posts of the saw-frame. While the lower portion of the mill is arranged much as in the use of the gate-saw, with the addition of necessary slides, the upper end of the saw is guided in a strong iron frame pendent from the weigh-beam overhead. On each side of this frame are slides in which are placed boxes, attached by a noddle pin and strap to the upper end of the saw, keeping the tool in line with the cut, and the cutting is accomplished wholly by the downward thrust, the motion of the crank beneath imparting a forward motion to the blade in its cutting functions and a retreating motion as it rises from the cut. By an ingenious arrangement of the slides an increased oscillation may be imparted, the object being to cause the saw-teeth to hug the timber closer on the downward or cutting thrust, and to recede and run clear of the timber on the upward motion, thus decreasing the friction. Muley-saws are usually run at a speed of 300 revolutions of the driving wheel per minute, and the daily capacity may be stated at about 5000 superficial feet. Water-power was used almost exclusively in saw-mills until 1835, after which year steam was rapidly substituted, until at the present time it is as difficult to find a water-power saw-mill as it is to find a gate or muley.

The use of the circular-as the main saw of a mill is of comparatively recent origin, the experimental point in its introduction having been passed only about the year 1855. Since that time it has rapidly reached the highest efficiency. Driven by engines of from 25 to 100 horse-power the circular saw-mill, under proper management, turns out from 20,000 feet per day for smaller to 50,000 and 60,000 feet per day for larger mills, in addition to running the double-edgers and trimming saws, requisite for trimming off the rough edges and bad ends of the lumber produced.

The modern saw-mill stands upon the banks of a river or pond, at an elevation usually of twelve feet from the level of the land to the saw-floor. The logs are floated from the forest (often many hundred miles distant from the mill) down the river, in lengths as desired. Piling driven at convenient distances in the water serves to hold the long pieces of timber, which, secured to the piles by heavy chains, form a strong "boom," floating into which the logs are penned or "boomed" until required. From the rear end of the mill, at the second story or saw-floor, a "jack ladder" is constructed of heavy timber, the lower ends resting in the bottom of the stream upon a bed of timber heavily weighted. Upon the sides of the jack ladder are laid ribbons of iron forming a track for the log car, which, strongly constructed and with its top cross sections or "bunks" heavily studded with A-headed bolts, is run under the water at a depth to allow the log to float over it in such manner that, as the chain running to the "bull-wheel" in the mill is wound up, the spikes of the car catch upon the under-side of the log or logs, which thus load themselves and are hauled up the incline to the mill floor. Here they are rolled upon skids leading to the saw-carriage, and are soon running rapidly their course of manufacture. Loaded upon the "head-blocks," by a quick motion of a lever upon the standard, the "setter" inserts an iron "dog," which holds the log firmly in place ready for advancing to the saw. This is accomplished by one of several methods: (1) by rack and pinion worked by "cone feed," in which a belt is moved upon two parallel cones to impart a more rapid or a slower motion to the pinion shaft; (2) by "rope feed," a rope, usually of wire, being attached to each end of the mill carriage, and passing over pulleys in the floor to a drum beneath, so arranged as to be under control of the sawyer in its feeding movement or in reversal to "gig" the carriage back to its first position; or (3) by "steam feed." This is the more modern and rapid means employed, and is sometimes termed "lightning feed." A steam cylinder of 8 or 10 inches diameter is laid upon the floor of the mill beneath the saw-carriage, its piston connecting with the carriage. Steam being admitted to the driving end of the cylinder (the length of which is according to the length of timber to be sawed, sections being added or removed at pleasure) the saw carriage is driven with lightning speed, both in the cutting feed and reversing "gig." Thirty ordinary cuts per minute, on 12 inches feed to the revolution of the saw, may be obtained with this adaptation. As the limit of capacity for work with a circular saw is practically the ability of the operators to remove the lumber, 60,000 to 70,000 feet per day is no unusual cut, while a rate of 100,000 feet per day has been maintained (for a short period) by a single circular. The lumber as it drops from the saw falls upon "live rolls," a series of iron or wooden rollers connected by chain belts, which carry it within reach of the "edger," who rapidly passes that portion which requires "edging" or splitting through the "double-edger," to a carriage or truck on which it is pushed to the piling ground, or, in some mills, to another series of live rolls which take it to the front of the "trimmer," an ingenious arrangement of table, beneath which are several saws which advance or recede at the operator's pleasure, cutting the lumber to even and uniform lengths, or trimming off such defects as may exist in the end of the piece. Ordinary lengths are 12, 14, 16, and 18 feet, and by use of the trimmer all superfluous ends are removed, leaving each piece of uniform length with its fellows. The waste of the log, consisting of the "slabs" and edgings, are carefully gone over, and such as are suitable for that purpose go to the "lath" machines, where they are cut into strips four feet in length, $\frac{3}{8}$ inch thick, and $1\frac{1}{2}$ inches wide, for lath and plaster work. In the sawing of logs, imperfections are often discovered in the timber, unfitting it for ordinary uses, and in many mills it is customary to saw such timber into "cants" of usually six inches thickness. These cants are turned over to a "butting saw," where they are cut into lengths of 16 inches (in some localities 18 inches) and turned over to the shingle mill to be manufactured into shingles. Shingles are tapering pieces $\frac{3}{8}$ inch thick at one end, and $\frac{1}{16}$ inch at the other, and are used as a roof covering in lieu of slating or tiles. They are laid in uniform courses, with $4\frac{1}{2}$ to 5 inches of the butt end laid to the weather, and are good for from 20 to 30 years' wear upon a roof. An adjunct to the circular saw is often found in a top or upper saw, overhanging the main circular a little in advance of its track, for the purpose of enabling larger logs to be handled than the diameter of an ordinary circular will permit. The upper saw cuts into the top of the log in a line with the cut of the lower or main saw, thus increasing the depth of the cut. In California, where logs of 8 and 10 feet diameter are not unusual (larger logs being quartered by the use of gunpowder or other explosive, timber as much as 20 and even 25 feet in diameter being found in the redwood forests), an ingenious arrangement of four saws placed one higher than the other, some horizontal and others vertical, permits the handling of huge trees, which until recently were not considered available. A thoroughly modern saw-mill embraces all which has been said regarding the circular, with the addition of the "gang" feature, for, while a majority of the saw-mills of North America are single "circulars," many of them have a rotary upon each side of the mill floor, the log-jack being in the centre of the building rolling its logs either to the right hand or the left. The larger mills have in addition to the rotaries from one to four gangs. In these cases the log usually goes first to the circular, where the slabs of two sides are removed, leaving a flat cant, which is then transferred to the gangs. These mills are fully equipped with all the modern patent improvements. The logs are drawn from the water by an endless chain running in a V-shaped log slide, the chains being provided either with spikes or concave chairs which hold the log from slipping back. One log follows the other in endless succession. On its arrival at the log deck on the mill floor, the manipulation of a lever causes an arm or arms to rise through the floor against the side of the log, which is partially raised and thrown with considerable force upon the skids leading to the saw carriage. When one log has been sawed, another is loaded by the simple touch of a lever in the hands of the sawyer, causing arms to rise in the skids under the log, which is thrown upon the carriage ready for the saw. When the first slab

has been removed, the sawyer's touch of a lever brings through the floor the "nigger," a piece of strong timber, iron-bound and with sharp teeth or spikes protruding from its frout face. Its motion tends slightly forward as it advances to a height of five or six feet above the floor, its spiked surface catching the side or face of the log, turning it instantly to any desired position. If the log is simply to be "canted" for the gang the two opposite sides or slabs are removed, and as the last cut is complete a hook thrown over the rear end of the cant prevents its return with the saw carriage and it drops upon rolls which move it so far out of the way of the returning carriage with its fresh load as is necessary to start it in an opposite direction to the gang which is to complete its manufacture. Until now, aud until it shall emerge from the gang, no hand of man has necessarily touched the log. Machinery guided by human intelligence has done all the work. When the log reached the carriage it was dogged, not with the old-fashioned lever dog driven by a mallet, but by the simple movement of a lever. It was brought to its proper position before the saw by nicely adjusted set works, which graduated its position to one-eighth of an inch. After the slab was removed, if another cut was required the same set works moved it forward with lightning quickuess, leaving it at the exact point, to a nicety, requisite for the production of just the thickness desired for the next piece. From the water to the pile in the millyard hands have necessarily been employed in actual handling of the product only at the edger and the trimmer, and in assorting the qualities upou the tram-car which removes it from the mill. Machinery, guided by human intelligence, has done all the heavy work. A mill answering closely to our description was recently burned at Bay City, Michigan, the yearly production of which for several years past has been 40,000,000 feet of lumber, besides shingles, lath, pickets, etc., cut from the slabs and waste. The total production of the saw-mills of the United States approximates 26,000,000,000 feet annually.

The "band" saw-mill is rapidly working its way into public favor because of the economy attending its use. The band saw is a long ribbon of steel, six to eight inches in width, running over large pulleys above and below, the upper pulley running almost vertically above the lower, the saw acting as a belt between the two and as the driving power to the upper wheel. These saws are very thin and have a manufacturing capacity of from 30,000 to 40,000 feet per day, with the consumption of 25 to 40 per cent. less power than is required for the ordinary circular saw of the same daily capacity for work. The main advantage found in the use of the band-saw is in the saving of timber (20 per cent.). The set works do not differ from those of rotary mills, and either cone, rope, or steam feed may be used in connection with it.

A useful adjunct to the many saw-mills, which produce more waste than can be consumed in raising the necessary steam, is the "slab-burner" or "hell," a large circular brick furnace often 50 feet in height by 25 feet internal diameter, erected conveniently near the saw-mill, into which by chain carriers leading to an opening at a sufficient height from the bottom, the sawdust, edgings, worthless slabs, and débris of the mill are conveyed, to be destroyed by fire.

Shingle Mills.

Shingle Mills.—A standard shingle is four inches wide, and all computations of quantity are based upon that width, although the individual shingle may be six or eight inches wide or as much as 18 inches, in the latter case counting 4½ shingles. A shingle mill differs from a saw-mill in the adaptations of machinery. Saws of 16-gauge, 40 inches in diameter, are most commonly employed. In cases where shingle manufacture is carried on in connection with the saw-mill, the process of preparing the blocks has already been described. A majority of the shingles manufactured, however, are made in mills built for the special purpose. Logs suitable, usually of a medium quality, are placed before a "bolting" or "drag" saw, which sevcrs them into the required length. The block is then stripped of its bark and sap by splitting off a section of the outer circumference of the heart wood, with axes; it is next quartered, and the iuside section of heart, which is never sound, removed; and then it goes to the machine for manufacture. The machines are sometimes horizoutal, sometimes vertical, but all work upon the same principle, viz., that of a tilting-table, allowing a thick butt and a thin point to be alternately taken. The shingles as they drop from the saw are rough-edged, and require to be "jointed," generally upon a rapidly revolving wheel, upon the face of which are secured four well-balanced knives, which, as the shingle is pressed against them, eat away the imperfect edge with great rapidity, leaving a straight smooth edge, which when laid upon a roof makes a good joint with its fellows. The edging or jointing process is often performed with small saws in place of the wheel-jointer. The shingles are usually packed in bunches containing the equivalent of one quarter thousand 4-inch pieces, and are more used for roof covering than any other material in the United States or Canada. (G. W. H.)

SAXE, Maurice, Comte De (1696–1750), marshal of France, was the natural son of Augustus II. of Saxony and the countess Aurora of Königsmark. An entry in the parish registers of Goslar shows that he was born in that town, 28th October, 1696. In 1698 the countess sent him to Warsaw to his father, who had been elected king of Poland the previous year, but on account of the unsettled condition of the country the greater part of his youth was spent outside its limits, a yearly income being assigned him. This enforced separation from his father made him more independent of his control than he would otherwise have been, and had an important effect on the character of his future career. At the age of twelve he was present, under the direction of the count of Schulenburg, in the army of Eugene, at the sieges of Tournay and Mons and the battle of Malplaquet, but the achievements ascribed to him in this campaign are chiefly fabulous. A proposal to send him at the close of it to a Jesuit college at Brussels was relinquished on account of the strong protests of his mother; and, returning to the camp of the allies in the beginning of 1710, he displayed a courage so impetuous as to call forth from Eugene the friendly admonition not to confound rashness with valor. After receiving in 1711 formal recognition from his father, with the rank of count, he accompanied him to Pomerania, and in 1712 he took part in the siege of Stralsund. As he grew up to manhood he was seen to bear a strong resemblance to his father, both in person and character. His grasp was so powerful that he could bend a horseshoe with his hand, and to the last his energy and endurance were unsubdued by the severe bodily illnesses resulting from his many excesses. The impetuosity noted by Eugene manifested itself in his private life in a dissoluteness only slightly tempered by his generosity and good humor. In his military career during his mature years it was indicated only in his blindness to danger and his unmoved calm amidst the blackest lowerings of misfortune, for it was tempered by the "vigilance, forethought, sagacious precaution" which Carlyle notes as "singular in so dissolute a man." In 1714 a marriage was arranged between him and one of the richest of his father's subjects, the Countess von Loeben, but her immense fortune he dissipated so rapidly that he was soon heavily in debt, and, having given her more serious grounds of complaint against him, he consented without defence to an annulment of the marriage in 1721. Meantime, after serving in a campaign against the Turks in 1717, he had in 1719 gone to Paris to study mathematics, and in 1720 obtained the office of "maréchal de camp." In 1725 negotiations were entered into for his election as duke of Courland, at the instance of the duchess Anna Ivanovna, who offered him her hand. He was chosen duke in 1726, but declining marriage with the duchess found it impossible to resist her opposition to his claims, although, with the assistance of £30,000 [$145,800] lent him by the French actress Adrienne Lecouvreur, his relations with whom form the subject of the drama of that name by Scribe and Legouvé, published in 1849, he raised a force by which he maintained his authority till 1727, when he withdrew and took up his residence in Paris. On the outbreak of the war in 1734 he served under Marshal Berwick, and for a brilliant exploit at the siege at Philippsburg he was in August named lieutenant-general. It was, however, with the opening of the Austrian Succession War in 1741 that he first rose into prominence. In command of a division forming the advance guard of an army sent to invade Austria, he on the 19th November surprised Prague during the night, and took it by assault before the garrison were aware of the presence

of an enemy, a *coup de main* which at once made him famous throughout Europe. After capturing on the 19th April, 1742, the strong fortress of Eger, he received leave of absence, and went to Russia to push his claims on the duchy of Courland, but obtaining no success returned to his command. His exploits had been the sole redeeming feature in an unsuccessful campaign, and on 26th March, 1743, his merits were recognized by his promotion to be marshal of France. In 1744 he was chosen to command the expedition to England in behalf of the Pretender, which assembled at Dunkirk but did not proceed farther. After its abortive issue he received an independent command in the Netherlands, and by dexterous manœuvring succeeded in continually harrassing the superior forces of the enemy without risking a decisive battle. In the following year he made a rapid march on Tournay, and, when the allies sent an army of 60,000 under the duke of Cumberland to its relief, gave them battle 11th May, without relaxing the siege, from a strongly entrenched position at Fontenoy. The contest raged from early morning till two o'clock, when, by a charge at a critical moment which annihilated a column of the enemy, fortune was decided in his favor. During the battle he was unable on account of dropsy to sit on horseback except for a few minutes, and was carried about in a wicker basket. In recognition of his brilliant achievement the king conferred on him the castle of Chamford for life, and in April, 1746, he was naturalized. The campaign of 1746 was signalized by the capture of Antwerp on the 1st June, the capture of Namur in September, and the total route of Prince Charles at Raucoux 11th October. Having on the 12th January, 1747, been made marshal-general, he in the following campaign won the victory of Lawfeldt over the duke of Cumberland and on 16th September he stormed Bergen-opzoom. In May, 1748, he captured Maestricht after a month's siege. After the peace, he lived in broken health chiefly at Chamford, and he died there 30th November, 1750.

Maurice de Saxe was the author of a work on military science. *Mes Réveries*, described by Carlyle as "a strange military farrago, dictated, as I should think, under opium," published posthumously in 1757 (last ed., Paris, 1877). His *Lettres et Mémoires Choisis* appeared in 1794. Many previous errors in former biographies were corrected and additional information supplied in Carl von Weber's *Moritz, Graf von Sachsen, Marschall von Frankreich, nach archivalischen Quellen* (Leipsic, 1863), and in Taillandier's *Maurice de Saxe, étude historique d'après les documents des Archives de Dresde* (1865). See also Carlyle's *Frederick the Great.*

SAXE-ALTENBURG. (Germ. *Sachsen-Altenburg*), a duchy in Thuringia, and an independent member of the German empire, consists of two detached and almost equal parts, separated from each other by a portion of Reuss (junior line), and bounded on the S. and W. by the grand duchy of Saxe-Weimar-Eisenach, on the N. by Prussia, and on the E. by the kingdom of Saxony. There are in addition 12 small exclaves. The total area is 510 square miles (about half the size of Cheshire in England), of which 254 are in the east or Altenburg division and 256 in the west or Saal-Eisenberg division. The former district, traversed by the most westerly offshoots of the Erzgebirge and watered by the Pleisse and its tributaries, forms an undulating and fertile region, containing some of the richest agricultural soil in Germany. The western district, through which the Saale flows, is rendered hilly by the beginnings of the Thuringian Forest, and in some measure makes up by its fine woods for the comparatively poor soil. The mineral wealth of Saxe-Altenburg is scanty; lignite, the chief mineral, is worked mainly in the eastern district.

See Plate V.

According to the returns for 1883, 58½ per cent. of the entire duchy was occupied by arable land, and 27½ per cent. by forests, of which four-fifths were coniferous. The chief crops were rye (42,317 acres, yielding 20,412 tons), oats (36,807 acres, 22,996 tons), barley (21,390 acres, 13,912 tons), wheat (17,490 acres, 9724 tons), and potatoes (19,870 acres, 113,209 tons). The cattle-raising and horse-breeding of the duchy are of considerable importance. In 1883 the duchy contained 9934 horses, 60,335 cattle, 20,996 sheep, 46,387 pigs, and 12,420 goats. About 35 per cent. of the population are directly supported by agriculture. The manufactures of the duchy are very varied, but none is of any great importance; woollen goods, gloves, hats, porcelain and earthenware, and wooden articles are the chief products. Trade in these, and in horses, cattle, and agricultural produce, is tolerably brisk. The chief seats of trade and manufacture are Altenburg the capital (29,422 inhabitants in 1885), Ronneburg (5485 inhabitants in 1880), Schmölln (6394), Gössnitz (4949) and Meuselwitz (3402) in the Altenburg division; and Eisenberg (6277), Roda (3465), and Kahla (2999) in the Saal-Eisenberg division. Besides these there are the towns of Lucka (1505) and Orlamünde (1461), and 449 villages, of which Russdorf (1781), in an exclave, is the largest.

Next to the two principalities of Reuss, Saxe-Altenburg is the most densely peopled part of Thuringia. In 1880 the population was 155,036 or 304 per square mile. Of these 154,187 were Protestants, 741 Roman Catholics, 33 Jews, and 75 of other sects. The population in 1885, according to a provisional return of the census of that year, was 161,129. In the west division the population (49,788) is wholly Teutonic, but in the east (111,341) there is a strong Wendish or Slavonic element still to be traced in the peculiar manners and custom of the country-people, though these are gradually being given up. The farmers and peasant-proprietors of the east division (Altenburger Bauern) are an industrious and well-to-do class, but like similar classes in other countries they are said to be avaricious and purse-proud. Their holdings are seldom divided; a custom corresponding to BOROUGH-ENGLISH (*q.v.*), though not supported by law, obtains among them; and sometimes the elder brothers are employed by the youngest as servants on the paternal farm. The destitution to which the disinherited children are often reduced by this custom is seriously prejudicial to morality. The Altenburg peasants are pleasure-loving, and in spite of their avarice are said to gamble for very high stakes, especially at the complicated card-game of "skat," now universal in Germany, which many believe to have been invented here.

Saxe-Altenburg is a limited hereditary monarchy, its constitution resting on a law of 1831, subsequently modified. The diet consists of 30 members elected for 3 years, of whom 9 are returned by the highest taxpayers, 9 by the towns, and 12 by the country districts. The franchise is enjoyed by all males over 25 years of age who pay taxes. The duke has considerable powers of initiative and veto. The government is carried on by a ministry of three members, of whom two administer justice and finance respectively, and the third all the other departments of home and foreign affairs. The budget for 1884–86 estimated the yearly income at £127,180 [$618,094.80], and the yearly expenditure at £125,530 [$610,075.80]. The Altenburg troops are united with the contingents of Schwarzburg-Rudolstadt, and the two Reusses to form the 7th Thuringian infantry regiment of the imperial army. Saxe-Altenburg has one vote in the Reichstag and one in the federal council.

After the conquest of the Wends, the present Altenburg district became an imperial possession, lying partly in the Pleissengau and partly in the Voigtland, while the west district was divided among a number of small nobles. The margrave of Saxony obtained permanent possession of Altenburg about 1329, and the west division was also early incorporated with his dominions. Both districts were among the lands assigned to the Ernestine line of the house of Saxony by the convention of Wittenberg in 1547 (see SAXONY). From 1603 till 1672 there existed an independent duchy of Altenburg; but in 1826, when the present division into the four Saxon duchies was made, both Altenburg and Eisenberg belonged to Gotha. Duke Frederick, who exchanged Saxe-Hildburghausen for the present duchy of Saxe-Altenburg in 1826, was the founder of the reigning line. A constitution was granted in 1831 in answer to popular commotion; and greater concessions were extorted by more threatening disturbances in 1848. The second duke (Joseph) abdicated in 1848 in favor of his brother George. Under Ernest, who succeeded his father as fourth duke in 1853, a period of violent reaction set in, so that even now the constitution is considerably less liberal than it was in 1849. In 1873 the long-disputed question as to the public domains was settled, two-thirds of these being now regarded as belonging to the duke in *fideicommissum* and in lieu of a civil list.

SAXE-COBURG-GOTHA. (Germ. *Sachsen-Koburg-Gotha*), a duchy in Thuringia, and an independent member of the German empire consists of the two formerly separate duchies of Coburg and Gotha, which lie at a distance of 14 miles from each other, and of eight small scattered exclaves, the most northerly of which is 70 miles from the most southerly. The total area is 760 square miles (about 2 square miles more than the county of Surrey in England), of which 217 are in Coburg and 543 in Gotha. The duchy of Coburg is bounded on the S.E., S., and S.W., by Bavaria, and on the other sides by Saxe-Meiningen, which, with part of Prussia, separates it from Gotha. The considerable exclave of Königsberg in Bavaria, 10 miles south, belongs to Coburg. Lying on the south slope of the Thuringian Forest and in the Franconian plain, this duchy is an undulating and fertile district, reaching its highest point in the Senichshöhe (1716 feet) near Mirsdorf. Its streams, the chief of which are the Itz, Steinach, and Rodach, all find their way into the Main. The duchy of Gotha, more than twice the size of Coburg, stretches from the south borders of Prussia along the northern slopes of the Thuringian Forest, the highest summits of which (Grosse Beerberg, 3225 feet; Schneekopf, 3179 feet; Inselberg, 2957 feet) rise within its borders. The more open and level district on the north is spoken of as the "open country" ("das Land") in contrast to the wooded hills of the "forest" ("der Wald"). The Gera, Hörsel, Unstrut, and other streams of this duchy flow to the Werra or to the Saale.

See Plate V.

In both duchies the chief industry is agriculture, which employs 33 per cent. of the entire population. According to the returns for 1883, 53½ per cent. of the area was occupied by arable land, 10 per cent. by meadow-land and pasture, and 30 per cent. by forest. In the same year the chief crops were oats (43,715 acres, yielding 19,229 tons), barley (37,387 acres, 20,148 tons), rye (29,077 acres, 12,048 tons), wheat (24,255 acres, 9,272 tons), and potatoes (24,546 acres, 116,695 tons). A small quantity of hemp and flax is raised (less than 1000 acres of each), but a considerable quantity of fruit and vegetables is annually produced. Cattle-breeding is an important resource, especially in the valley of the Itz in Coburg. In 1883 the two duchies contained 8187 horses, 58,196 cattle, 73,249 sheep, 51,549 pigs, and 27,015 goats. The mineral wealth of Saxe-Coburg-Gotha is insignificant; small quantities of coal, lignite, ironstone, millstone, etc., are annually raised. There are also salt-works and some deposits of potter's clay.

The manufactures of the duchies, especially in the mountainous parts less favorable for agriculture, are tolerably brisk, but there is no large industrial centre in the country. Iron goods and machinery, safes, glass, earthenware, chemicals, and wooden articles, including large quantities of toys, are produced; and various branches of textile industry are carried on. Ruhla (two-fifths of which is situated in Saxe-Weimar-Eisenach) is famous for its meerschaum pipes and cigar-holders, which are exported to all parts of the world; and the maps of Perthes's geographical institute at Gotha may also be reckoned among the national products. Coburg (15,791 inhabitants in 1881) and Gotha (28,100 in 1885) are the chief towns of the duchies, to which they respectively give name; the latter is the capital of the united duchy. There are seven other small towns, and 320 villages and hamlets. The villages of Friedrichroda and Ruhla and the Inselberg and Schneekopf and other picturesque points annually attract an increasing number of summer visitors and tourists. Neudietendorf or Guadenthal is a Moravian settlement founded in 1742.

The population in 1880 was 194,716, or 256 per square mile, of whom 56,728 (261 per square mile) were in Coburg, and 137,988 (254 per square mile) in Gotha. In the former duchy the people belong to the Franconian and in the latter to the Thuringian branch of the Teutonic family. In 1880 there were 192,025 Lutherans, 2062 Roman Catholics, 490 Jews, and 139 others. In 1885 the population was 198,717, —57,355 in Coburg, and 141,362 in Gotha.

Saxe-Coburg-Gotha is a limited hereditary monarchy, its constitution resting on a law of 1852, modified in 1874. For its own immediate affairs each duchy has a separate diet (in Coburg of 11, in Gotha of 19 members); but in more important and general matters a common diet, formed of the members of the separate diets, meeting at Coburg and Gotha alternately, exercises authority. The members are elected for four years; the franchise is extended to all male taxpayers of twenty-five years of age and upwards. The ministry has special departments for each duchy, but is under a common president. In finance the duchies are also separate, the budget in Coburg being voted for a term of six years, and in Gotha for four years. After long disputes between the duke and the Government a compromise was effected in 1855, by which the greater part of the public lands is regarded as a *fideicommissum* in the possession of the reigning duke, while the income from the rest is regarded as state-revenue. There are thus two budgets for each duchy. The annual income of the public lands in Coburg is estimated for the period 1886–92 at £20,700 [$100,602], and the expenditure at £11,900 [$57,834]; in Gotha (period 1886–90) the same source is estimated to yield £102,621 [$498,738.06], and to cost £61,996 [$301,300.56];—together producing a surplus of £49,425 [$240,205.50], of which the duke receives £29,700 [$144,342], and the state-treasury £19,725 [$95,863.50]. The annual state-revenue in the same periods was estimated for Coburg at £51,520 [$250,387.20], or £2246 [$10,915.56] more than the estimated expenditure, and in Gotha at £106,020 [$515,257.20], or £2244 [$10,905.84] more than the expenditure. Besides the civil list the duke of Saxe-Coburg-Gotha enjoys a very large private fortune, amassed chiefly by Ernest I., who sold the principality of Lichtenberg to Prussia in 1834 for an annual payment of £12,000 [$58,320]. The congress of Vienna had bestowed the principality upon him in recognition of his services in 1813. The house of Saxe-Coburg-Gotha is directly connected with five of the royal houses of Europe, and the actual rulers or the heirs of three kingdoms trace their descent from it. The succession is hereditary in the male line; and by the deed of succession of 1855 the heir to the throne is the duke of Edinburgh, nephew of the present duke.

History.—The elder line of Saxe-Coburg was founded in 1680 by Albert, the second son of Ernest the Pious. On his dying childless in 1699, however, the line became extinct, and his possessions became the subject of vehement contention amongst the other Saxon houses, until they were finally distributed at the end of the 18th century. The present reigning family is the posterity of John Ernest, the seventh son of Ernest the Pious, who originally ruled in Saxe-Saalfeld. His two sons, ruling in common, acquired possession of Coburg, and, changing their residence, styled themselves dukes of Saxe-Coburg-Saalfeld. Under the son and successor of the survivor (who introduced the principle of primogeniture), Ernest Frederick I. (1764–1800), the land was plunged into bankruptcy, so that an imperial commission was appointed on his death to manage the finances. The measures adopted to redeem the country's credit were successful, but imposed so much hardship on the people that a rising took place, which had to be quelled with the aid of troops from the electorate of Saxony. The duke Francis Frederick Antony died in December 1806, and was succeeded by his son Ernest III. (1806–1844), although the country was occupied by the French from 1807 until the peace of Tilsit in 1816. In the redistribution of the Saxon lands in 1826, Ernest resigned Saalfeld to Meiningen, receiving Gotha in exchange and assuming the title of Ernest I. of Saxe-Coburg-Gotha. The line of Saxe-Gotha had been founded in 1680 by the eldest son of Ernest the Pious, and had become extinct in 1825. When Ernest II.[1] (b. 1818) succeeded in 1844 both the public finances and the private fortune of the ducal family (see above) were flourishing. In his reign various liberal reforms have been achieved, and the union of the duchies has been made closer.

SAXE-MEININGEN (Germ. *Sachsen-Meiningen*), a duchy in Thuringia, and an independent member of the German empire, consists chiefly of an irregular crescent-shaped territory, which, with an average breadth of 10 miles, stretches for over 80 miles along the southwest slope of the Thuringian Forest. The convex side rests upon the duchy of Coburg, and is in part bounded by Bavaria, while the concave side, turned towards the north, contains portions of four other Thuringian states and Prussia between its horns, which are 46 miles apart. The districts of Kranichfeld, 15 miles northwest, and Kamburg, 22 miles due north of the eastern horn, together with a number of smaller scattered exclaves, comprise 74 of the 953 square miles now belonging to the duchy (about the size of county Down in Ireland). The surface on the whole is hilly, and is partly occupied by offshoots of the Thuringian Forest; the

See Plate V.

[1] He died 22d Aug., 1893, and his nephew, Prince Alfred, Duke of Edinburgh, second son of Albert, Prince Consort of Queen Victoria, succeeded, who then relinquished three-fifths of his British annuity of £125,000.

highest summits are the Kieserle (2851 feet) and the Bless (2834 feet). The chief streams are the Werra, which traverses the south and east of the duchy, and various tributaries of the Main and the Saale, so that Saxe-Meiningen belongs to the basins of the three great rivers, Weser, Rhine, and Elbe.

The soil is not very productive, although agriculture flourishes in the valleys and on the level ground; grain has to be imported to meet the demand. In 1883 only 41.8 per cent. of the total area (in 1878, 41.6) was devoted to agriculture, while meadow land and pasture occupied 11 per cent. The chief grain crops in 1883 were rye (44,442 acres, yielding 16,112 tons), oats (42,447 acres, 17,343 tons), wheat (25,252 acres, 9033 tons), and barley (19,015 acres, 94,456 tons). The cultivation of potatoes is very general (31,006 acres, 143,327 tons). Tobacco, hops and flax (in 1883, 997 acres) are also raised. The Werrathal and the other fertile valleys produce large quantities of fruit. Sheep and cattle raising is a tolerably important branch of industry throughout the duchy; horses are bred in Kamburg. In 1883 Saxe-Meiningen contained 5174 horses, 66,733 cattle, 58,940 sheep, 45,136 pigs, and 26,817 goats. The extensive and valuable forests, of which 75 per cent. are coniferous trees, occupy 41.9 per cent. of the entire area. Nearly one half of the forests belong to the state and about one-third to public bodies and institutions, leaving little more than a sixth for private owners. The mineral wealth of the duchy is not inconsiderable. Iron, coal, and slate are the chief minerals worked. There are salt-works at Salzungen and Sulza, the former the most important in Thuringia; and the mineral water of Friedrichshall is well known. The manufacturing industry of Saxe-Meiningen is very active, especially in the districts of Sonneberg, Gräfenthal, and Saalfeld. Iron goods of various kinds, glass and pottery, school-slates, marbles, etc., are produced; the abundant timber fosters the manufacture of all kinds of woodeu articles, especially toys; and textile industry is also carried on to a slight extent.

The capital of the duchy is Meiningen (in 1881 11,227 inhabitants.) Of the sixteen other towns (Salzungen, Wasungen, Hildburghausen, Eisfeld, Sonneberg, Saalfeld, Pössneck, Kamburg, etc.) none has so many as 10,000 inhabitants. There are 392 villages and hamlets. In 1880 the population was 207,075 (217 per square mile), of whom 30 per cent. lived in communities of more than 2000. As in the other Saxon duchies the population is almost exclusively Lutheran; in 1883 202,970 belonged to that confession, 2274 were Roman Catholics, 204 of other Christian sects, and 1627 Jews.

Saxe-Meiningen is a limited monarchy, its constitution resting on a law of 1829, subsequently modified. The diet, elected for six years, consists of 24 members, of whom 4 are elected by the largest landowners, 4 by those who pay the highest personal taxes, and 16 by the other electors. The franchise is enjoyed by all domiciled males over twenty-five years of age who pay at least a minimum of taxes. The government is carried on by a ministry of five, with departments for the ducal house and foreign affairs, home affairs, justice, education and public worship, and finance. The returns of the state-lands and the ordinary state-revenue are treated in separate budgets. The estimate for the period 1884-86 puts the annual income from the former at £105,340 [$511,952.40], and the annual expenditure at £77,915 [$378,666.90], while the annual income and expenditure of the latter are balanced at £145,148 [$705,419.28]. Half of the surplus of £27,425 [$133,285.50] is credited to each fund. The duke's civil list of £19,714 (394,286 marks [or $95,810.04]), is paid out of the returns from the state-lands, at one time in the possession of the reigning house. Saxe-Meiningen has one vote in the federal council and sends two deputies to the reichstag.

The original territory of the duchy of Saxe-Meiningen, founded in 1680 by Bernhard, third son of Ernest the Pious, consisted of what is now the western horn of the duchy, from Henneberg northwards. Bernhard was succeeded in 1706 by his three sons; but by 1746 the only survivor was the youngest, Antony Ulrich, who reigned alone until his death in 1763. The duchy had meanwhile been considerably increased in extent; but contentions and petty wars with the other Saxon principalities on questions of inheritance, the extravagance of the court, and the hardships of the Seven Years' War plunged it into bankruptcy and distress. A happier time was enjoyed under Charlotte Amalie, Antony's wife, who ruled as regent for her two sons Charles (1775–1782) and George (1782–1803), and also under these princes themselves. George, who had introduced the principle of primogeniture, was succeeded by his infant son Bernhard Erich Freund, born in 1800. The war with France at the beginning of the present century, with its attendant quartering of troops, conscription, and levies of money, joined with cattle-disease and scanty harvests in once more plunging the country into distress, from which it but slowly recovered. Bernhard had already spontaneously granted a liberal constitution to his subjects in 1824, when large additions (530 square miles) consequent upon the redistribution of the Saxon lands in 1826 more than doubled his possessions and rendered reorganization necessary. Among the additions to Saxe-Meiningen were the duchy of Hildburghausen (whence the full title of the present duchy is Saxe-Meiningen-Hildburghausen), which had been founded in 1680 by Ernest, the sixth son of Ernest the Pious; the principality of Saalfeld, which, founded by John Ernest, Ernest's seventh son, in 1680, had been united to Coburg in 1735; and the districts of Themar, Kranichfeld, Kamburg, and other smaller territories. Saxe-Meiningen, like the other Saxon duchies, entered the Confederation of the Rhine in 1806; but in 1866, unlike its neighbors, it declared for Austria in the war against Prussia. The land was at once occupied by Prussian troops, and Bernhard abdicated (September, 1866) in favor of his son George, who made peace with Prussia and entered the North German Confederation. In 1871 the dispute which had lasted since 1826 between the duke and the diet as to the respective rights of each to the state-lands was terminated by a compromise.

SAXE-WEIMAR-EISENACH (Germ. *Sachsen-Weimar-Eisenach*), the largest of the Thuringian states, is a grand duchy and a member of the German empire. It consists of the three chief detached districts of Weimar, Eisenach, and Neustadt, and twenty-four scattered exclaves, of which Allstedt, Oldisleben, and Ilmenau belonging to Weimar, and Ostheim belonging to Eisenach, are the chief. The first and last named of these exclaves are 70 miles apart; and the most easterly of the other exclaves is 100 miles from the most westerly. The total area of the grand duchy is 1387 square miles (or slightly larger than Wiltshire in England), of which 678 are in Weimar, 465 in Eisenach, and 244 in Neustadt. See Plate V.

The district of Weimar, which is at once the largest division and the geographical and historical kernel of the grand duchy, is a roughly circular territory, situated on the plateau to the northeast of the Thuringian Forest. It is bounded on the N. and E. by Prussia, on the S. and W. by the Schwarzburg Oberherrschaft and detached portions of Saxe-Altenburg, and lies 23 miles east of the nearest part of Eisenach, and 7 miles northwest of the nearest part of Neustadt. The exclaves of Allstedt and Oldisleben lie in Prussian territory 10 miles to the north and northwest respectively; Ilmenau as far to the southwest. The surface is undulating and destitute of any striking natural features, although the valleys of the Saale and Ilm are picturesque. The Kickelhahn (2825 feet) and the Hohe Tanne (2641 feet) rise in Ilmenau; but the Grosser Kalm (1814) near Remda, in the extreme south, is the highest point in the main part of Weimar. The broad-based Ettersburg (1519 feet), a part of which is known as "Herder's Hill" after the poet, rises on the Ilm plateau, near Ettersburg, where Schiller finished his *Maria Stuart*. The Saale flows through the east of the district, but, although the chief river hydrographically, it yields in fame to its tributary the Ilm. The Unstrut joins the Saale from Oldisleben and Allstedt. The chief towns are Weimar, the capital, on the Ilm; Jena, with the common university of the Thuringian states, on the Saale; and Apolda, the "Manchester of Weimar," to the west.

Eisenach, the second district in size, and the first in point of natural beauty, stretches in a narrow strip from north to south on the extreme western boundary of Thuringia, and includes parts of the church lands of Fulda, of Hesse, and of the former countship of Henneburg. It is bounded on the N. and W. by Prussia, on the S. by Bavaria (which also surrounds the exclave of Ostheim), and on the E. by Saxe-Meiningen and Saxe-Gotha. The north is occupied by the rounded hills of the Thuringian Forest, while

the Rhön Mountains extend into the southern part. The chief summits of the former group, which is more remarkable for its fine forests and picturesque scenery than for its height, are the Wartburg Hill (1355 feet), the northwestern termination of the system, Ottowald (2103 feet), Wachstein (1801) feet), Ringberg (2106 feet), Hohe Vogelheid (2378 feet), and the Glöckner (2211 feet). Among the Rhön Mountains in Eisenach the loftiest summits are the Elnbogen (2677 feet), Bayerberg (2359 feet), Hohe Rain (2375), and the Gläserberg (2231 feet). The chief river is the Werra, which flows across the centre of the district from east to west, and then bending suddenly northwards, re-enters from Prussia, and traverse the northeastern parts in an irregular course. Its chief tributaries in Eisenach are the Hörsel and the Ulster. Eisenach is the only town of importance in this division of the grand duchy.

Neustadt, the third of the largest divisions, is distinguished neither by picturesque scenery nor historical interest. It forms an oblong territory, about 24 miles long by 16 broad, and belongs rather to the hilly district of the Voigtland than to Thuringia. It is bounded on the N. by Reuss (junior line) and Saxe-Altenburg, on the W. by Saxe-Meiningen and a Prussian exclave, on the S. by the two Reuss principalities, and on the E. by the kingdom of Saxony. The Kesselberg (1310 feet), near the town of Neustadt, is the chief eminence. This district lies in the basin of the Saale, its chief streams being the White Elster, the Weida, and the Orla. Neustadt, Auma, and Weida are the principal towns.

Agriculture forms the chief occupation of the inhabitants in all parts of the duchy, though in Eisenach and Ilmenau a large proportion of the area is covered with forests. According to the returns for 1883, 56.3 per cent. of the entire surface was occupied by arable land, 25.8 per cent. by forests, 8.8 by pasture and meadow-land, and 4.1 per cent. by buildings, roads, and water. Only 5 per cent. was unproductive soil or moorland. These figures indicate that Saxe-Weimar-Eisenach has nearly as large a percentage of arable land as Saxe-Altenburg, and, notwithstanding the extensive woods in Eisenach and Ilmenau, a lower proportion of forest than any other Thuringian state. In 1883 the chief grain crops were oats (80,682 acres, yielding 38,271 tons), barley (78,067 acres, 45,249 tons), rye (72,607 acres, 29,006 tons), and wheat (47,732 acres, 19,949 tons). About 50,000 acres were planted with potatoes, yielding 237,627 tons, or nearly 4 per cent. per acre less than the average of the five years immediately preceding. All the grain crops were slightly above the average of the same period. The 79,405 acres devoted to hay produced 98,910 tons. Among the other crops were beet-root for sugar (8602 acres), flax (1300 acres), and oil-yielding plants (4562 acres). Fruit grows in abundance, especially in the neighborhood of Jena, in the valley of the Gleisse, and on the lower Ilm; 1070 acres, mostly on the banks of the Saale, were occupied with vines. Of the forests 38.5 per cent. are deciduous and 61.5 per cent. coniferous trees; fully a half of the former are beeches. The greater part of the forests belong to the Government. Cattle-raising is carried on to a considerable extent, especially in Eisenach and Neustadt, while the sheep-farming centres in Weimar. The grand-ducal stud-farm in Allstedt maintains the breed of horses. In 1883 the duchy contained 17,271 horses, 110,092 cattle, 145,442 sheep, 101,443 pigs, and 41,291 goats. Although iron, copper, cobalt, and lignite are worked, the mineral wealth is trifling. Salt is also worked at different places.

The manufacturing industries in the grand duchy are considerable; they employ 37.3 per cent. of the population. The most important is the textile industry, which centres in Apolda, and employs more than 20,000 hands throughout the country. The production of woollen goods (stockings, cloth, underclothing) forms the leading branch of the industry; but cotton and linen weaving and yarn-spinning are also carried on. Large quantities of earthenware and crockery are made, especially at Ilmenau. The microscopes of Jena, the scientific instruments (thermometers, barometers, etc.), of Ilmenau, and the pipes and cigar-holders of Ruhla (partly in Gotha) are well known. Leather, paper, glass, cork, and tobacco are among the less prominent manufactures. There are numerous breweries in the duchy. The volume of trade is not very great, although some of the productions (chiefly those first mentioned) are exported all over Europe, and in some cases to other continents as well. The chief imports, besides colonial goods, are wool for the manufactures, hides, coal, meerschaum (from Smyrna and Vienna), amber, horn, etc. Eisenach and Weimar are the chief seats of trade.

The population in 1880 was 309,577, or 223 per square mile, of whom 297,735 were Lutherans, 10,267 Roman Catholics, 327 Christians of other sects, and 1248 Jews. The Thuringian and Franconian branches of the Teutonic family are both represented in the duchy. According to the employment census of 1882, agriculture, forestry, and fishing supported 135,200 or 44 per cent. of the population; industrial pursuits, 114,835 or 37.3 per cent.; trade, 23,939 or 7.8 per cent.; service, 4086 or 1.3 per cent.; official, military, and professional employments, 16,066 or 5.2 per cent.; while 13,597 persons or 4.4 per cent. made no returns.

Saxe-Weimar-Eisenach is a limited hereditary monarchy, and was the first state in Germany to receive a liberal constitution. This was granted in 1816 by Charles Augustus, the patron of Goethe, and was revised in 1850. The diet consists of one chamber with thirty-one members, of whom one is chosen by the nobility, four by owners of land worth at least £150 [$729] a year, five by those who derive as much from other sources, and twenty-one by the rest of the inhabitants. The diet meets every three years; the deputies are elected for six years. The franchise is enjoyed by all domiciled citizens over twenty-five years of age. The government is carried on by a ministry of three, holding the portfolios of finance, of home and foreign affairs, and of religion, education, and justice, with which is combined the ducal household. The budget for the finance-period 1884–86 estimated the yearly income at £308,586 [$1,499,727.96] and the yearly expenditure at about £1560 [$7,581.60] less. The public debt is more than covered by the active capital. The ducal house receives a civil list of £46,500 [$225,990]. The Saxe-Weimar family is the oldest branch of the Ernestine line, and hence of the whole Saxon house. By treaties of succession the grand-duke is the next heir to the throne of Saxony, should the present Albertine line become extinct. He is entitled to the predicate of "royal highness." By a treaty with Prussia in 1867, which afterwards became the model for similar treaties between Prussia and other Thuringian states, the troops of the grand duchy were incorporated with the Prussian army.

In the early times Weimar, with the surrounding district, belonged to the counts of Orlamünde, and from the end of the 10th century until 1067 it was the seat of a line of counts of its own. It afterwards fell to the landgrave of Thuringia, and in 1440 passed into the possession of Frederick the Mild, elector of Saxony. Involved after the convention of Wittenberg (1547) in the complicated and constantly shifting succession arrangements of the Ernestine dukes of Saxony, who delayed the introduction of primogeniture, Weimar does not emerge into an independent historical position until 1640, when the brothers William, Albert, and Ernest the Pious founded the principalities of Weimar, Eisenach, and Gotha. Eisenach fell to Weimar in 1644, and, although the principality was once more temporarily split into the lines Saxe-Weimar, Saxe-Eisenach (1672–1741), and Saxe-Jena (1672–1690), it was again reunited under Ernest Augustus (1728–1748), who secured it against future subdivision by adopting the principle of primogeniture. His son of the same name who succeeded died in 1758, two years after his marriage with Anna Amalia of Brunswick. Next year the duchess Amalia, although not yet twenty years old was appointed by the emperor regent of the principality and guardian of her infant son Charles Augustus (1758–1828). The reign of the latter, who assumed the government in 1775, is the most brilliant epoch in the history of Saxe-Weimar. A gifted and intelligent patron of literature and art, Charles Augustus attracted to his court the leading authors and scholars of Germany. Goethe, Schiller, and Herder were members of the illustrious society of the capital, and the university of Jena became a focus of light and learning, so that the hitherto obscure little state attracted the eyes of all Europe.[1] The war with France was fraught with danger to the continued existence of the principality, and after the battle of Jena (October 14, 1806) it was mainly the skilful management of the duchess Louise that dissuaded Napoleon from removing her husband from among the reigning princes. In 1807 Saxe-Weimar-Eisenach entered the confederation of the Rhine, and was promoted from a principality (Fürstenthum) to a duchy (Herzogthum). In

[1] An article on Saxe-Weimar-Eisenach would hardly be complete without Goethe's famous lines:

"Klein ist unter den Fürsten Germaniens freilich der meine,
Kurz und schmal ist sein Land, mässig nur was er vermag;
Aber so wende nach innen, so wende nach aussen die Kräfte
Jeder, da wär' ein Fest Deutscher mit Deutschen zu sein."

the following campaigns it suffered greatly; and in 1815 the congress of Vienna recompensed its ruler with an addition to his territory of 660 square miles (including most of Neustadt) with 77,000 inhabitants, and with the title of grand-duke (Grossherzog). On the restoration of peace Charles Augustus redeemed his promise of granting a liberal constitution (1816). Freedom of the press was also granted, but after the festival of the Wartburg in 1819 it was seriously curtailed. Charles Frederick (1828–1853) continued his father's policy, but his reforms were neither thorough enough nor rapid enough to avert political commotion in 1848. A popular ministry received power, and numerous reforms were carried through. Reaction set in under Charles Alexander, who succeeded his father in 1853, and the union of the state-lands and crown-lands was repealed, though both were appointed to remain under the same public management. In 1866 the grand duchy joined Prussia against Austria, although its troops were then garrisoning towns in the Austrian interest; later it entered the North German Confederation. The press restrictions were removed in 1868 and the tendency of recent legislation has been liberal. (F. MU.)

SAXIFRAGE (*Saxifraga*), a genus of plants which gives its name to the order of which it is a member. There are nearly 200 species distributed in the temperate and arctic parts of the northern hemisphere, frequently at considerable heights on the mountains. They are mostly herbs with perennial rootstocks, leaves in tufts, or, on the flower-stalks, scattered. The arrangement of the flowers is very various, as also are the size and color of the flowers themselves. They have a calyx with a short tube, five petals, ten (or rarely five) stamens springing, like the petals, from the edge of the tube of the calyx. The pistil is partly adherent to the calyx-tube, and is divided above into two styles. The ovules are numerous, attached to axile placentas. The seed-vessel is capsular. Many species are natives of Britain, some alpine plants of great beauty (*S. oppositifolia*, *S. nivalis*, *S. aizoides*, etc.), and others, like *S. granulata*, frequenting meadows and low ground, while *S. tridactylites*, may be found on almost any dry wall. Many species are in cultivation, including the Bergenias or Megaseas with their large fleshy leaves and copious panicles of rosy or pink flowers, the numerous alpine species, such as *S. pyramidalis*, *S. Cotyledon*, etc., with tall panicles studded with white flowers, and many others.

SAXO GRAMMATICUS, the celebrated Danish historian and poet, belonged to a family of warriors, his father and grandfather having served under king Valdemar I. (d. 1182). He himself was brought up for the clerical profession, entered about 1180 the service of Archbishop Absalon as one of his secretaries, and remained with him in that capacity until the death of Absalon in 1201. At the instigation of the latter he began, about 1185, to write the history of the Danish Christian kings from the time of Sven Estridsön, but later Absalon prevailed on him to write also the history of the earlier, heathen times, and to combine both into a great work, *Gesta Danorum*. The archbishop died before the work was finished, and therefore the preface, written about 1208, is dedicated to his successor Archbishop Andreas, and to King Valdemar II. Nothing else is known about Saxo's life and person; a chronicle of 1265 calls him "miræ et urbanæ eloquentiæ clericus"; and an epitome of his work from about 1340 describes him as "egregius grammaticus, origine Sialandus"; that he was a native of Zealand is probably correct, inasmuch as, whereas he often criticises the Jutlanders and the Scanians, he frequently praises the Zealanders. The surname of "Grammaticus" is probably of later origin, scarcely earlier than 1500, apparently owing to a mistake. The title of "provost (dean) of Röskilde," given him in the 16th century, is also probably incorrect, the historian being confounded with an older contemporary, the provost of the same name. Saxo, from his apprenticeship as the archbishop's secretary, had acquired a brilliant but somewhat euphuistic Latin style, and wrote fine Latin verses, but otherwise does not seem to have had any very great learning or extensive reading. His models of style were Valerius Maximus, Justin, and Martianus Capella, especially the last. Occasionally he mentions Bede, Dudo, and Paulus Diaconus, but does not seem to have studied them or any other historical works thoroughly, and he neither understands nor is interested in scientific research, in general history, or even in chronology. He wrote because he did not like his countrymen to be behind other nations through the want of an historian, and because he wished to perpetuate the record of the exploits of the Danes. His sources are partly Danish traditions and old songs, partly the statements of Archbishop Absalon, partly the accounts of Icelanders, and, lastly, some few earlier, but scanty, sources, being lists of Danish kings and short chronicles, which furnished him with some reliable chronological dates. He considered traditions as history, and therefore made it his chief business to recount and arrange these, by the help of the lists of the kings, into a connected whole. His work, therefore, is a loosely connected series of biographies of Danish kings and heroes; he dwells with predilection on those periods during which Danish kings were said to have made great conquests, and he represents these conquerers as the paragons of their times.

The first nine books comprise "Antiquity," that is, traditions of kings and heroes of the half-mythical time up to about 950. Here we have traditions about Fredfrode, about Amleth (Hamlet) and Fenge, about Rolf Krake, Hadding, the giant Starkather, Harald Hildetann, and Ragnar Lodbrok. In this earlier history Saxo has also embodied myths of national gods who in tradition had become Danish kings, for instance, Balder and Hother, and of foreign heroes, likewise incorporated in Danish history, as the Gothic Jarmunrik (A. S. Eormenríe), the Anglian Vermund (A. S. Gármund) and Uffe (A. S. Offa), the German Hedin and Hild, etc. Frequently the narrative is interrupted by translations of poems, which Saxo has used as authentic sources, although they are often only a few generations older than himself. In the later books (x.–xvi.) of his work he follows to a greater extent historical accounts, and the more he approaches his own time the fuller and the more trustworthy his relation becomes; especially brilliant is his treatment of the history of King Valdemar and of Absalon. But his patriotism often makes him partial to his countrymen, and his want of critical sense often blinds him to the historical truth.

Saxo's work was widely read during the Middle Ages, and several extracts of it were made for smaller chronicles. It was published for the first time, from a MS. afterwards lost, in Paris, 1514, by the Danish humanist Christiern Pedersen; this edition was reprinted at Basel, 1534, and at Frankfort, 1576. Of later editions may be mentioned that of Stephen Stephanius, Sorö, 1644, that of C. A. Klotz, Leipsic, 1771, and that of P. E. Müller and J. M. Velschow, Copenhagen, 1839. No complete MS. any longer exists; yet of late small fragments have been found of three MSS. The most remarkable of these is the fragment found at Angers, in France, written shortly after 1200, perhaps by Saxo himself or under his superintendence; here several corrections are found above the lines, showing how the author varied and polished his Latin style.

SAXON DUCHIES. For the four Saxon duchies, SAXE-ALTENBURG, SAXE-COBURG-GOTHA, SAXE-MEININGEN, and SAXE-WEIMAR-EISENACH, see those headings.

SAXONS, LAW OF THE. See SALIC LAW.

SAXONY is the name successively given in German history to a mediæval duchy in northern Germany, to a later electorate which afterwards became the present kingdom of Saxony (described below), and to a ducal province of Prussia. The last was formed directly out of part of the second in 1815, but the connection between the first and second, as will be seen from the present article, is neither local nor ethnographical but political. Plate V.

The Saxons (Lat. *Saxones*, Ger. *Sachsen*), a tribe of the Teutonic stock, are first mentioned by Ptolemy as occupying the southern part of the Cimbrian peninsula between the Elbe, Eider, and Trave, the district now known as Holstein. The name is most

commonly derived from "sahs," a short knife, though some authorities explain it as meaning "settled," in contrast to the Suevi or "wandering" people. By the end of the 3d century, when we hear of a "Saxon Confederation" embracing the Cherusci, Chauci, and Angrivarii, and perhaps corresponding to the group of tribes called Ingævones by Tacitus, the chief seat of the nation had been transferred south of the Elbe to the lands on both sides of the Weser now occupied by Oldenburg and Hanover. The Saxons were one of the most warlike and adventurous of the Teutonic peoples, and they not only steadily extended the borders of their home, but made colonizing and piratical excursions by sea far and wide. In 287 they assisted the Menapian Carausius to make himself master of Romanized Britain, where he assumed the title of Augustus; and on the Continent they came into collision with the Roman empire under both Julian and Valentinian, the latter of whom defeated them in 373 so far south as Deutz, opposite Cologne. Their settlements along the coast of France extended to the mouth of the Loire, and, though these were soon absorbed by the Franks, their expeditions to England finally resulted in the foundation of lasting kingdoms (Essex, Sussex, Wessex) (see ENGLAND, vol. viii. pp. 244 *sq.*).[1] About the beginning of the 5th century part of the Flemish coast became known as the *Litus Saxonium*, from the settlements of this people. The Saxons who remained in Germany (Alt-Sachsen or Old Saxons) gradually pushed their borders further and further until they approached the Rhine, and touched the Elbe, the North Sea, and the Harz Mountains. In 531 they joined their neighbors the Franks in a successful expedition against the Thuringians, and received as their spoil the conquered territory between the Harz and the Unstrut. Their settlements here were, however, forced to acknowledge the supremacy of the Franks, and from this period may be dated the beginning of the long strife between these two peoples which finally resulted in the subjugation of the Saxons. During the reigns of the weak Merovingian kings who succeeded Lothair I. on the Frankish throne, the Saxons pushed into northern Thuringia, afterwards known as the Alt-Mark. Pippin the Short obtained a temporary advantage over them in 753 and imposed a tribute of three hundred horses, but their final conquest was reserved for Charlemagne. At this time the Saxons did not form a single state under one ruler, but were divided into the four districts of Westphalia to the west of the Weser, Eastphalia chiefly to the east of that river, Engern or Angria along both banks, and Nordalbingia in Holstein. The gaus were independent, each having an ealdorman of its own; and they only combined in time of war or other emergency to choose a herzog, or common leader. The people were divided into the "frilinge" or "frone," who possessed the land, the "liti" or "lazzi," a semi-freed class, and the serfs, who had no rights. The "edilinge" were the chiefs, but had no political advantages over the "frilinge." Their religion was a simple type of northern heathenism. See GERMANY, vol. x. pp. 426 and 429 *sq.*

In 772 Charlemagne, induced partly by a desire to protect his kingdom from the incursions of hostile neighbors and partly by a proselytizing spirit, began the subjugation of the Saxons. The war, waged on both sides with the utmost ferocity, lasted in a series of campaigns with but brief intervals for thirty-one years. Repeatedly conquered and baptized, the Saxons rose again and again in revolt as soon as Charlemagne withdrew his troops, threw off their forced allegiance to Christianity, and under various leaders, of whom Wittekind or Widukind is the most famous, struggled fiercely to regain their independence. Charlemagne was too strong and his measures too relentless. On one occasion he butchered 4500 captives in cold blood, as a revenge and a warning. Wittekind surrendered and was baptized in 785; and after what is called the Second Saxon War, which broke out in 792, resistance died away about 803. The Saxons were allowed a considerable amount of freedom by their sagacious conqueror. The first *Capitulare Saxonicum*, issued at Paderborn in 788, while very strict in maintaining Christianity and in punishing all rebellion, confirmed a great number of Saxon customs and laws. After 803 the laws were made milder, and no tribute except tithes was demanded. The people lived according to their former laws,[2] under grafs appointed by Charlemagne; various bishoprics were founded, of which Osnabrück (783), Verden (786), and Bremen (787), are the earliest; and tranquillity was still further secured by transplanting colonies of Saxons to other parts of the kingdom, and introducing Frankish colonies to take their place in Saxony. The land now gradually became an integral portion of the kingdom of the Franks.[3] Under Louis the German, to whom Saxony had fallen at the treaty of Verdun in 843, it was harassed by the inroads of the Normans and Slavs on either side, and, in order to cope with these, herzogs or dukes were appointed about 850 to keep the Saxon Mark, a narrow territory in Nordalbingia, on the west bank of the Elbe. These herzogs, remembering their predecessors or their ancestors (Ludolf, the first duke of Saxony, is said to have been a descendant of Wittekind), rapidly extended their power beyond the mark over the rest of Saxony, and thus founded the powerful duchy of Saxony. Otto the Illustrious, who succeeded his brother Bruno as duke in 880, added Thuringia to the duchy, and attained such a pitch of power that he was offered the crown of Germany in 911. He refused the honor on the score of old age, but his son Henry the Fowler accepted it in 919, and founded the line of Saxon emperors which expired with Henry II. the Pious in 1024. Otto the Great, son of Henry I., bestowed the duchy of Saxony upon Hermann Billing or Billung, in whose family it remained till 1106. The power and influence of Saxony during this period depended partly on the favor of the emperors, but chiefly on the sagacity and energy of the successive dukes. The Saxons were hostile to the Franconian emperors who succeeded the Saxon house, and in 1073 they rose in revolt against Henry IV. They were at first successful, but in 1075, at the battle of Langensalza, they were defeated by the emperor. The rebels were severely punished, though Otto of Nordheim, one of their leaders, was made administrator of the duchy. Taking advantage of Henry IV.'s troubles with the pope, they again rebelled and espoused the cause of Rudolf of Swabia; but in 1087, on the resignation of Hermann of Luxemburg, whom they had chosen king, they made peace once more with the emperor. Magnus was the last duke of the Billing line. The emperor Henry V. now (1106) presented the lapsed duchy to Lothair, count of Supplinburg, who rapidly became the most powerful prince in Germany, and in 1125 was placed on the imperial throne by the influence of the papal party. Two years after his elevation he assigned the duchy of Saxony to his powerful son-in-law Henry the Proud, who was already duke of Bavaria and had inherited the private possessions of the Billings in Saxony, in right of his mother, who was a daughter of Magnus. Henry had aspired to be emperor in 1138, and his suc-

[1] Though the Saxons were not the first to effect the foundation of a Teutonic kingdom in England, they were the first to attempt it; and hence their name was applied (as it still is) by the Celtic inhabitants of the British islands to all Teutonic settlers. A similar general use of the name survives in Transylvania, where the German inhabitants are called "Saxons," although only a small proportion of them trace their descent from the Saxon branch of the Teutonic family.

[2] The *Lex Saxonum*, 19 titles of which have survived, was reduced to writing under Charlemagne. See under SALIC LAW.

[3] The *Heliand* (Saviour), a religious poem ascribed to an unknown Saxon poet of the 9th century, is often cited as a proof of the rapid Christianization of the Saxons. It is also almost the only relic of their dialect.

cessful rival Conrad III., wishing to reduce his power, alleged that it was unlawful for one prince to hold two duchies, and ordered him to resign Saxony. On his refusal, the emperor immediately declared both duchies to be forfeited. Henry died before the ensuing war was ended, and Conrad compromised matters by appointing his opponent's young son, afterwards known as Henry the Lion, to the duchy of Saxony, compensating Albert the Bear, the former imperial candidate, with the independence of the North Mark of Saxony, afterwards called Brandenburg (see PRUSSIA, vol. xx. p. 6). In 1155 Henry received Bavaria from his cousin and personal friend the emperor Frederick Barbarossa, and thus became second only to the emperor in power. He added considerably to the extent of Saxony by conquest among the Wends, east of the Elbe, where the boundary had always been a fluctuating one. But Henry was not only powerful, he was also arrogant, and incurred the jealousy of the other princes, so that, when he quarrelled with the emperor and his lands were declared forfeited in 1180, he had no allies to assist him in his resistance. Westphalia, the principal part of Saxony, went to the archbishop of Cologne, the Saxon Palatinate to the landgrave of Thuringia, and other portions to other princes. A small district round Lauenburg, north of the Elbe, was assigned with the title of duke of Saxony to Bernhard of Ascania, son of Albert the Bear. Henry was reduced to submission in 1181; but his duchies could not be restored, and he was forced to content himself with Brunswick and Lüneburg. The duchy of Saxony was never restored in the old sense, in which it had been one of the four principal duchies of the empire, and embraced the territories now occupied by Westphalia, Oldenburg, Hanover, the Harz, and parts of Mecklenburg and Holstein. The new creation never rose to any importance. Bernhard of Ascania (1181–1212), before his accession as duke of Saxony, had held Anhalt and Wittenberg, to the southeast of Saxony, and separated from it by the Mark of Brandenburg; and when his grandsons John and Albert II. divided their inheritance in 1260 the latter placed his seat at Wittenberg, and two tiny duchies arose—Saxe-Lauenburg and Saxe-Wittenberg. Saxe-Lauenburg was now the only part of the great duchy which retained the name; while Saxe-Wittenberg, the nucleus of the later electorate, transferred the name to entirely new soil. Both duchies claimed the electoral privileges, including the office of grand marshal (Erzmarschall), which had belonged to the original duke of Saxony, but the Golden Bull of 1356 confirmed the claims of Wittenberg. Rudolph II. (about 1370) is the first duke who formally styles himself elector (*princeps elector*). The small electorate was made still smaller in 1411 by the formation of Anhalt into a separate principality. In 1422 the Ascanian line became extinct with Albert III., and in 1423 the emperor Sigismund conferred their lands and titles upon Frederick, margrave of Meissen, and landgrave of Thuringia, to whom he was deeply indebted both for money and assistance in the Hussite wars. The new and more honorable style of elector of Saxony superseded Frederick's other titles, and the term Saxony gradually spread over all his other possessions, which included the country now known under that name. The early history of the electorate and kingdom of Saxony is thus the early history of the Mark of Meissen, the name of which now lingers only in a solitary town on the Elbe.[1]

Among the mountains of Lusatia, in the south of the Saxon province of Bautzen, there exist to this day about 50,000 Wends, possessing characteristics and speaking a language of their own. These curious people are the relics of a vast Slavonic horde which, appearing on the borders of the kingdom of the Hermunduri or Thuringians about the 4th century, pressed into their territories on the downfall of that kingdom in the 6th century, and settled themselves between the Spree and the Saale. They were known as the Sorbs or Sorabi, and the country, which included the whole of the modern kingdom of Saxony, was called Sorabia. Warlike and persistent, their influence has never been obliterated, and, though conquered, their stock has neither been exterminated nor absorbed. They were skilled in agriculture and cattle-breeding, and soon improved the fertile soil of their new settlements. Some writers are disposed to recognize their influence in the strong bent to agricultural and industrial pursuits which has ever since characterized the inhabitants of this part of Germany; and less doubtful traces have been left in the popular superstitions and legends, and in the local names. For more than a hundred years after their first collision with the German kingdom the Sorbs repulsed all attacks, but in 928 Henry the Fowler, the first Saxon emperor, crossing the Elbe, devastated the land of the Daleminzians, and built the strong castle of Misnia or Meissen, which thenceforward formed the centre of a gradually increasing mark against the heathen. For two hundred years the office of margrave of Meissen was not hereditary, but in 1123 Count Conrad of Wettin obtained the succession for his house, and founded a line of princes whose descendants still occupy the throne. It is said, though on very doubtful grounds, that Conrad was a scion of the family of the old Saxon hero Wittekind. In 1156, when Conrad abdicated and set the pernicious example of dividing his lands among his sons, his possessions extended from the Neisse and the Erzgebirge to the Harz and the Saale. During these two centuries the state of the country had but slowly improved. The Sorbs had been reduced to a condition of miserable serfdom, and the best land was in the hands of Frankish peasants who had been attracted by its fertility. Agriculture was encouraged by the ecclesiastics, especially by Bishop Benno, who occupied the see of Meissen (founded in 961) about the time of the conquest of England by the Normans. In the reign of Otto the Rich (1157–1190) the first silver mines were discovered, and the famous mining town of Freiberg founded. Trade also received its first encouragement; the great fairs of Leipsic were protected; and roads were made and towns fortified with the produce of the mines. Otto's grandson, Henry the Illustrious (1221–1288), whose mother Jutta was a Thuringian princess, reunited most of Conrad's lands by inheriting part of Thuringia (the rest went to the duke of Brabant) and the Pleissnerland, as the district on both banks of the upper course of the Pleisse was called. He too lost the chance of founding a magnificent kingdom in the heart of Germany, by subdividing his territories, which stretched in a compact mass from the Werra to the Oder and from the mountains of Bohemia to the Harz. The consequences of this policy of subdivision, which was followed by his successors, were bitter family feuds and petty wars, seriously hampering the development of the country. Frederick the Grave (1324–1347) was the last prince of the house of Wettin who was sole ruler of all the ancestral lands of his house. The next powerful figure is Frederick the Warlike, who became margrave in 1381. Besides the Mark he possessed the Osterland, the territory to the northwest of the present kingdom, stretching from the Saale at Weissenfels to the Elbe at Torgau, and embracing the plain of Leipsic. Frederick, in whose reign the university of Leipsic was founded, had acquired his surname by his energetic support of Sigismund, especially in the Hussite wars. As we have seen, that emperor's desire to attach to himself so powerful an ally led him to bestow the vacant electoral duchy of Saxe-Wittenberg upon the margrave in 1423. Despite the troublous state of public affairs, the internal prosperity of the land had steadily advanced. Most of the chief towns had by this time been founded,—Leipsic, Erfurt, Zwickau, and Freiberg being the most conspicuous. Chemnitz had begun its textile industry. The condition of the peasants was still far below that of the burghers of the towns; many of them were mere serfs. The church retained the high pitch of power which it had early attained in Meissen, and religious institutions were numerous all over the most fertile districts. In spite of fresh discoveries of silver, the pecuniary wants of the princes had to be occasionally sup-

[1] A different and considerably later use of the name Saxony may be conveniently mentioned here, for, though not based upon any political or ethnographical considerations, it is frequently referred to in German history. When Maximilian (1493–1519) formed the ten great imperial administrative circles, that part of the empire to the east of the Weser and north of the Erzgebirge was divided between the circles of Lower and Upper Saxony. The former, occupying the northwest of this territory, included the Harz principalities, Magdeburg, Brunswick, Mecklenburg, Bremen, and Holstein; the latter, besides Thuringia, the electorate of Saxony and Brandenburg, embraced the conquered Slavonic lands to the east and north, including Lusatia and Pomerania. The lands which still preserve the name of Saxony are thus all within the limits of these circles.

SAXONY.

9 10 11 12 13 14 15

HANOVER
BRUNSWICK
PRUSSIA
Altmark
Magdeburg
Mittelmark
Potsdam
BRANDENBURG
Hildesheim
LIPPE DETMOLD Detmold
HESSE CASSEL
HESSE DARMSTADT Part of)
WALDECK
SAXE GOTHA
SAXE WEIMAR
SAXE MEININGEN
SAXE COBURG
SCHWARZBURG
SAXE ALTENBURG
KINGDOM OF SAXONY
BOHEMIA
BAVARIA

Verden Uelzen Wittenberge Soldin Landsberg
Hoya Kyritz Königsberg
Nienburg Celle Salzwedel Osterburg Stendal Gardelegen Gifhorn Hagenburg Wölpinghausen Langenhagen HANOVER Minden Bückeburg Lemgo Hameln Pyrmont Detmold Paderborn Einbeck Holzminden Osterode Göttingen Northeim Uslar Warburg Arolsen Frankenberg Rotenburg Hersfeld Alsfeld Lauterbach Fulda Schlüchtern Gelnhausen Hanau Frankfurt
Wolfenbüttel Helmstedt Braunschweig Brunswick Wolfenbüttel Seesen Goslar Harzburg Wernigerode Quedlinburg Aschersleben Bernburg Cöthen Halberstadt Magdeburg Burg Calvörde Neuhaldensleben Wolmirstedt Neustadt Sudenburg Schönebeck Barby Zerbst Jüterbogk Dessau Zahna Seida Wittenberg Lucken Lübben Guben Krossen
Heiligenstadt Mühlhausen Sangerhausen Eisleben Hettstedt Gerbstedt Könnern Bernburg Aken Köthen Halle Merseburg Weissenfels Naumburg Zeitz Leipzig Eilenburg Torgau Schildau Belgern Mühlberg Elsterwerda Hoyerswerda Finsterwalde Spremberg Sommerfeld Forst Sorau
Eschwege Witzenhausen Kassel Cassel Hofgeismar Grebenstein Immenhausen Münden Langensalza Mühlhausen Eisenach Gotha Erfurt Weimar Jena Apolda Buttelstedt Kölleda Sömmerda Weissensee Freyburg Naumburg Lützen Grimma Colditz Leisnig Oschatz Mügeln Eilenburg Wurzen Delitzsch Düben Strehla Kamenz Bautzen Görlitz Lauban Zittau
Hersfeld Alsfeld Lauterbach Fulda Schlüchtern Gelnhausen Hanau Frankfurt Meiningen Römhild Sonneberg Coburg Hildburghausen Eisfeld Saalfeld Rudolstadt Blankenburg Arnstadt Ilmenau Suhl Schleusingen Gera Greiz Zeulenroda Plauen Reichenbach Zwickau Hohenstein Chemnitz Freiberg Dresden Pirna Königstein Schandau Tetschen Aussig Teplitz Leitmeritz Leipa Karlsbad Eger Hof Schönberg Adorf Oelsnitz Auerbach Falkenstein Eibenstock Schneeberg Annaberg Marienberg Brüx
Frankfurt Sinn Aschaffenburg Würzburg Bamberg Münchberg Kronach Lichtenfels Forchheim Erlangen Nürnberg Fürth Schwabach Ansbach Gunzenhausen Weissenburg Eichstädt Neumarkt Regensburg Amberg Sulzbach Weiden Tirschenreuth Eger Karlsbad Plauen Hof Schönberg Adorf Oelsnitz Auerbach Falkenstein Eibenstock Schneeberg Annaberg Marienberg Brüx

Note to Colouring
Kingdom of Saxony
Saxon Duchies
Prussian Province of Saxony
Scale of English Miles
0 10 20 30 40

Longitude East 12 from Greenwich

plied by contributions called "bedes" from the nobles and ecclesiastics, who were summoned from time to time to meet in a kind of diet.

Frederick's new dignities as elector, combined with his personal qualities, now made him one of the most powerful princes in Germany; had the principle of primogeniture been established in the country as he left it, Saxony and not Brandenburg might have been the leading power in the empire to-day. He died in 1428, just in time to escape the grief of seeing his lands cruelly ravaged by the Hussites in 1429 and 1430. The division of territory between his two sons, Frederick the Mild (1428–1464) and William, once more called forth destructive internecine wars (the "Brüderkrieg"), in which the former for a time forgot his surname. It was in 1455, during this war, that the knight Kunz von Kaufungen carried into execution his bold, though only momentarily successful, plan of stealing the two young sons of the elector Frederick. Ernest and Albert, the two princes in question, succeeded to their father's possessions in 1464, and for twenty years ruled peacefully in common. The land rapidly prospered during this respite from war. Trade made great advances, encouraged by an improved coinage, which was one of the consequences of the silver discoveries on the Schneeberg. Several of the powerful ecclesiastical principalities were at this time held by members of the Saxon electoral house, so that the external influence of the electorate corresponded to its internal prosperity. Matters were not suffered to continue thus. The childless death of their uncle William in 1482 bequeathed Thuringia to the two princes, and the younger Albert insisted upon a division of the common possessions. In August, 1485, the Partition of Leipsic took place, which resulted in the foundation of two Saxon lines, the Ernestine and the Albertine. The lands were never again united. Ernest divided the lands into two portions, and Albert chose. Apart from the electoral duchy of Wittenberg, which necessarily went to Ernest as the elder brother, the lands were divided into Thuringia, half of the Osterland, and Naumburg and the Voigtland on the one hand, and Meissen and the remaining parts of eastern Saxony on the other. To Ernest's deep chagrin, Albert chose Meissen, the old ancestral lands of the Wettins. The former only survived his vexation a year.

The electorate remained at first with the Ernestine line. Ernest was succeeded by his son Frederick the Wise (1486–1525), one of the most illustrious princes in German history. Under his rule Saxony was perhaps the most influential member of the German empire; and on the death of Maximilian the imperial crown itself was offered to him, but he vindicated his character by refusing it. In this reign Saxony became the cradle of the Reformation. The elector's wise tolerance and subsequent protection and hearty support of Luther are well known to every reader. He is said to have remained unmarried out of love to his brother John, who succeeded him. He died during the horrors of the Peasants' War. John (1525–1532) was an even more enthusiastic favorer of the Reformed doctrines, and shared the leadership of the Schmalkald League with Philip of Hesse. His son, John Frederick the Magnanimous (1532–1547), might with equal propriety have been surnamed the Unfortunate. He took part in the Schmalkald War, but in 1547 was captured at Mühlberg by the emperor Charles V., and forced to sign the capitulation of Wittenberg. This deed transferred the electorate and nearly all the Saxon lands to the Albertine line, whose astute representative had taken the imperial side. Only a few scattered territories in Thuringia were reserved for John Frederick's sons, and on these were afterwards founded the Ernestine duchies of Weimar, Gotha, etc. For the second time in the history of the Saxon electorate, the younger line on a division ultimately secured the highest dignity, for the Wittenberg line had been junior to the Lauenburg line. The Albertine line is now the royal line of Saxony.

The Albertine Maurice became elector after the capitulation of Wittenberg. He was the grandson of the founder of his house, and had been preceded on the throne of Meissen by his uncle George (1500–1539) and by his father Henry (1539–1541). George was a zealous Roman Catholic, and had vainly endeavored to stem the Reformation in his dominions; Henry was an equally devoted Protestant. Maurice (1541–1553) was also a Protestant, but he was too astute to permit his religion to blind him to his political interests. His ruling motive seems to have been ambition to increase his personal power and the consequence of his country. He refused to join the Schmalkald League with the other Protestant princes, and made a secret treaty with the emperor instead. By invading the Ernestine lands in John Frederick's absence during the Schmalkald War, he forced that prince to return hastily from the Danube, and thus weakened the army opposed to the emperor. Though he was compelled to retreat before his indignant and surprised kinsman, his fidelity to the emperor was rewarded, as we have seen, at the capitulation of Wittenberg. All the lands torn from the Ernestines were not, however, assigned to Maurice; he was forced to acknowledge the suzerainty of Bohemia over the Voigtland and the Silesian duchy of Sagan, and to renounce his own superiority over the Reuss dominions. The Roman Catholic prelates were moreover reinstated in the three great bishoprics of Meissen, Merseburg, and Naumburg-Zeitz. Recognizing as a Protestant sovereign that the best alliance for securing his new possessions was not with the Roman Catholic emperor but with the other Protestant princes, Maurice now began to withdraw from the former and to conciliate the latter. In 1552, suddenly marching against the emperor at Innsbruck, he extorted from him the peace of Passau, which accorded religious freedom throughout Germany. Thus, at the close of his life (he died of a wound in the battle in 1553), Maurice came to be regarded as the champion of German national and religious freedom. Amid the distractions of outward affairs, Maurice had not neglected the internal interests of Saxony. To the already conspicuous educational advantages in the country he added the three grammar schools (Fürstenschulen) at Pforta, Grimma, and Meissen; and for administrative purposes, especially for the collection of the taxes which had now become practically annual, he divided the country into the four "circles" of the Electorate, Thuringia, Leipsic, and Meissen. In 1542 the first coal mine was opened. Over two hundred convents were suppressed in Saxony; Leipsic, Wittenberg, Jena, and Erfurt had each a university; books began to increase, and the Saxon dialect became the ruling dialect of German in virtue of Luther's translation of the Bible. Augustus I. (1553–1586), brother of Maurice, was one of the best domestic rulers that Saxony ever had. He increased the area of the country by the "circles" of Neustädt and the Voigtland, and by parts of Henneberg and the silver-yielding Mansfeld, and he devoted his long reign to the development of its resources. He visited all parts of the country himself, and personally encouraged agriculture; he introduced a more economical mode of mining and smelting silver; he favored the importation of finer breeds of sheep and cattle, and he brought foreign weavers from abroad to teach the Saxons. Under him lace-making began on the Erzgebirge, and cloth-making flourished at Zwickau. He was the first to fortify the Königstein, the one fortress in modern Saxony, and he built other castles. With all his virtues, however, Augustus was an intolerant Lutheran, and used very severe means to exterminate the Calvinists; in his electorate he is said to have expelled one hundred and eleven Calvinist preachers in a single month. Under his son Christian I. (1586–1591) the chief power was wielded by the

chancellor Crell, who strongly favored Calvinism, but, when Christian II. (1591–1611) came to the throne a mere child, Crell was sacrificed to the Lutheran nobles. The duke of Weimar was made regent, and continued the persecution of crypto-Calvinism, in spite of the breach with the Reformed imperial diet which this course involved. Christian II. was succeeded by his brother John George I. (1611–1656), under whom the country was devastated by the Thirty Years' War. John George was an amiable but weak prince, totally unfitted to direct the fortunes of a nation in time of danger. He refused the proffered crown of Bohemia, and, when the Bohemian Protestants elected a Calvinist prince, he assisted the emperor against them with men and money. The Restitution Edict, however, in 1629, opened his eyes to the emperor's projects, and he joined Gustavus Adolphus. Saxony now became the theatre of war. The first battle on Saxon soil was fought in 1631 at Breitenfeld, where the bravery of the Swedes made up for the flight of the Saxons. Wallenstein entered Saxony in 1632, and his lieutenants Holk and Gallas plundered, burned, and murdered through the length and breadth of the land. After the death of Gustavus Adolphus at the battle of Lützen, not far from Leipsic, in 1632, the elector, who was at heart an imperialist, detached himself from the Swedish alliance, and in 1635 concluded the peace of Prague with the emperor. By this peace he was confirmed in the possession of Upper and Lower Lusatia, a district of 180 square miles and half a million inhabitants, which had already been pledged to him as a reward for his services against the Bohemians. Lusatia had once belonged to Conrad of Meissen, whose descendants, however, had lost it to Brandenburg at the beginning of the 14th century. Saxony had now to suffer from the Swedes a repetition of the devastations of Wallenstein. No other country in Germany was so terribly scourged by this terrible war. Immense tracts were rendered absolutely desolate, and whole villages vanished from the map; the people were tortured to reveal their treasures, or from wanton brutality; famine was followed by plague; civilization was thrown back and barbarism revived. In eight years the population sank from three to one and a half millions. When the war was at length ended by the peace of Westphalia in 1648, Saxony found that its influence had begun to decline in Germany. Its alliance with the Catholic party deprived it of its place at the head of the Protestant German states, which was now taken by Brandenburg. John George's will made the decline of the electorate even more inevitable by detaching from it the three subsidiary duchies of Saxe-Weissenfels, Saxe-Merseburg, and Saxe-Zeitz in favor of his younger sons. By 1746, however, these lines were all extinct, and their possessions had returned to the main line. Saxe-Neustädt was a short-lived branch from Saxe-Zeitz, extinct in 1714. The next three electors, who each bore the name of John George, had uneventful reigns. The first made some efforts to heal the wounds of his country; the second wasted the lives of his people in foreign wars against the Turks; and the third was the last Protestant elector of Saxony. John George IV. was succeeded by his brother Frederick Augustus I., or Augustus the Strong (1694–1733). This prince was elected king of Poland as Augustus II. in 1697, but any weight which the royal title might have given him in the empire was more than counterbalanced by the fact that he, though the ruler of an almost exclusively Protestant electorate, became a Roman Catholic in order to qualify for the new dignity. The connection with Poland was disastrous for Saxony. In order to defray the expenses of his wars with Charles XII., which resulted from his Polish policy, Augustus pawned and sold large districts of Saxon territory, while he drained the electorate of both men and money. For a year before the peace of Altranstädt in 1706, when Augustus gave up the crown of Poland, Saxony was occupied by a Swedish army, which had to be supported at an expense of twenty-three million thalers [$16,721,000] The wars and extravagance of the elector-king, who regained the Polish crown in 1709, are said to have cost Saxony a hundred million thalers [$72,700,000]. From this reign dates the privy council (Geheimes Kabinet), which lasted until 1830. The caste privileges of the estates (Stände) were increased by Augustus, a fact which tended to alienate them more from the people, and so to decrease their power. Böttger made his famous discovery in 1710, and the manufacture of porcelain were begun at Meissen, and in this reign the Moravian Brethren made their settlement at Herrnhut (1722). Frederick Augustus II. (1733–1763), who succeeded his father in the electorate, and was afterwards elected to the throne of Poland as Augustus III., was an indolent prince, wholly under the influence of Graf von Brühl. Brühl was an incompetent statesman and an extravagant financier, who yet contrived to amass large sums for his private purse. Under his ill-omened auspices Saxony sided with Prussia in the First Silesian War, and with Austria in the other two. It gained nothing in the first, lost much in the second, and in the third, the Seven Years' War (1756–1763), again became the scene of war and suffered renewed miseries. The country was deserted by its king and his minister, who retired to Poland. By the end of the war it had lost 90,000 men and a hundred million thalers [$72,700,000]; its coinage was debased and its trade ruined; and the whole country was in a state of frantic disorder. The elector died seven months after his return from Poland; Brühl died twenty-three days later. The elector's son and successor, Frederick Christian, survived his father only two months, leaving a son, Frederick Augustus III. (1763–1827), a boy of thirteen. Prince Xaver, the elector's uncle, was appointed guardian, and he set himself to the sorely-needed work of healing the wounds of the country. The foundation of the famous school of mining at Freiberg, and the improvement of the Saxon breed of sheep by the importation of merino sheep from Spain, were due to his care. Frederick assumed the government in 1768, and in his long and eventful reign, which saw the electorate elevated to the dignity of a kingdom, though deprived of more than half its area, he won the surname of the Just. As he was the first king of Saxony, he is usually styled Frederick Augustus I. The first ten years of his active reign passed in peace and quiet; agriculture, manufactures, and industries were fostered, economical reforms instituted; and the heavy public debt of forty million thalers [$29,080,000] was steadily reduced. In 1770 torture was abolished. When the Bavarian succession fell open in 1777, Frederick Augustus joined Prussia in protesting against the absorption of Bavaria by the Austrian emperor, and Saxon troops took part in the bloodless "potato-war." The elector commuted his claims in right of his mother, the Bavarian princess Maria Antonia, for six million florins [$3,360,000], which he spent chiefly in redeeming Saxon territory that had been pawned to other German states. When Saxony joined the Fürstenbund in 1785, it had an area of 15,185 square miles and a population of nearly 2,000,000, but its various parts had not yet been combined into a homogeneous whole, for the two Lusatias, Querfurt, Henneberg, and the ecclesiastical foundations of Naumburg and Merseburg had each a separate diet and government, independent of the diet of the electorate proper. In 1791 Frederick declined the crown of Poland, although it was now offered as hereditary even in the female line. He remembered how unfortunate for Saxony the former Polish connection had been, and he mistrusted the attitude of Russia towards the proffered kingdom. Next year saw the beginning of the great struggle between France and Germany. Frederick's conduct throughout was perhaps more pusillanimous than self-seeking, but it entailed its own

punishment. His first policy was one of selfish abstention, and from 1793 until 1796, when he concluded a definite treaty of neutrality with France, he limited his contribution to the war to the bare contingent due from him as a prince of the empire. When war broke out in 1806 against Napoleon, 22,000 Saxon troops shared the defeat of the Prussians at Jena, but the elector immediately afterwards snatched at Napoleon's offer of neutrality, and abandoned his former ally. At the peace of Posen (11th December, 1806) Frederick entered the Confederation of the Rhine, assuming the title of king of Saxony, and promising a contingent of 20,000 men to Napoleon.

No change followed in the internal affairs of the new kingdom, except that Roman Catholics were admitted to equal privileges with Protestants. Its foreign policy was dictated by the will of Napoleon, of whose irresistibility the king was too easily convinced. In 1807 his submission was rewarded with the duchy of Warsaw and the district of Cottbus, though he had to surrender some of his former territory to the new kingdom of Westphalia. The king of Saxony's faith in Napoleon was momentarily shaken by the disasters of the Russian campaign, in which 21,000 Saxon troops had shared, and in 1813 he began to lean towards an alliance with Austria. Napoleon's victory at Lützen (May 2, 1813), however, suddenly restored all his awe for that great general, and the Saxon king and the Saxon army were once more at the disposal of the French. After the battle of Bautzen, Napoleon's headquarters were successively at Dresden and Leipsic. During the decisive battle at the latter town in October, 1813, the popular Saxon feeling was displayed by the desertion of the Saxon troops to the side of the allies. Frederick was taken prisoner in Leipsic, and the government of his kingdom was assumed for a year by the Russians, who promptly turned its resources against its late French ally. Saxony was now regarded as a conquered country. Nothing but Austria's vehement desire to keep a powerful neighbor at a distance from her boundaries, preserved it from being completely annexed by the Prussians, who had succeeded the Russians in the government. As it was, the congress of Vienna assigned the northern portion, consisting of 7800 square miles, with 864,404 inhabitants to Prussia, leaving 5790 square miles, with a population of 1,182,744 to Frederick, who was permitted to retain his royal title. He was forced to acquiesce in the dismemberment of his kingdom, and to console himself with the reflection that his share, though the smaller half, was richer, more populous, and more beautiful than the other.

From the partition in 1815 to the war of 1866 the history of Saxony is mainly a narrative of the slow growth of constitutionalism and popular liberty within its limits. Its influence on the general history of Europe ceased when the old German empire was dissolved. In the new empire it is too completely overshadowed by Prussia to have any objective importance by itself. Frederick lived twelve years after the division of his kingdom. The commercial and industrial interests of the country continued to be fostered, but only a few of the most unavoidable political reforms were granted. The fact that some of these had not been granted before is more significant than that they were granted now. Religious equality was extended to the Reformed Church in 1818, and the separate diet of Upper Lusatia abolished. Frederick Augustus was succeeded by his septuagenarian brother Antony (1827–1836), to the great disappointment of the people, who had expected a more liberal era under Prince Frederick Augustus, the king's nephew. Antony announced his intention of following the lines laid down by his predecessor. He accorded at first only a few trifling reforms, which were far from removing the popular discontent, while he retained the unpopular minister Einsiedel and continued the encouragement of the Roman Catholics. The old feudal arrangement of the diet, with its inconvenient divisions, was retained, and the privy council continued to be the depository of power. An active opposition began to make itself evident in the diet and in the press, and in 1830 riots in Leipsic and Dresden impressed the king with the necessity of concession. Einsiedel was cashiered, Prince Frederick Augustus assumed as co-regent, and a constitution promised. After consultation with the diet the king promulgated a new constitution on September 4, 1831, which is the basis of the present government. An offer from Metternich of Austrian arms to repress the discontent by force had been refused. The feudal estates were replaced by two chambers, largely elective, and the privy council by a responsible ministry of six departments. Bernhard von Lindenau was the head of the first responsible cabinet, and the first constitutional assembly sat from January 27, 1833, till October 30, 1834. While Saxony's political liberty was thus enlarged, its commerce and credit were stimulated by the construction of railways. Antony had died in 1836, and Frederick Augustus II. (1836–1854) became sole king. Growing interest in politics produced dissatisfaction with the compromise of 1831, and the liberal opposition grew in numbers and influence. The burning questions were the publicity of legal proceedings and the freedom of the press; and on these the Government sustained its first crushing defeat in the lower or second chamber in 1842. Lindenau resigned in 1843. Religious considerations as to the recognition of the German Catholics and a new constitution for the Protestant Church began to mingle with purely political questions, and Prince John, as the supposed head of the Jesuit party, was insulted at a review of the communal guards at Leipsic in 1845. The military rashly interfered, and several innocent spectators were shot. The bitterness which this occurrence provoked was intensified by a political reaction which was initiated about the same time under Von Könneritz. Warned by the sympathy excited in Saxony by the revolutionary events at Paris in 1848, the king dismissed his reactionary ministry, and a liberal cabinet took its place in March, 1848. The disputed points were now conceded to the country. The privileges of the nobles were curtailed; the administration of justice was put on a better footing; the press was unshackled; publicity in legal proceedings was granted; trial by jury was introduced for some special cases; and the German Catholics were recognized. The feudal character of the first chamber was abolished, and its members made mainly elective from among the highest tax-payers, while an almost universal suffrage was introduced for the second chamber. The first demand of the overwhelmingly democratic diet returned under this reform bill was that the king should accept the Frankfort constitution. Frederick, alleging the danger of acting without the concurrence of Prussia, refused, and dissolved the diet. A public demonstration at Dresden in favor of the Frankfort constitution was prohibited as illegal on May 2, 1849. This at once awoke the popular fury. The mob seized the town and barricaded the streets; Dresden was almost destitute of troops; and the king fled to the Königstein. The rebels then proceeded to appoint a provisional Government, consisting of Tzschirner, Heubner, and Todt, though the true leader of the insurrection was the Russian Bakunin. Meanwhile Prussian troops had arrived to aid the Government, and after two days' fierce street fighting the rising was quelled. The bond with Prussia now became closer, and Frederick entered with Prussia and Hanover into the temporary "alliance of the three kings." He was not sincere, however, in desiring to exclude Austria, and in 1850 accepted the invitation of that power to send deputies to Frankfort. The first chamber immediately protested against this step, and refused to consider the question of a pressing loan. The king retorted by dissolving the diet and summoning the old estates abolished in 1848. When a quorum, with some difficulty, was obtained, another period of retrograde legislation set in. The constitution of the chambers has never been restored to the basis of 1848. The king himself was carried away with the reactionary current, and the people remained for the time indifferent. Von Beust became minister for both home and foreign affairs in 1852, and under his guidance the policy of Saxony became more and more hostile to Prussia and friendly to Austria. Saxony was not, however, able to withdraw from the customs union, which indeed conferred the very highest benefit on its trade and manufactures.

The sudden death of the king, by a fall from his carriage in Tyrol, left the throne to his brother John (1854–1873), a learned and accomplished prince, whose name is known in German literature as a translator and annotator of Dante. His brother's ministers kept their portfolios, but their views gradually became somewhat liberalized with the spirit of the times. Beust, however, still retained his feudalistic and philo-Austrian views. When war was declared between Prussia and Austria in 1866, Saxony declined the former's offer of neutrality, and, when a Prussian force crossed the border, the Saxon army under the king and the crown prince joined the Austrians in Bohemia. The entire kingdom, with the solitary exception of the Königstein, was

occupied by the Prussians. On the conclusion of peace Saxony lost no territory, but had to pay a war indemnity of ten million thalers, and was compelled to enter the North German Confederation. Its army and its postal and telegraph system were placed under the control of Prussia, and its representation at foreign courts was intrusted to the Prussian embassies. Beust was forced to resign; and liberal measures in both church and state were actively carried through. John was succeeded in 1873 by his elder son Albert (born 1828), who had won distinction as a general in the wars of 1866 and 1870. Under this prince the general course of politics has presented nothing of special importance, except perhaps the steady spread of the doctrines of social democracy, which has flourished especially in Saxony. As a loyal member of the new German empire, Saxony has gradually transferred its sympathies from its old ally Austria to its new leader Prussia. In 1877 Leipsic was chosen as the seat of the supreme court of law for the empire.

The political history of the parts of Saxony left by the capitulation of Wittenberg to the Ernestine line, which occupy the region now generally styled Thuringia (Thüringen), is mainly a recital of partitions, reunions, redivisions, and fresh combinations of territory among the various sons of the successive dukes. The principle of primogeniture was not introduced until the end of the 17th century, so that the Protestant Saxon dynasty, instead of building up a single compact kingdom for itself, has split into four petty duchies, of no political influence whatever. In 1547 the elector John Frederick the Magnanimous was allowed to retain Weimer, Jena, Eisenach, Gotha, Henneberg, and Saalfeld. Altenburg and a few other districts were added to the Ernestine possessions by the treaty of Naumburg in 1554, and other additions were made from other sources. John Frederick, who had retained and transmitted to his descendants the title of duke of Saxony, forbade his sons to divide their inheritance; but his wishes were respected only until after the death of his eldest son in 1565. The two survivors then founded separate jurisdictions at Weimar and Coburg, though arrangements were made to exchange territories every three years. In 1596 Saxe-Coburg gave off the branch Saxe-Eisenach; and in 1603 Saxe-Weimar gave off Saxe-Altenburg, the elder Weimar line ending and the younger beginning with the latter date. By 1638 Weimar had absorbed both Coburg and Eisenach; Altenburg remained till 1672. John, duke of Saxe-Weimar, who died in 1605, is regarded as the common ancestor of the present Ernestine lines. In 1640 his three surviving sons ruled the duchies of Weimar, Eisenach, and Gotha. Eisenach fell in 1644 and Altenburg in 1672, thus leaving the dukes of Saxe-Weimar and Saxe-Gotha to become the ancestors of the modern ruling houses. Saxe-Weimar was still repeatedly divided; in 1668 a Saxe Marksuhl appears, and about 1672 a Saxe-Jena and a new Saxe-Eisenach. All these, however, were extinct by 1741, and their possessions returned to the main line, which had adopted the principle of primogeniture in 1719. The present grand-duchy of SAXE-WEIMAR-EISENACH is separately noticed.

Saxe-Gotha was even more subdivided; and the climax was reached about 1680, when Gotha, Coburg, Meiningen, Romhild, Eisenberg, Hildburghausen, and Saalfeld were each the capital of a duchy. By the beginning of 1825 only the first three of these and Hildburghausen remained, the lands of the others having been divided after much quarrelling. In that year the Gotha line expired, and a general redistribution of the lands of the "Nexus Gothanus," as this group of duchies was called, was arranged on 12th November, 1826. The duke of Hilburghausen gave up his lands entirely for Altenburg and became duke of SAXE-ALTENBURG; the duke of Coburg exchanged Saalfeld for Gotha and became duke of SAXE-COBURG-GOTHA; and the duke of SAXE-MEININGEN received Hildburghausen, Saalfeld, and some other territories, and added Hildburghausen to his title. These duchies are separately noticed. See also THURINGIA.

GEOGRAPHY AND STATISTICS.

The kingdom of Saxony, the history of which has been traced above, is the third constituent of the German empire in point of population, and the fifth in point of area. With the exception of the two small exclaves of Ziegelhein in Saxe-Altenburg and Leibschwitz on the borders of Reuss, Saxe-Weimar, and Saxe-Altenburg, it forms a compact whole of a triangular shape, its base extending from northeast to southwest, and its apex pointing northwest. It lies between 50° 10′ and 51° 29′ N. lat. and between 11° 53′ and 15° 4′ E. long. The total area is 5789 square miles (about half the size of Belgium), or 2.7 per cent. of the entire empire; its greatest length is 130 miles, and its greatest breadth 93 miles. Its frontiers have a circuit of 760 miles. On the south it is bounded by Bohemia, on the west by Bavaria and the Thuringian states, and on the remaining sides by Prussia. Except on the south, where the Erzgebirge forms at once the limit of the kingdom and of the empire, the boundaries are entirely political. For administrative purposes the kingdom of Saxony is divided into the four districts of Bautzen in the southeast, Dresden in the northeast, Leipsic in the Northwest, and Zwickau in the southwest.

Physical Features.—Saxony belongs almost entirely to the central mountain region of Germany, only the districts along the north border and around Leipsic descending into the great North-European plain. The average elevation of the country is not, however, great; and it is more properly described as hilly than as mountainous. The ordinary estimates return one-fifth of the area as plain, two-fifths as hill country, and two-fifths as mountain land. The slope is very regularly from southeast to northwest, in the direction of the shorter axis. The chief mountain range is the Erzgebirge, stretching for 90 miles along the south border, and reaching in the Fichtelbergs (3979 feet and 3953 feet) the highest elevation in the kingdom. The west and southwest half of Saxony is more or less occupied by the ramifications and subsidiary groups of this range, one of which is known from its position as the Central Saxon chain, and another lower group still farther north as the Oschatz group. The southeast angle of Saxony is occupied by the mountains of Upper Lusatia (highest summit 2600 feet), which form the link between the Erzgebirge and Riesengebirge in the great Sudetic chain. Northwest from this group, and along both banks of the Elbe, which divides it from the Erzgebirge, extends the picturesque mountain region known as the Saxon Switzerland. The action of water and ice upon the soft sandstone of which the hills here are chiefly composed has produced remarkable formations of deep gorges and isolated fantastic peaks, which, however, though both beautiful and interesting, by no means recall the characteristics of Swiss scenery. The highest summit attains a height of 1830 feet; but the more interesting peaks, as the Lilienstein, Königstein, and the Bastei, are lower. With the trifling exception of the southeast of Bautzen, which sends its waters by the Neisse to the Oder, Saxony lies wholly in the basin of the Elbe, which has a navigable course of 72 miles from southeast to northwest through the kingdom. Comparatively few of the numerous smaller streams of Saxony flow directly to the Elbe, and the larger tributaries only join it beyond the Saxon borders. The Mulde, formed of two branches, is the second river of Saxony; others are the Black Elster, the White Elster, the Pleisse, and the Spree. There are no lakes of any size, but mineral springs are very abundant. The best known is at Bad Elster in the Voigtland.

Climate.—The climate of Saxony is generally healthy. It is mildest in the valleys of the Elbe, Mulde, and Pleisse, and severest in the Erzgebirge, where the district near Johanngeorgenstadt is known as Saxon Siberia. The average temperature, like that of central Germany as a whole, varies from 48° to 50° Fahr.; in the Elbe valley the mean in summer is from 62° to 64°, and in winter about 30°; in the Erzgebirge the mean temperature in summer is from 55° to 57°, and in winter 23° or 24°. The Erzgebirge is also the rainiest district, 27½ to 33½ inches falling per annum; the amount decreases as we proceed northwards, and Leipsic with an annual fall of 15½ to 21½ inches enjoys the driest climate.

Soil.—Saxony is one of the most fertile parts of Germany; and in regard to the productive occupation of its soil it stands among the most advanced nations of the world. Only 1 per cent. of the total area is waste or unused. According to the returns for 1883, 55.7 per cent. of the area is under agriculture, 11.7 in pasture and meadow, 27.4 under forest, and 4.2 occupied by buildings, roads, and water. The lowest lands are the most productive, and fertility diminishes as we ascend towards the south, until on the bleak crest of the Erzgebirge cultivation ceases altogether. Saxon agriculture, though dating its origin from the Wends, has received its full development only in the present century. Long fettered by antiquated customs, the land was subdivided into small parcels and subjected to vexatious rights. But in 1834 a law was passed providing for the union of the scattered lands belonging to each proprietor, and that may be considered the dawn of modern Saxon agriculture, which has now reached a very high pitch of excellence. It has been fostered both publicly and privately, and a special official secretary assists the minister of the interior in attending to this branch of national prosperity. In 1883 the agricultural lands in Saxony were divided among 192,000 farmers or proprietors, of whom only 758 held 250 acres and upwards, 28,200 between 25 and

250 acres, and the rest less than 25 acres. The small proprietors held 28.7 per cent. of the total area, the middle class 57.2, and the large owners 14.1. The richest grain districts are near Meissen, Grimma, Bautzen, Döbeln, and Pirna. The chief crop is rye, but oats are hardly second to it. Wheat and barley are grown in considerable less quantity. Very large quantities of potatoes are grown, especially in the Voigtland. Beet is chiefly grown as feeding stuff for cattle, and not for sugar. Flax (8270 acres in 1883) is grown in the Erzgebirge and Lusatian mountains, where the manufacture of linen was at one time a flourishing domestic industry. Saxony owes its unusual wealth in fruit to the care of the paternal elector Augustus (1553–1586), who is said never to have stirred abroad without fruit seeds for distribution among the peasants and farmers. Enormous quantities of cherries, plums, and apples are annually borne by the trees round Leipsic, Dresden, and Colditz. The cultivation of the vine in Saxony is respectable for its antiquity, though the yield is insignificant. Wine is said to have been grown here in the 11th century; the Saxon vineyards, chiefly on the banks of the Elbe near Meissen and Dresden, occupied 2515 acres in 1883.

Live Stock.—According to returns made for 1883 Saxony contained 126,886 horses, 651,329 cattle, 149,037 sheep, 355,550 pigs, and 116,547 goats. The breeding of horses is carried on to a very limited extent in Saxony, more than nine-tenths of the horses required being imported. Cattle-rearing, which has been an industry since the advent of the Wends in the 6th century, has attained very considerable importance on the extensive pastures of the Erzgebirge and in the Voigtland. Sheep-farming has considerably declined within the last few decades, as in most parts of northern Germany. While other classes of domestic animals have retained very much the same proportion to the number of the human population, sheep have decreased from one to every six inhabitants in 1861 to one to every twenty in 1883. In 1765 the regent Prince Xaver imported 300 merino sheep from Spain, and so improved the native breed by this new strain that Saxon sheep were eagerly imported by foreign nations to improve their flocks, and "Saxon electoral wool" became one of the best brands in the market. The high level was not long maintained; flock-masters began to pay more attention to quantity than to quality of wool, and the Saxon wool has accordingly deteriorated. In 1868 no less than 1,166,130 lbs. of wool were offered for sale in the wool markets of Saxony, of which Leipsic and Dresden are the chief; in 1884 only 276,843 lbs. were offered. Swine furnish a very large proportion of the flesh-diet of the people. Geese abound particularly round Leipsic and in Upper Lusatia, poultry about Bautzen. Bee-keeping flourishes on the heaths on the right bank of the Elbe; in 1883 there were 53,756 bee-hives in Saxony. Game is not now very abundant; hares and partridges are shot in the plains to the northwest.

Forests.—The forests of Saxony are extensive, and have long been well cared for both by Government and by private proprietors. The famous school of forestry at Tharandt was founded in 1811. The Voigtland is the most densely wooded portion of the kingdom, and next comes the Erzgebirge. About 8,379,200 acres, or 85 per cent. of the whole forest land, were planted with coniferous trees; and about 1,439,700 acres or 15 per cent. with deciduous trees, among which beeches and birches are the commonest. About 30 per cent. of the total belongs to Government.

Minerals.—The mineral wealth of Saxony is very considerable; and its mines are among the oldest in Germany. Silver was raised in the 12th century, and argentiferous lead is still the most valuable ore mined; tin, iron, and cobalt rank next; and coal is one of the chief exports. Copper, zinc, and bismuth are also worked. Saxon mines now produce about 6 per cent. of the gross quantity, and about 8 per cent. of the aggregate value of metals raised in Germany. The country is divided into four mining districts: Freiberg, where silver and lead are the chief products; Altenberg, where tin is mainly raised; Schneeberg, yielding cobalt, nickel, and ironstone; and Johanngeorgenstadt, with ironstone and silver mines. There are in all 236 mines, but in 1883 only 150 of these were in operation, employing 8615 hands. In 1870 253 mines employed 9132 hands. The total value of metal raised in Saxony in 1883 was £288,200 [$1,400,652]; in 1870 it was £314,916 [$1,530,491.76]. Coal is found principally in two fields,—one near Zwickau, and the other in the circle of Dresden. Brown coal or lignite is found chiefly in the north and northwest, but not in sufficiently large quantities to be exported. The number of coal-mines is steadily decreasing, though the number of miners and the gross produce are both on the increase. The following table shows the output in tons since the years named:

	Mines.	Hands.	Coal.	Lignite.	Anthracite.	Value.
						£
1870...	242	16,811	2,608,705	506,687	346	1,083,625
1880...	189	19,625	3,622,007	590,119	345	1,363,780
1883...	166	20,136	4,088,484	648,044	280	1,510,863

Peat is especially abundant on the Erzgebirge. Immense quantities of bricks are made all over the country. Excellent sandstone for building is found on the hills of the Elbe; in 1883 266 quarries employed 1348 hands. Fine porcelain clay occurs near Meissen, and coarser varieties elsewhere. A few precious stones are found among the southern mountains. Saxony has no salt-mines.

Industries.—The Central-European position of Saxony has fostered its commerce; and its manufactures have been encouraged by the abundant water-power throughout the kingdom. Nearly one-half of the motive power used in Saxon factories is supplied by the streams, of which the Mulde, in this respect, is the chief. The early foundation of the Leipsic fairs, and the enlightened policy of the rulers of the country, have also done much to develop its commercial and industrial resources. Next to agriculture, which supports about 20 per cent. of the population, by far the most important industry is the textile. Saxony carries on 26 per cent. of the whole textile industry in Germany, a share far in excess of its proportionate population. Prussia, which has more than nine times as many inhabitants, carries on 45 per cent., and no other state more than 8 per cent. Nearly 18½ per cent. of the population were engaged in this industry in 1882, by far the largest proportion in any German state except Reuss (älterer Linie), which had 36 per cent. so engaged. The chief seats of the manufacture are Zwickau, Chemnitz, Glauchau, Meeraue, and Hohenstein in the south of Zwickau, and Camenz, Pulsnitz, and Bischofswerda in the north of Dresden. The centre of the cotton manufacture (especially of cotton hosiery) is Chemnitz; cotton-muslins are made throughout the Voigtland, ribbons at Pulsnitz and its neighborhood. Woollen cloth and buckskin are woven at Camenz, Bischofswerda, and Grossenhain, all in the northeast, woollen and half-woollen underclothing at Chemnitz, Glauchau, Meerane, and Reichenbach; while Bautzen and Limbach produce woollen stockings. Linen is manufactured chiefly in the mountains of Lusatia, where the looms are still to some extent found in the homes of the weavers. The coarser kinds only are now made, owing to the keen English competition in the finer varieties. Damask is produced at Gross-Schönau and Neu-Schönau. Lace-making, discovered or introduced by Barbara Uttmann in the latter half of the 16th century, and now fostered by Government schools, has long been an important domestic industry among the villages of the Erz Mountains. Straw-plaiting occupies 6000 hands on the mountain slopes between Gottleuba and Lockwitz. Wax-cloth is manufactured at Leipsic, and artificial flowers at Leipsic and Dresden. Stoneware and earthenware are made at Chemnitz, Zwickau, Bautzen, and Meissen, porcelain ("Dresden china") at Meissen, chemicals in and near Leipsic. Döbeln, Werdau, and Lossnitz are the chief seats of the Saxon leather trade; cigars are very extensively made in the town and district of Leipsic, and hats and pianofortes at Leipsic, Dresden, and Chemnitz. Paper is made chiefly in the west of the kingdom, but does not keep pace with the demand. Machinery of all kinds is produced, from the sewing-machines of Dresden to the steam-locomotives and marine-engines of Chemnitz. The last-named place, though the centre of the iron-manufacture of Saxony, has to import every pound of iron by railway. The leading branch is the machinery used in the industries of the country—mining, paper-making, and weaving. The very large printing trade of Leipsic encourages the manufacture of printing-presses in that city. In 1883–84 Saxony contained 744 active breweries and 683 distilleries. The tendency in this branch of industry is to extinguish the smaller establishments, and to form large joint-stock companies. The smelting and refining of the metal ores is also an important industry. The chief smelting works, at Freiberg, employed 1377 hands in 1883.

Trade.—Leipsic, with its famous and still frequented fairs, is the focus of the trade of Saxony. The fur trade between eastern and western Europe and the book-trade of Germany centre here. Chemnitz, Dresden, Plauen, Zwickau, Zittau, and Bautzen are the other chief commercial cities. The principal exports are wool, woollen, cotton, and linen goods, and the other produce of the factories and of the mines.

Communication.—The roads of Saxony are numerous and good. In 1883 there were 2304 miles of road in the kingdom. Saxony was the first German state to encourage and develop a railway system, and, although at first private enterprise led the way, the Saxon lines are now almost exclusively in the hands of Government. The first railway, between Leipsic and Althen, was opened on April 24, 1837. In 1837 there were 9 miles of state railway; in 1840, 71 miles; in 1850, 250; in 1870, 685; in 1880, 1184; and in 1884, 1355 miles, which, together with 75 miles of private line, mostly worked by the state, employed 24,400 hands. There are no canals in Saxony, and the only navigable river is the Elbe.

Population.—In 1880 the population of Saxony was 2,972,805, or 6½ per cent. of the total population of the German empire, on 2.7 per cent. of its area. The provisional returns of the census of 1885 gave a population of 3,179,168. With the exception of the free towns, Saxony is the most densely peopled member of the empire, and its population is increasing at a more rapid rate than is the case in any of the larger German states. In 1880 Saxony had 513.5 inhabitants per square mile, nearly three times as many as Bavaria; Prussia had 202.8, and the average for the empire was 216.7. More than half (56 per cent.) of the people live in communities of over 2000 inhabitants. The following table shows the distribution of the population among the four administrative districts. It will be noticed that the industrial district of Zwickau is the most densely peopled.

District.	Population.	Area in Square Miles.	Average per Square Mile.
Bautzen.....	351,326	953	368.6
Dresden.....	808,512	1675	482.7
Leipsic.....	707,826	1377	514.0
Zwickau	1,105,141	1784	619.4

The growth of the population since 1815, when the kingdom received its present limits has been as follows: in 1815, 1,178,802; in 1830, 1,402,066; in 1840, 1,706,275; in 1864, 2,344,094; and in 1875, 2,760,586.

The number of marriages per 1000 inhabitants is between 8 and 9; the birth-rate is 43, and the death-rate 30 per thousand. The annual increase of the population, on the average of the five years between 1875 and 1880, is at the rate of 1.48 per cent. The death-rate in Saxony is the highest in Germany, but its birth-rate is also the highest, except in the small state of Reuss (älterer Linie). In 1883, out of 132,209 births, 16,990, or 12.8 per cent., were illegitimate, and 4935, or 3.7 per cent., were still-born, and these rates represent tolerably accurately the average of the last few years. In the relative number of suicides (311 per 1,000,000 inhabitants) Saxony ranks highest among the European states (see Morselli *Int. Sci. Ser.*, vol. xxxvi.). In 1884 1114 persons, of whom 861 were males, committed suicide. In the same year 17,706 persons were punished as vagrants.

The preponderating industrial activity of Saxony fosters the tendency of the population to concentrate in towns; with the exception of the free towns and Anhalt, no German state has so large a proportion of urban population, *i.e.*, inhabitants residing in communities of 2000 persons and upwards. In the empire as a whole 41.4 per cent. of the population is urban in this sense; in Saxony the proportion rises to 56.6 per cent. The largest towns are Dresden (245,515 inhabitants), the capital since the middle of the 16th century, Leipsic (170,076), and Chemnitz (110,693). Eighteen other towns, chiefly in the manufacturing district of Zwickau, have over 10,000 inhabitants, and thirty-five between 5000 and 10,000. The main results of the industrial census of 1882, which shows an increase of population since 1880 of 42,000, are summarized in the following table, which gives the number of persons (including wives, families, and dependants) supported by the several occupations, and the percentage of the total population:

Occupation.	Persons.	Percentage.
1. Agriculture, forestry, and fishing.....	602,378	20
2. Industrial pursuits.....	1,695,895	56.2
3. Trade.....	360,675	12
4. Domestic servants and general laborers.	53,584	1.7
5. Official, military, and professional classes	148,361	5
6. Not returned under any occupation.....	153,929	5.1

The people of Saxony are chiefly of pure Teutonic stock; a proportion are Germanized Slavs, and in the south of Bautzen there are still about 50,000 Wends, who retain their peculiar customs and language. In some villages near Bautzen hardly a word of German is spoken.

Religious Statistics.—About 97 per cent. of the inhabitants of Saxony are Protestants; between 6000 and 7000 are Jews, and the remainder, including the royal family, are mostly Roman Catholics. According to the religious census of 1880, 2,886,806 were Evangelicals, 74,333 Roman Catholics, 1467 German Catholics, 620 Anglicans, 453 Greek Catholics, 6518 Jews, and 339 "others." The Evangelical Lutheran or State Church had 1130 pastors and 1393 places of worship in 1884. Its head is the minister "de evangelicis" so long as the king is Roman Catholic; and its management is vested in the Evangelical Consistory at Dresden. Its representative assembly, consisting of twenty-nine clergymen and thirty-five laymen, is called a synod (*Synode*). The Roman Catholic Church has enjoyed the patronage of the reigning family since 1697, though it was the peace of Posen (1806) which placed it on a level with the Lutherans. By the peace of Prague, which transferred Upper Lusatia to Saxony in 1635, stipulations were made in favor of the Roman Catholics of that region, who are ecclesiastically in the jurisdiction of the cathedral chapter of St. Peter at Bautzen, the dean of which has *ex-officio* a seat in the first chamber of the diet. The other districts are managed by an apostolic vicariate at Dresden, under the direction of the minister of public worship. Two nunneries in Bautzen are the only conventual establishments in Saxony, and no others may be founded. Among the smaller religious sects the Moravian Brethren (*q.v.*), whose chief seat is at Herrnhut, are perhaps the most interesting. In 1868 civil rights were declared to be independent of religious confession.

Education.—Saxony claims to be one of the most highly educated countries in Europe, and its foundations of schools and universities were among the earliest in Germany. Of the four universities founded by the Saxon electors at Leipsic, Jena, Wittenberg, and Erfurt, only the first is included in the present kingdom of Saxony. It is second only to Berlin in the number of its students. The endowed schools (Fürstenschulen) at Meissen and Grimma have long enjoyed a high reputation. Besides these there are 12 other gymnasia, 13 realschulen of the first class, and 19 of the second class, the organization of which resembles that already described in detail under Prussia. There are nearly 4000 elementary and preparatory schools; and education is compulsory. Of 8856 recruits in 1883–84 only 13 (.15 per cent.) were unable to read and write. Saxony is particularly well-equipped with technical schools, the textile industries being especially fostered by numerous schools of weaving, embroidery, lace-making, etc.; but the mining academy at Freiberg and the school of forestry at Tharandt are probably the most widely known. The conservatory of music at Leipsic enjoys a world-wide reputation; not less the art collections at Dresden.

Constitution.—Saxony is a constitutional monarchy and a member of the German empire, with four votes in the federal council and twenty-three in the reichstag. The constitution rests on a law promulgated on 4th September, 1831, and subsequently amended. The crown is hereditary in the Albertine Saxon line, with reversion to the Ernestine line, of which the duke of Saxe-Weimar is now the head. The king enjoys a civil list of 2,940,000 marks or £147,000 [$714,420], while the apanages of the crown, including the payments to the other members of the royal house, amount to £15,670 [$76,156.20] more. The legislature (Ständeversammlung) is bicameral,—the constitution of the coördinate chambers being finally settled by a law of 1868 amending the enactment of 1831. The first chamber consists of the adult princes of the blood, five hereditary members from among the nobility, representatives of the Lutheran and Roman Catholic Churches, a representative of Leipsic university, twelve representatives of proprietors with landed property of an annual value of at least £150 [$729], elected for life, and ten representatives of the same class nominated for life, by the crown, the chief magistrates of the eight principal towns, and five other life members, chosen without any restrictions by the king. The second chamber consists of thirty-five members from the towns and forty-five from the country, elected for six years. All male citizens twenty-five years old and upwards who pay one thaler (3s. or 73 cents) per annum in taxes have the suffrage; and all above thirty years of age who pay 10 thalers [$7.29] in annual taxes are eligible as members of the diet. The chambers must be convened at least once every two years; and extraordinary meetings take place at every change of ruler and on other special occasions. One-third of the members of the second chamber

retire at the end of every period of two years. With the exceptiou of the hereditary and some of the ex-officio members of the first chamber, the members of the diet are entitled to an allowance (12s.=$2.92) for their daily expenses, as well as their travelling expeuses. The executive consists of a responsible ministry (Gesammtministerium), with the six departments of justice, finance, home affairs, war, public worship and education, and foreign affairs. The minister of the royal household does not belong to the cabinet. The constitution also provides for the formation of a kind of privy couucil (Staatsrath), consistiug of the cabinet ministers and other members appointed by the king.

For administrative purposes Saxouy is divided into four Kreishauptmannschaften or governmental departments subdivided into fifteen Amtshauptmannschafteu and one hundred and sixteen Aemter. The cities of Dresden and Leipsic form departments by themselves. The supreme court of law for both civil and criminal cases is the Oberlandes-Gericht at Dresdeu, subordinate to which are seven other courts in the other principal towus and one hundred and five inferior tribuuals. The German imperial code was adopted by Saxony in 1879. Leipsic is the seat of the imperial supreme court.

Finance.—The Saxon financial period embraces a space of two years. For 1884–5 the "ordinary" budget showed an income of £3,496,000 [$16,990,560], balanced by the expenditure which included a reserve fund of £29,400 [$142,884]. The chief sources of iucome were taxes (£1,377,293 or $6,693,643.98, includiug £899,975 or $4,373,-878.50 of direct taxes), state railways (£1,357,890 or $6,599,-345.40), and the public forests and domains (£359,171 or $1,745,571). Lotteries brought in £232,270 [$1,128,832.20], and the royal porcelain manufacture £17,500 [$85,050]. The chief expenditure was on the interest (£1,135,681 or $5,519,409.66) and sinking fund (£410,000 or $1,992,-600) of the national debt. The "extraordiuary" budget, applying exclusively to public works, showed au income and expenditure tallying at £882,800 or [$4,290,408]. The national debt, incurred almost wholly in making and buying railways, amounted on 1st January, 1885, to £32,670,300 [$157,777,680], mostly payiug interest at the rate of 4 per cent.

Army.—The Saxon army is modelled on that of Prussia. It forms the 12th army corps in the imperial German army, and consists of the 23d and 24th divisions, with headquarters at Dresden and Leipsic respectively. On its peace-footing the Saxon contingent includes 20,500 infantry, 4180 cavalry, and 3000 artillery; in war it has 75,800 infantry, 6680 cavalry, and 8050 artillery.

The statistical information in the above article has been derived chiefly from the *Kalendar und statistisches Jahrbuch für das Königreich Sachsen* (Dresden, 1875–86) and the *Zeitschrift des Königlichen Sächsischen statistischen Bureau* (Dresden, 1855–85). The *Staatshandbuch für das Königreich Sachsen* is an annual official register. Engelhardt's *Vaterlandskunde für Schule und Haus im Königreich Sachsen* (Dresden, 3d ed. by Flathe, 1877) contains a comprehensive account of the country and its resources; and Daniel's *Handbuch der Geographie* (Leipsic, 1881) clearly summarizes the principal points. The standard history of Saxony is Böttiger's *Geschichte des Kurstaats und Königreichs Sachsens* (3 vols., Gotha, 3d ed., edited and continued by Flathe, 1867–73). Brandes's *Grundriss der Sächsischen Geschichte* (Leipsic, 1860) is a succinct but somewhat dry summary. Other leading works on the subjects are Gretschel, *Geschichte des Sächsischen Staats und Volks* (3 vols., Leipsic, 2d ed., continued by Bulau, 1862–63); Meynert, *Geschichte des Sächsischen Volks* (2 vols., Leipsic, 1833–35); Heinrich, *Sächsische Geschicte* (2 vols., Leipsic, 1810–12); and Weisse, *Geschichte der Kursächsischen Staaten* (7 vols., Leipsic, 1802–12). The publication of the *Codex Diplomaticus Saxoniæ Regiæ* was begun in 1864 under the care of Gersdorf, and has been continued under Posse and Emerisch. Posse has also published *Die Markgrafen von Meissen und das Haus Wettin bis zu Konrad dem Grossen* (Leipsic, 1881); and Emerisch is the editor of the *Neue Archiv für Sächsische Geschichte* (Leipsic, 6 vols.), which contains full information as to works on the history of the country. Weber's older *Archiv für die Sächsische Geschichte* appeared in 1864 *sq.*; and a still older periodical publication on the subject is Von Braun's *Monatlicher Auszug aus der Geschichte des Kur- und Fürstlichen Hauses Sachsens* (6 vols., Langensalza, 1778–81). See also Tutschmann's *Atlas zur Geschichte der Sächsischen Länder* (Grimma, 1852). (F. MU.)

SAXONY, PRUSSIAN (Germ. *Provinz Sachsen*), one of the central provinces of the kingdom of Prussia, consists mainly of what was formerly the northern part of the kingdom of Saxony (ceded to Prussia in 1815), but also comprises the duchy of Magdeburg, the Altmark, and other districts, the connection of which with Prussia is of earlier date. The area of the province is 9750 square miles. On the W. it is bounded by Hesse-Nassau, Hanover, and Brunswick, on the N. by Hanover and Brandenburg, on the E. by Brandenburg and Silesia, and on the S. by the kingdom of Saxony and the small Thuringian states. It is, however, very irregular in form, entirely surrounding parts of Brunswick and the Thuringian states, and itself possessing several "exclaves," while the northern portion of the province is almost entirely severed from the southern by the duchy of Anhalt. The major part of the province is flat and belongs to the great North-German plain, but the western and southwestern districts are hilly, including parts of the Harz (with the Brocken, 3417 feet) and the Thuringian Forest. About nine-tenths of Prussian Saxony belongs to the system of the Elbe, the chief feeders of which within the province are the Saale and the Mulde, but a small district on the west drains into the Weser. The saltwater lakes between Halle and Eisleben are the only lakes of the kind in Prussia.

See Plate V.

Saxony is on the whole the most fertile province of Prussia, and excels all the others in its produce of wheat and beetroot sugar (as well as in salt, brown coal, and copper), but the nature of its soil is very unequal. The best crop-producing districts lie near the base of the Harz Mountains, such as the "Magdeburger Börde" and the "Goldene Aue," and rich pasture lands occur in the river valleys, but the sandy plains of the Altmark, in the north part of the province, yield but a scanty return for the husbandman's toil.

Of the total area of the province 61 per cent. is occupied by arable land, 13 per cent. by meadows and pastures, and 20.5 per cent. by forests. Wheat and rye are raised in such abuudance as to allow of a considerable export, while the other grain crops meet the local demand. The beetroot for sugar is grown chiefly in the district to the north of the Harz, as far as the Ohre, and on the banks of the Saale, and the amount of sugar produced (upwards of 400,000 tons in 1883–84) is nearly as much as that of all the rest of Prussia together. Flax, hops, and seeds for oil are also cultivated to some extent, and large quantities of excellent fruit are grown at the foot of the Harz and in the valleys of the Unstrut and the Saale. The market-gardening of Erfurt is well known throughout Germany. Wine, of indifferent quality, is produced in the vicinity of Naumburg. Saxony is comparatively poor in timber, though there are some fine forests in the Harz and other hilly districts. Cattle-rearing is carried on with success in the river valleys, and more goats are met with here than in any other part of Prussia. The live-stock census for 1883 gave the following figures: horses, 182,485; cattle, 624,973: sheep, 1,390,915; pigs, 719,-627; goats, 261,225. (Compare the tables uuder PRUSSIA, vol. xx. p. 18.)

The principal underground wealth of Prussian Saxony consists of its salt and its brown coal, of both of which it possesses larger stores than any other part of the German empire. The rock-salt mines and brine springs (the chief of which are at Stassfurt, Schönebeck, Halle, etc.) produced in 1883–4 no less than 256,000 tons of salt, while the annual output of brown coal amounts to about 8,000,000 tons, or more than the entire yield of the rest of Germany. Prussian Saxony also possesses three-fourths of the wealth of Germany in copper, the yield in 1883 amounting to 445,000 tons of ore and 11,000 tons of the pure metal. The copper mines are found chiefly in the Harz district. The other mineral resources include silver (one-third of the total German yield), pit-coal, pyrites, alum, plaster of Paris, sulphur, alabaster, and several varieties of good building-stone. Numerous mineral springs occur in the Harz.

In addition to the production of sugar already noted, the most important iudustries are the manufactures of cloth, leather, iron and steel wares (chiefly at Suhl and Sömmerda), spirits (Nordhausen), chemicals (Stassfurt), and starch. Beer is also brewed extensively in Prussian Saxony, where the annual consumption per head (107 quarts) is considerably in excess of the average for the kingdom. Trade is much facilitated by the great waterway of the Elbe, as well as by a very complete system of railways. The chief articles are wool, grain, sugar, salt, lignite, and the principal manufactured products named above.

The population of the province of Saxony in 1880 was 2,312,007, including 2,154,663 Protestants, 145,518 Roman Catholics, and 6700 Jews; in 1885, according to provisional census returns, the population was 2,427,968. The great bulk of the inhabitants are of unmixed German stock, but many of those in the east part of the province have Wendish blood in their veins. The province belongs to the more thickly populated parts of Germany, the average

being 237 persons to the square mile, and the ratio of the urban population to the rural is about as 4½ to 5½. The occupation census of 1882 gives the following percentages for the different classes of the population: agricultural, 36.78; industrial, 35.18; trade, 8.15; domestic servants and day laborers, 8.70; official and professional, 5.12.

Prussian Saxony is divided into the three government districts of Magdeburg, Merseburg, and Erfurt. Magdeburg is the most important town and the headquarters of an army corps, but the provincial chambers meet at Merseburg. The province sends twenty members to the reichstag and thirty-eight to the Prussian house of representatives. The religious control of the district is in the hands of a consistory at Madgeburg; the Roman Catholics belong to the diocese of Paderborn. The university of Halle holds a high rank among German seats of learning, and the other educational requirements of the province are adequately provided for. The illiterate recruits of this province in 1883–4 numbered only 13 out of a total of 7868, equivalent to 0.17 per cent. The principal towns are Magdeburg (abont 150,000 inhabitants, including Neustadt and Buckau), Halle (81,869), Erfurt (58,307), Halberstadt (34,048), Nordhausen, Mühlhausen, and Aschersleben.

The history of the present Prussian province of Saxony as such dates only from 1815, and is of course, merely of local interest. The previous history of its constituent parts, of considerable more interest and importance, must be sought for under the various headings that will suggest themselves, such as SAXONY (*supra*), PRUSSIA, MAGDEBURG, ERFURT, etc. It is, however, worth noting that the province comprises the Altmark or old North Mark that formed the kernel of the Prnssian state (see PRUSSIA, vol. xx. p. 6), and also the old bishoprics on the Elbe and Saale, from which as a centre the Christianization of Germany mainly spread. And the leading position of this part of Germany in promoting the Reformation should also be remembered.

SAY, JEAN BAPTISTE (1767–1832), an eminent French political economist, was born at Lyons, 5th January, 1767. His father, Jean Étienne Say, was of a Protestant family which had originally belonged to Nîmes, but had removed to Geneva for some time in consequence of the revocation of the edict of Nantes. Young Say was intended to follow a commercial career, and was accordingly sent, with his brother Horace, to England, and lived first at Croydon, in the house of a merchant, to whom he acted as clerk, and afterwards at London, where he was in the service of another employer. When, on the death of the latter, he returned to France, he was employed in the office of a life assurance company directed by Clavière, afterwards known in politics. It was Clavière who called his attention to the *Wealth of Nations*, and the study of that work revealed to him his vocation. His first literary attempt was a pamphlet on the liberty of the press, published in 1789. He worked under the celebrated Mirabeau on the *Courrier de Provence*. In 1792 he took part as a volunteer in the campaign of Champagne; in 1793 he assumed, in conformity with the Revolutionary fashion, the pre-name of *Atticus*, and became secretary to Clavière, then finance minister. He married in 1793 Mlle. Deloche, daughter of a former *avocat au conseil;* the young pair were greatly straitened in means in consequence of the depreciation of the assignats. From 1794 to 1800 Say edited a periodical entitled *La Décade philosophique, littéraire, et politique*, in which he expounded the doctrines of Adam Smith. He had by this time established his reputation as a publicist, and when the consular government was established in the year VIII. (1799), he was selected as one of the hundred members of the tribunate, and resigned, in consequence, the direction of the *Décade*. He published in 1800 *Olbie, ou Essai sur les moyens de réformer les mœurs d'une nation*.

In 1803 appeared his principal work, the *Traité d'Économie Politique*. In 1804, having shown his unwillingness to sacrifice his convictions for the purpose of furthering the designs of Napoleon, he was removed from the office of tribune, being at the same time nominated to a lucrative post, which, however, he thought it his duty to resign. He then turned to industrial pursuits, and having made himself acquainted with the processes of the cotton manufacture, founded at Auchy, in the Pas de Calais, a spinning-mill which employed four or five hundred persons, principally women and children. He devoted his leisure hours to the improvement of his economic treatise, which had for some time been out of print, but which the censorship did not permit him to republish; and in 1814 he availed himself (to use his own words) of the sort of liberty arising from the entrance of the allied powers into France to bring out a second edition of the work, dedicated to the emperor Alexander, who had professed himself his pupil. In the same year the French Government sent him to study the economic condition of Great Britain. The results of his observations during his journey through England and Scotland appeared in a tract *De l'Angleterre et des Anglais;* and his conversations with distinguished men in those countries contributed, he tells us, to give greater correctness to the exposition of principles in the third edition of the *Traité*, which appeared in 1817. A chair of industrial economy was founded for him in 1819 at the Conservatoire des Arts et Métiers, in which he lectured with ability and success. In 1831 he was made Professor of political economy at the Collége de France. He published in 1828–30 his *Cours Complet d'Economie Politique pratique*, which is in the main an expansion of the *Traité*, with practical applications. In his later years he became subject to attacks of nervous apoplexy, which increasingly reduced his strength. He lost his wife, to whom he was fondly attached, in January, 1830; and from that time his health constantly declined. When the revolution of that year broke out, he was named a member of the council-general of the department of the Seine, but found it necessary to resign that position. He died at Paris, 16th November, 1832, leaving behind him a well-earned reputation for private worth and political integrity.

Say was essentially a propagandist, not an originator. His great service to mankind lies in the fact that he disseminated throughout Europe by means of the French language, and popularized by his clear and easy style, the economic doctrines of Adam Smith. It is true that his French panegyrists (and he is not himself free from censure on this score) are nnjust in their estimate of Smith as an expositor; they give false or exaggerated ideas of his obscurity, his prolixity, and his want of method; and they accordingly extol too highly the merits of Say. Those merits are, however real and considerable; his writings were without doubt very effective in diffusing throughout Continental Enrope a taste for economic inquiry and a knowledge of its principal results. On the side of the philosophy of science Say is weak; his observations on that subject are usnally commonplace or snperficial. Thus he accepts the shallow dictum of Condillac that *toute science se réduit à une langue bien faite*. He recognizes political economy and statistics as alike sciences, and represents the distinction between them as having never been made before him, though he quotes what Smith had said of political arithmetic. Whilst always deserving the praise of honesty, sincerity, and independence, he is very inferior to his great predecessor in breadth of view on moral and political questions. In his general conception of human affairs there is a tendency to regard too exclusively the material side of things, which made him preëminently the economist of the French liberal *bourgeoisie;* thns Storch jnstly censures the levity with which he donbts the necessity of a public religious cultns, suggesting that enlightened nations might dispense with it "as the Pacific islanders do." He is inspired with the dislike and jealonsy of Governments so often felt and expressed by thinkers formed in the social atmosphere of the last century. Soldiers are for him not merely unprodnctive laborers, as Smith called them; they are rather "destructive laborers." "A nation might," he says, "strictly speaking, subsist without a government, each profession exchanging the fruits of its labors with the products of the labors of others,"—a remark which betrays the notion that economic coincides with social life. Taxes are uncompensated payments; they are plagues like hail, war, or depredation; they may fitly be described as of the nature of robbery. When he says, "Lorsqu' on vous vend nn privilège, comme le droit de chasse, ou senlement de port d'armes, on vous vole votre droit naturel d'être armé ponr le vous vendre après l'avoir volé," we see that we are still in the region of the *jus naturæ*, which lies at the basis of all the old economics.

Say is considered to have brought out the importance of capital as a factor in production more distinctly than the English economists, who unduly emphasized labor. The special doctrines most commonly mentioned as due to him are: (1) that of "immaterial products," and (2) what is called his "théorie des débouchés." Objecting, as Germain Garnier had done before him, to Smith's well-known distinction between productive and unproductive labor, he maintains that, production consisting in the creation or addition of a utility, all useful labor is productive. He is thus led to recognize immaterial products, whose characteristic quality is that they are consumed immediately and are incapable of accumulaton; under this head are to be ranged the *services* rendered either by a person, a capital, or a portion of land, as *e.g.*, the advantages derived from medical attendance, or from a hired house, or from a beautiful view. But in working out the consequences of this view Say is not free (as Storch has shown) from obscurities and inconsistencies; and by his comprehension of these immaterial products within the domain of economics he is confirmed in the error of regarding that science as filling the whole sphere which really belongs to sociology. His "théorie des débouchés" amounts to this, that, products being, in last analysis, purchased only with products, the extent of the markets (or outlets) for home products is proportional to the quantity of foreign productions; when the sale of any commodity is dull, it is because there is not a sufficient number, or rather value, of other commodities produced with which it could be purchased Another proposition on which Say insists is that every value is consumed and is created only to be consumed. Values can therefore be accumulated only by being reproduced in the course, or as often happens, by the very act of consumption; hence his distinction between reproductive and unproductive consumption. We find in him other corrections or new presentations of views previously accepted, and some useful suggestions for the improvement of nomenclature.

Say's writings occupy vols. ix.–xii. of Guillaumin's *Collection des Principaux Economistes*. Among them are, in addition to those already mentioned, *Catéchisme d'Economie Politique*, 1815; *Petit Volume contenant quelques apercus des Hommes et de la Société. Lettres à Malthus sur différens sujets d'Economie Politique*, 1820; *Epitomé des Principes de l'Economie Politique*. 1831. A volume of *Mélanges et Correspondance* was published posthumously by Charles Comte, author of the *Traité de Législation*, who was his son-in-law. To the above must be added an edition of Storch's *Cours d'Economie Politique*, which Say published in 1823 without Storch's authorization, with notes embodying a "critique amère et virulente," a proceeding which Storch justly resented.

The last edition of the *Traité d'Economie Politique* which appeared during the life of the author was the 5th (1826); the 6th, with the author's final corrections, was edited by the eldest son, Horace Emile Say, himself known as an economist, in 1846. The work was translated into English "from the 4th edition of the French," by C. R. Prinsep (1821), into German by Ludwig Heinrich von Jakob (1807), and by C. Ed. Morstadt (1818 and 1830), and, as Say himself informs us, into Spanish by José Queypo. The *Cours d'Economie Politique Pratique*, from which Morstadt had given extracts, was translated into German by Max Stirner (1845). The *Catéchisme* and the *Petit Volume* have also been translated into several European languages. An English version of the *Lettres à Malthus* appears in vol. xvii. of the *Pamphleteer*, 1821. (J. K. I.)

SCALA NOVA, Scala Nuova, or (Turkish) Kushadassi, also known as New Ephesus, a harbor on the west coast of Asia Minor, in the vilayet of Aidin, opposite the island of Samos. Before the opening of the Smyrna-Aidin railway its excellent roadstead was largely frequented by vessels trading with the Anatolian coast, and it has often been proposed to connect it with this system by a branch line, and thus enable it to compete with Smyrna as a trading centre. The population is estimated at 7000 to 10,000, of whom about 3000 are Greeks.

SCALIGER. For some account of the great Della Scala (Lat. *Scaliger*) family, the reader is referred to the article Verona. The name has also been borne by two scholars of extraordinary eminence in the world of letters.

1. Julius Cæsar Scaliger (1484–1558), so distinguished by his learning and talents that, according to De Thou, no one of the ancients could be placed above him, and the age in which he lived could not show his equal, was, according to his own account, a scion of the illustrious house of La Scala, for a hundred and fifty years princes of Verona, and was born in 1484 at the castle of La Rocca on the Lago de Garda. At the age of twelve he was presented to his kinsman the emperor Maximilian, and placed by him among his pages. He remained for seventeen years in the service of the emperor, following him in his expeditions through half Europe, and distinguished himself no less by personal bravery as a soldier than by military skill as a captain. But he was unmindful neither of letters, in which he had the most eminent scholars of the day as his instructors, nor of art, which he studied with considerable success under Albert Dürer. In 1512 he fought at the battle of Ravenna, where his father and elder brother were killed. He there displayed prodigies of valor, and received the highest honors of chivalry from his imperial cousin, the emperor conferring upon him with his own hands the spurs, the collar, and the eagle of gold. But this was the only reward he obtained for his long and faithful devotion. He left the service of Maximilian, and after a brief employment by another kinsman, the duke of Ferrara, he decided to quit the military life, and in 1514 entered as a student at the university of Bologna. He determined to take holy orders, in the expectation that he would become in due time cardinal, and then be elected pope, when he would wrest from the Venetians his principality of Verona, of which the republic had despoiled his ancestors. But, though he soon gave up this design, he remained at the university until 1519. The next six years he passed at the castle of Vico Nuova, in Piedmont, as a guest of the family of La Rovère, at first dividing his time between military expeditions in the summer, in which he achieved great successes, and study, chiefly of medicine and natural history in the winter, until a severe attack of rheumatic gout brought his military career to a close. Henceforth his life was wholly devoted to study. In 1525 he accompanied M. A. de la Rovère, bishop of Agen, to that city as his physician. Such is the outline of his own account of his early life. It was not until some time after his death that the enemies of his son first alleged that he was not of the family of La Scala, but was the son of Benedetto Bordone, an illuminator or schoolmaster of Verona; that he was educated at Padua, where he took the degree of M.D.: and that his story of his life and adventures before arriving at Agen was a tissue of fables. It certainly is supported by no other evidence than his own statements, some of which are inconsistent with well-ascertained facts.

The remaining thirty-two years of his life were passed almost wholly at Agen, in the full light of contemporary history. They were without adventure, almost without incident, but it was in them that he achieved so much distinction that at his death in 1558 he had the highest scientific and literary reputation of any man in Europe. A few days after his arrival at Agen he fell in love with a charming orphan of thirteen, Andiette de la Roque Lobejac. Her friends objected to her marriage with an unknown adventurer, but in 1528 he had obtained so much success as a physician that the objections of her family were overcome, and at forty-five he married Andiette, who was then sixteen. The marriage proved a complete success; it was followed by twenty-nine years of almost uninterrupted happiness, and by the birth of fifteen children.

A charge of heresy in 1538, of which he was acquitted by his friendly judges, one of whom was his friend Arnoul Le Ferron, was almost the only event of interest during these twenty-nine years, except the publication of his books, and the quarrels and criticisms to which they gave rise.

In 1531 he printed his first oration against Erasmus, in defence of Cicero and the Ciceronians. It is a piece of vigorous invective, displaying, like all his subsequent writings, an astonishing knowledge and command of the latin language, and much brilliant rhetoric, but full of vulgar abuse, and completely missing the point of the *Ciceronianus* of Erasmus, The writer's indignation at finding it treated with silent contempt by the great scholar, who thought it was the work of a personal enemy—Aleander—caused him to

write a second oration, more violent, more abusive, with more self-glorification, but with less real merit than the first. The orations were followed by a prodigious quantity of Latin verse, which appeared in successive volumes in 1533, 1534, 1539, 1546, and 1574; of these, a friendly critic, Mr. Pattison, is obliged to approve the judgment of Huet, who says: "par ses poésies brutes et informes Scaliger a deshonoré le Parnasse;" yet their numerous editions show that they commended themselves not only to his contemporaries but to succeeding scholars. A brief tract on comic metres (*De Comicis Dimensionibus*) and a work *De Causis Linguæ Latinæ*—the earliest Latin grammar on scientific principles, and following a scientific method—were his only other purely literary works published in his lifetime. His *Poetics* was left unpublished, and only appeared in 1561 after his death. With many paradoxes, with many criticisms which are below contempt, and many indecent displays of violent personal animosity,—especially in his reference to the unfortunate Dolet, over whose death he gloated with brutal malignity,—it yet contains much acute criticism, and shows that for the first time a writer had appeared who had formed an adequate idea of what such a treatise ought to be, and how it ought to be written.

But it is as a philosopher and a man of science that J. C. Scaliger ought to be judged. His tastes were for metaphysics and physics rather than for literature. Classical studies he regarded as an agreeable relaxation from severer pursuits. Whatever the truth or fable of the first forty years of his life, he had certainly been a most close and accurate observer, and had made himself acquainted with many curious and little-known phenomena, which he had stored up in a most tenacious memory, and which he was able to make use of with profit. His scientific writings are all in the form of commentaries, and it was not until his seventieth year that (with the exception of a brief tract on the *De Insomniis* of Hippocrates) he felt that any of them were sufficiently complete to be given to the world. In 1556 he printed his *Dialogue* on the *De Plantis* attributed to Aristotle, and in 1557 his *Exercitationes* on the work of Cardan, *De Subtilitate*. His other scientific works, *Commentaries* on Theophrastus's *History of Plants* and Aristotle's *History of Animals*, he left in a more or less unfinished state, and they were not printed until after his death. They are all marked by the same characteristics: arrogant dogmatism, violence of language, irritable vanity, a constant tendency to self-glorification, which we expect to find only in the charlatan and the impostor, are in him combined with extensive real knowledge, with acute reasoning, with an observation of facts and details almost unparalleled. He displays everywhere what Naudé calls "an intellect teeming with heroic thought." But he is only the naturalist of his own time. That he anticipated in any manner the inductive philosophy cannot be contended; his botanical studies did not lead him, like his contemporary Gesner, to any idea of a natural system of classification, and he rejected with the utmost arrogance and violence of language the discoveries of Copernicus. In metaphysics and in natural history Aristotle was a law to him, and in medicine Galen, but he was not a slave to the text or the details of either. He has thoroughly mastered their principles, and is able to see when his masters are not true to themselves. He corrects Aristotle by himself. He is in that stage of learning when the attempt is made to harmonize the written words with the actual facts of nature, and the result is that his works have no real scientific value. Their interest is only historical. His *Exercitationes* upon the *De Subtilitate* of Cardan (1557) is the book by which Scaliger is best known as a philosopher. Its numerous editions bear witness to its popularity, and until the final fall of Aristotle's physics it continued a popular text-book; as late as the middle of the seventeenth century an elaborate commentary upon it was published by Sperling, a professor at Wittenberg. We are astonished at the encyclopædic wealth of knowledge which the *Exercitationes* display, at the vigor of the author's style, at the accuracy of his observations, but are obliged to agree with Naudé that he has committed more faults than he has discovered in Cardan, and with Nisard that his object seems to be to deny all that Cardan affirms and to affirm all that Cardan denies. Yet it is no light praise that writers like Liebnitz and Sir William Hamilton recognize J. C. Scaliger as the best modern exponent of the physics and metaphysics of Aristotle. He died at Agen 21st October, 1558.

2. Joseph Justus Scaliger (1540–1609), the greatest scholar of modern times, was the tenth child and third son of Julius Cæsar Scaliger and Andiette de la Roque Lobejac (see above). Born at Agen in 1540, he was sent when twelve years of age, with two younger brothers, to the college of Guienne at Bordeaux, then under the direction of Jean Gelida. An outbreak of the plague in 1555 caused the boys to return home, and for the next few years Joseph was his father's constant companion and amanuensis. The composition of Latin verse was the chief amusement of Julius in his later years, and he daily dictated to his son from eighty to a hundred lines, and sometimes more. Joseph was also required each day to write a Latin theme or declamation, but in other respects he seems to have been left to his own devices. The Latin verse of Julius, faulty as it is in all that constitutes poetry, yet displays a more extensive knowledge of the Latin language, and a greater command of its resources, than is to be found in the verse of any of his contemporaries; and this constant practice in writing and reading or speaking Latin, under the supervision of one who knew the language thoroughly, was probably the foundation of Joseph's Latin scholarship. But the companionship of his father was worth more to him than any mere instruction. He learned from Julius what real knowledge was, and that it did not consist in discussions on words and phrases; and to his father he owed it that he was not a mere scholar, but something more—an acute observer, never losing sight of the actual world, and aiming not so much at correcting texts as at laying the foundation of a science of historical criticism.

In 1558, on the death of his father, he proceeded to Paris, and spent four years at the university there. Of his life at Paris we know but little. Hitherto he had not studied Greek. Now he felt that not to know Greek was to know nothing. It was in the literature of Greece that he must look for the true key of antiquity, and he forthwith began to attend the lectures of Turnebus. But after two months he found out his mistake. He had much to learn before he could be in a position to profit by the lectures of the greatest Greek scholar of the time. He shut himself up in his chamber, and determined to teach himself. He read Homer in twenty-one days, and then went through all the other Greek poets, orators, and historians, forming a grammar for himself as he went along. From Greek, at the suggestion of Postel, he proceeded to attack Hebrew, and then Arabic; of both he acquired a respectable knowledge, though not the critical mastery which he possessed in Latin and Greek. The name of Dorat then stood as high as that of Turnebus as a Greek scholar, and far higher as a professor. He has left nothing to justify his reputation as a scholar; but as a teacher he undoubtedly possessed the highest qualifications. He was able not only to impart knowledge, but to kindle enthusiasm for his subject in the minds of his hearers and pupils. It was to Dorat that Scaliger owed the home which he found for the next thirty years of his life. In 1563 the professor recommended him to Louis de Chastaigner, the young lord of La Roche Pozay, as a companion in his travels. A close friendship sprung up between the two young men, which remained unbroken till the death of Louis

in 1595. The travellers first proceeded to Rome. Here they found Muretus, who, when at Bordeaux and Toulouse, had been a great favorite and occasional visitor of Julius Cæsar at Agen. Muretus soon recognized Scaliger's merits, and devoted himself to making his stay at Rome as agreeable as possible, introducing him to all the men that were worth knowing. After visiting a large part of Italy, the travellers passed to England and Scotland, taking as it would seem La Roche Pozay on their way, for Scaliger's preface to his first book, the *Conjectanea in Varronem*, is dated there in December, 1564. Scaliger formed an unfavorable opinion of the English. Their inhuman disposition and inhospitable treatment of foreigners, especially impressed him. He was also disappointed in finding few Greek manuscripts and few learned men. It was not until a much later period that he became intimate with Richard Thompson and other Englishmen. In the course of his travels he had become a Protestant. His father, though he lived and died in the communion of the Church of Rome, had been suspected of heresy, and it is probable that Joseph's sympathies were early enlisted on the side of Protestantism. On his return to France he spent three years with the Chastaigners, accompanying them to their different chateaux in Poitou, as the calls of the civil war required their presence. In 1570 he accepted the invitation of Cujas, and proceeded to Valence to study jurisprudence under the greatest living jurist. Here he remained three years, profiting not only by the lectures but even more by the library of Cujas, which filled no less than seven or eight rooms and included five hundred manuscripts.

The massacre of St. Bartholomew—occurring as he was about to accompany the Bishop of Valence on an embassy to Poland—induced him with other Huguenots to retire to Geneva, where he was received with open arms and was appointed a professor in the academy. He lectured on the *Organon* of Aristotle and the *De Finibus* of Cicero with much satisfaction to the students but with little to himself. He hated lecturing, and was bored to death with the importunities of the fanatical preachers; and in 1574 he returned to France, and made his home for the next twenty years in the chateaux of his friend the lord of La Roche Pozay. Of his life during this period we have for the first time interesting details and notices in the *Lettres françaises inédites de Joseph Scaliger*, edited by M. Tamizey de Larroque (Agen, 1881), a volume which adds much to our knowledge of Scaliger's life. Constantly moving from chateau to chateau through Poitou and the Limousin, as the exigencies of the civil war required, occasionally taking his turn as a guard when the chateau was attacked, at least on one occasion trailing a pike on an expedition against the Leaguers, with no access to libraries, and frequently separated even from his own books, his life during this period seems in one aspect most unsuited to study. He had, however, what so few contemporary scholars possessed—leisure, and freedom from pecuniary cares. In general he could devote his whole time to study; and it was during this period of his life that he composed and published the books which showed how far he was in advance of all his contemporaries as a scholar and a critic, and that with him a new school of historical criticism had arisen. His editions of the *Catalecta* (1574), of Festus (1576), of Catullus, Tibullus, and Propertius (1577) are the work of a man who writes not only books of instruction for learners, but who is determined himself to discover and communicate to others the real meaning and force of his author. Discarding the trivial remarks and groundless suggestions which we find in the editions of nearly all his contemporaries and predecessors, he first laid down and applied sound rules of criticism and emendation, and changed textual criticism, from a series of haphazard and frequently baseless guesses, into a "rational procedure subject to fixed laws" (Pattison). But these works, while proving Scaliger's right to the foremost place among his contemporaries so far as Latin scholarship and criticism were concerned, did not go beyond mere scholarship. It was reserved for his edition of Manilius (1579), and his *De Emendatione Temporum* (1583), to revolutionize all received ideas of the chronology of ancient history,—to show for the first time that ancient chronology was of the highest importance as a corrector as well as a supplement to historical narrative, that ancient history is not confined to that of the Greeks and Romans, but also comprises that of the Persians, the Babylonians, and the Egyptians, hitherto neglected as absolutely worthless, and that of the Jews, hitherto treated as a thing apart and too sacred to be mixed up with the others, and that the historical narratives and fragments of each of these, and their several systems of chronology, must be carefully and critically compared together, if any true and general conclusions on ancient history are to be arrived at. It is this which constitutes his true glory, and which places Scaliger on so immeasurably higher an eminence than any of his contemporaries. Yet, while the scholars of his time admitted his preëminence, neither they nor those who immediately followed seem to have appreciated his real merit, but to have considered his emendatory criticism and his skill in Greek as constituting his claim to special greatness. "Scaliger's great works in historical criticism had overstepped any power of appreciation which the succeeding age possessed" (Pattison). His commentary on Manilius is really a treatise on the astronomy of the ancients, and it forms an introduction to the *De Emendatione Temporum*, in which he examines by the light of modern and Copernican science the ancient system as applied to epochs, calendars, and computations of time, showing upon what principles they were based.

In the remaining twenty-four years of his life he at once corrected and enlarged the basis which he had laid in the *De Emendatione*. With incredible patience, sometimes with a happy audacity of conjecture which itself is almost genius, he succeeded in reconstructing the lost *Chronicle* of Eusebius—one of the most precious remains of antiquity, and of the highest value for ancient chronology. This he printed in 1606 in his *Thesaurus Temporum*, in which he collected, restored, and arranged every chronological relic extant in Greek or Latin. In 1590 Lipsius retired from Leyden, where for twelve years he had been professor of Roman history and antiquities. The university and its protectors, the states-general of Holland and the prince of Orange resolved to obtain Scaliger as his successor. He declined their offer. He hated the thought of lecturing, and there were those among his friends who erroneously believed that with the success of Henry IV. learning would flourish, and Protestantism be no bar to distinction and advancement. The invitation was renewed in the most gratifying and flattering manner a year later. Scaliger would not be required to lecture. The university only wished for his presence. He would be in all respects the master of his time. This offer Scaliger provisionally accepted. About the middle of 1593 he started for Holland, where he passed the remaining thirteen years of his life, never returning to France. His reception at Leyden was all that he could wish. A handsome income was assured to him. He was treated with the highest consideration. His rank as a prince of Verona was recognized. Placed midway between The Hague and Amsterdam, he was able to obtain, besides the learned circle of Leyden, the advantages of the best society of both these capitals. For Scaliger was no hermit buried among his books; he was fond of social intercourse with persons of merit and intelligence, and was himself a good talker.

For the first seven years of his residence at Leyden his reputation was at its highest point. His literary dictatorship was unquestioned. It was greater in kind

and in extent than that of any man since the revival of letters—greater even than that of Erasmus had been. From his throne at Leyden he ruled the learned world, and a word from him could make or mar a rising reputation. The electric force of his genius drew to him all the rising talent of the republic. He was surrounded by young men eager to listen to and profit by his conversation, and he enjoyed nothing better than to discuss with them the books they were reading, and the men who wrote them, and to open up by his suggestive remarks the true methods and objects of philological and historical study. He encouraged Grotius when only a youth of sixteen to edit Capella; the early death of the younger Douza he wept as that of a beloved son; Daniel Heinsius, from being his favorite pupil, became his most intimate friend. But Scaliger had made numerous enemies. He hated ignorance, but he hated still more half learning, and most of all dishonesty in argument or in quotation. Himself the soul of honor and truthfulness, with a single aim in all his writings, namely, to arrive at the truth, he had no toleration for the disingenuous arguments, and the misstatements of facts, of those who wrote to support a theory or to defend an unsound cause. Neither in his conversation nor in his writings did he conceal his contempt for the ignorant and the dishonest. His pungent sarcasms were soon carried to the ears of the persons of whom they were uttered, and his pen was not less bitter than his tongue. He resembles his father in his arrogant tone towards those whom he despises and those whom he hates, and he despises and hates all who differ from him. He is conscious of his power as a literary dictator, and not always sufficiently cautious or sufficiently gentle in its exercise. Nor, it must be admitted, was Scaliger always right. He trusted much to his memory, which was occasionally treacherous. His emendations, if frequently happy, were sometimes absurd. In laying the foundations of a science of ancient chronology, he relied sometimes upon groundless, sometimes even upon absurd hypotheses, frequently upon an imperfect induction of facts. Sometimes he misunderstood the astronomical science of the ancients, sometimes that of Copernicus and Tycho Brahe. And he was no mathematician. But his enemies were not merely those whose errors he had exposed, and whose hostility he had excited by the violence of his language. The results of his system of historical criticism had been adverse to the Catholic controversialists, and to the authenticity of many of the documents upon which they had been accustomed to rely. The Jesuits, who aspired to be the expounders of antiquity, the source of all scholarship and criticism, perceived that the writings and authority of Scaliger were the most formidable barrier to their claims. It was the day of conversions. Muretus in the latter part of his life professed the strictest orthodoxy; Lipsius had been reconciled to the Church of Rome; Casaubon was supposed to be wavering; but Scaliger was known to be hopeless, and as long as his supremacy was unquestioned the Protestants had the victory in learning and scholarship. A determined attempt must be made, if not to answer his criticisms, or to disprove his statements, yet to attack him as a man, and to destroy his reputation. This was no easy task, for his moral character was absolutely spotless.

After several scurrilous attacks by the Jesuit party, in which coarseness and violence were more conspicuous than ability, in 1607 a new and more successful attempt was made. Scaliger's weak point was his pride. Brought up by his father, whom he greatly reverenced, in the belief that he was a prince of Verona, he never forgot this himself, nor suffered it to be forgotten by others. Naturally truthful, honorable, and virtuous in every respect, he conceived himself especially bound to be so on account of his illustrious ancestry. In 1594, in an evil hour for his happiness and his reputation, he published his *Epistola de Vetustate et Splendore Gentis Scaligeræ et J. C. Scaligeri Vita.* In 1607 Gaspar Scioppius, then in the service of the Jesuits, whom he afterwards so bitterly libelled, published his *Scaliger Hypobolimæus* ("The Suppositious Scaliger"), a quarto volume of more than four hundred pages, written with consummate ability, in an admirable and incisive style, with the entire disregard for truth which Scioppius always displayed, and with all the power of that sarcasm in which he was an accomplished master. Every piece of gossip or scandal which could be raked together respecting Scaliger or his family is to be found there. The author professes to point out five hundred lies in the *Epistola de Vetustate* of Scaliger, but the main argument of the book is to show the falsity of his pretensions to be of the family of La Scala, and of the narrative of his father's early life, and to hold up both father and son to contempt and ridicule as impudent impostors. "No stronger proof," says Mr. Pattison, "can be given of the impressions produced by this powerful philippic, dedicated to the defamation of an individual, than that it has been the source from which the biography of Scaliger, as it now stands in our biographical collections, has mainly flowed." To Scaliger the blow was crushing. Whatever the case as to Julius, Joseph had undoubtedly believed himself a prince of Verona, and in his *Epistola* had put forth with the most perfect good faith, and without inquiry, all that he had heard from his father as to his family and the early life of Julius. It was this good faith that laid the way for his humiliation. His *Epistola* is full of blunders and mistakes of fact, and, relying partly on his own memory, partly on his father's good faith, he has not verified one of the statements of Julius, most of which, to speak most favorably, are characterized by rhodomontade, exaggeration, or inaccuracy. He immediately wrote a reply to Scioppius, entitled *Confutatio Fabulæ Burdonum.* It is written, for Scaliger, with unusual moderation and good taste, but perhaps for that very reason had not the success which its author wished and even expected. In the opinion of the highest and most competent authority, Mr. Pattison, "as a refutation of Scioppius it is most complete"; but there are certainly grounds for dissenting, though with diffidence, from this judgment. Scaliger undoubtedly shows that Scioppius has committed more blunders than he has corrected, that his book literally bristles with pure lies and baseless calumnies; but he does not succeed in adducing a single proof either of his father's descent from the La Scala family, or of any single event narrated by Julius as happening to himself or any member of his family prior to his arrival at Agen. Nor does he even attempt a refutation of what seems really to be the crucial point in the whole controversy, and which Scioppius had proved, as far as a negative can be proved,—namely, that William, the last prince of Verona, had no son Nicholas, the alleged grandfather of Julius, nor indeed any son who could have been such grandfather. But whether complete or not, the *Confutatio* had no success; the attack of the Jesuits was successful, far more so than they could possibly have hoped. Scioppius was wont to boast that his book had killed Scaliger. It certainly embittered the few remaining months of his life, and it is not improbable that the mortification which he suffered may have shortened his days. The *Confutatio* was his last work. Five months after it appeared, "on the 21st of January, 1609, at four in the morning, he fell asleep in Heinsius's arms. The aspiring spirit ascended before the Infinite. The most richly stored intellect which had ever spent itself in acquiring knowledge was in the presence of the Omniscient" (Pattison).

Of Joseph Scaliger the only biography in any way adequate is that of Jacob Bernays (Berlin, 1855). It was reviewed by the late Mark Pattison in an excellent article in the *Quarterly Review,* vol. cviii. (1860). Mr. Pattison had made many MS. collections for a life of Joseph Scaliger on a much more extensive scale, which it is greatly to be regretted he left unfinished, and in too fragmentary a state to be published. The present writer has had access to and

made much use of these MSS., which include a life of Julius Cæsar Scaliger written some years since. For the life of Joseph, besides the recently published letters above referred to, the two old collections of Latin and French letters and the two *Scaligerana* are the most important sources of information. For the life of Julius Cæsar the letters edited by his son, those subsequently published in 1620 by the President de Maussac, the *Scaligerana*, and his own writings, which are full of autobiographical matter, are the chief authorities. M. De Bourousse de Laffore's *Étude sur Jules César de Lescale* (Agen, 1860) and M. Magen's *Documents sur Julius Cæsar Scaliger et sa famille* (Agen, 1873) add important details for the lives of both father and son. The lives by M. Charles Nisard—that of Julius in *Les Gladiateurs de la République des Lettres*, and that of Joseph in *Le Triumvirat Littéraire au seizième siècle*—are equally unworthy of their author and their subjects. Julius is simply held up to ridicule, while the life of Joseph is almost wholly based on the book of Scioppius and the *Scaligerana*. A complete list of the works of Joseph will be found in his life by Beruays. (R. C. C.).

SCAMMONY. Under this name the dried juice of the root of *Convolvulus Scammonia*, L. (σκαμωνία), is used in medicine.[1] It appears to have been known to the Greeks as early as the 3d century B.C., and is supposed to have been one of the medicines recommended to Alfred the Great by Helias, patriarch of Jerusalem (*Cockayne Leechdoms*, vol. ii., pp. xxiv., 289, 175; 273, 281). The scammony plant is a native of the countries of the eastern part of the Mediterranean basin, growing in bushy waste places, from Syria in the south to the Crimea in the north, its range extending westward to the Greek islands, but not to northern Africa or Italy. It is a twining perennial, bearing flowers like those of *Convolvulus arvensis*, and having irregularly arrow-shaped leaves and a thick fleshy root. The drug is collected principally in Asia Minor, and near Aleppo in Syria, although a little is obtained from the neighborhood of Mount Carmel and the Lake of Tiberias. The principal places of export are Smyrna and Aleppo (Scanderoon), but the drug often bears in commerce the name of the district where it was collected, *e.g.*, Broussa, Angora, etc. Formerly Aleppo scammony was considered the best and commanded the highest price, but at present the purest article comes from Smyrna. The very variable quality of the drug has led to the use of the resin prepared directly from the root, which affords it to the extent of 5½ per cent., and an establishment for its manufacture was founded at Broussa in 1870. The dried root is also exported to England, and the resin prepared from it there. By purification the resin can be obtained almost white. The crude resin obtained from the root, being free from gum, does not present a milky appearance when rubbed with a wetted finger, and is thus easily distinguished from the natural product.

Scammony is used in medicine as a safe but energetic purgative, and is frequently prescribed in combination with calomel and colocynth. Its medicinal activity is due to the resin scammonin, which is also called jalapin from its occurrence in the root of the male jalap (*Ipomœa orizabensis*), and of Tampico jalap (*I. simulans*) see JALAP). The export of scammony from Smyrna in 1881 was only 97 boxes, valued at £544 [$2643.84], the amount having decreased of late years owing to the increased export of the root from Syria. More than half of this quantity was taken by England, about one-fourth by France, and the remainder by Italy, America, and Austria.

The drug is obtained from the root by slicing off obliquely one or two inches from the crown and allowing the milky juice which exudes to drain into a small shell (generally that of a freshwater mussel), which is inserted in the root just below the base of the incision. To prevent the juice from becoming soiled, the earth is scraped away so as to leave exposed four or five inches of the root. The shells are collected in the evening and their contents emptied into a copper or leatheru vessel,—the scrapings from the surface of the root, consisting of partially dried tears, being added. On the average, about one drachm is afforded by each incision; a plant four years old may give two drachms; in rare cases as much as twelve drachms has been obtained from a single large root. The collection usually takes place when the plant is in flower towards the end of summer. The product of differeut roots naturally varies in quality, and the peasants therefore, on arrival at their homes, render it uniform by mixing it with a knife. It is then spread out in the air to dry. Sometimes the gathering of several days is allowed to accumulate, and then moistened, kneaded, and made up into cakes. During the drying it appears to undergo a kind of fermentation, which gives the drug a slightly porous appearance and dark color. Frequently it is adulterated by adding 40 per cent. of flour and earthy matter. It then assumes a paler color and opaque appearance, and loses its brittleness. This adulterated article is known as "skilip," and the pure article as "virgin" scammony. The latter is met with in the form of flattened pieces half an inch or more in thickness, with a blackish, resinous fracture, thin fragments being translucent. Externally it is often covered with a grayish powder. The odor, when a piece is freshly broken, is cheesy; when chewed, it leaves an acrid sensation in the throat. Scammony of good quality should yield to ether 80 to 90 per cent. of resin; the remainder consists of gum and mineral matter.

[1] It was formerly called diagrydion, probably from δάκρυ, a tear, in allusion to the manner the juice exudes from the incised root.

SCANDERBEG, *i.e.*, Iskander (Alexander) Bey, is the Turkish name and title of GEORGE CASTRIOTA, the youngest son of John Castriota, lord of an hereditary principality in Albania. He was born about the year 1404, and as a boy was sent as a hostage to the Ottoman court, where he was brought up as a Mohammedan for the Turkish military service. He early distinguished himself as a soldier and received high promotion under Amurath II. In 1443 he was of the expedition against the Magyars, but shortly after taking the field he heard of his father's death and resolved to strike a blow for freedom. Availing himself of the opportunity afforded by John Hunyady's defeat of the Turks at Nish, he forced from the principal secretary of the sultan a firman making him governor of Croya, his native town, and forthwith left the camp with 300 Albanian horsemen. Once master of the place, he abjured Islam and proclaimed his independence. The Albanians soon recognized him as their head, and flocked to his standard, and pasha after pasha was vainly sent to crush him. Amurath II. in person unsuccessfully besieged him in 1450, and Mohammed II. found it necessary to grant him favorable terms of peace in 1461. Instigated by the legates of Pius II. and the ambassadors of the Venetian republic, Scanderbeg again proclaimed war in 1464, and at least was successful in repelling the sultan, who had invaded Albania. He died in January, 1467, at Alessio, leaving an infant son named John, whom he commended to the care of the Venetians. After a twelve years' war, the Turks finally gained possession of Croya, the representatives of Scanderbeg settling in Calabria.

SCANDEROON (ISCANDERÛN), or ALEXANDRETTA, lies girdled by green hills on the picturesque bay of the same name, the ancient *Sinus Issicus*, at the extreme north of the Syrian coast, where it forms an angle with that of Asia Minor. Alexandretta succeeded an older town of Alexandria (Little Alexandria), founded by Alexander the Great, but does not perhaps occupy quite the same site. The harbor is the best on the Syrian coast, and steamers call at it regularly, but the town is scourged with fever and has only some 2500 inhabitants, mainly Greek Christians. It is the port of Aleppo, and would naturally be the port of an "Euphrates railway."

SCANDINAVIAN LANGUAGES. By this expression we understand the closely allied languages which are and have been spoken by the Germanic population in Scandinavia, and by the inhabitants of the countries that have been wholly or partially peopled from it. At present the territory of these languages embraces—Sweden, except the most northerly part (Lapland and inland parts Territory.

of Vesterbotten, where Finnish and Lappish exclusively or chiefly prevail); certain islands and districts on the coast of western and southern Finland, as well as Åland;[1] a small tract on the coast of Esthonia, where Swedish is spoken, as it is also to some extent in the Esthonian islands of Dagö, Nargö, Nukkö, Ormsö, and Rågö;[2] Gammalsvenskby ("Galsvenskbi") in southern Russia (government of Kherson),[3] a village colonized from Dagö; the Livonian island of Runö,[4] where Swedish is spoken, as it formerly was on the island of Ösel; Norway, except certain regions in the northern part of the country, peopled by Finns and Lapps (diocese of Tromsö); Denmark, with the Faroes, Iceland, and Greenland, where, however, Danish is only spoken by a very small part of the population; the northernmost part of Schleswig; and, finally, several Scandinavian colonies in the United States of North America. Scandinavian dialects have besides been spoken for varying periods in the following places: Norwegian in certain parts of Ireland (800–1300 A.D.) and northern Scotland, in the Isle of Man, the Hebrides (800–1400, or longer), the Shetland Islands (800–1800), and the Orkneys (800–1800);[5] Danish in the whole of Schleswig, in the northeastern part of England (the "Danelag"), and in Normandy (900–1000, or a little longer);[6] Swedish in Russia (from the end of the 9th to the beginning of the 11th century).[7] At what epoch the Germanic population settled in Scandinavia we cannot as yet even approximately decide. It is quite certain, however, that it already existed there before the Christian era,—nay, most probably as early as the beginning of the so-called Stone Age (three thousand years before Christ). If this view be correct, the Scandinavian languages have had an existence of more than four thousand years.[8] But we do not know anything about them during the period before the birth of Christ. It is only from that epoch we can get any information concerning the language of the old Scandinavians, which seems by that time not only to have spread over Denmark and great parts of southern and middle Sweden and of (southern) Norway, but also to have reached Finland (at least Nyland) and Esthonia. In spite of its extension over this considerable geographical area, the language appears to have been fairly homogeneous throughout the whole territory. Consequently, it may be regarded as a uniform language, the mother of the younger Scandinavian tongues, and accordingly has been named the primitive Scandinavian (*urnordisk*) language. The oldest sources of our knowledge of this tongue are the words which were borrowed during the first centuries of the Christian era (some of them perhaps even earlier) by the Lapps from the inhabitants of central Sweden and Norway, and by the Finns from their neighbors in Finland and Esthonia, and which have been preserved in Finnish and Lappish down to our own days.[9] These borrowed words, denoting chiefly utensils belonging to a fairly advanced stage of culture, amount to several hundreds, with a phonetic form of a very primitive stamp; as Finn. *terva* (O. Sw. *tiœra*, Germ. *theer*), tar; *airo* (O. Sw. *ar*), oar; *kansa* (O. H. G. *hansa*), people; *napakaira* (O. H. G. *nabagêr*, O. Sw. *navar*), auger; *nekla* (Got. *nêpla*, O. Sw. *nal*), needle; *ansas* (Got. *ans*, O. Sw. *as*), beam; Lapp *sajet* (Got. *saian*, O. Sw. *sa*), sow; *garves* (O. H. G. *garawêr*, O. Sw. *gör*), finished; *divres* (O. Sax. *diuri*, O. Sw. *dyr*), dear; *saipo* (O. H. G. *seifa*, Sw. *såpa*), soap. These words, with those mentioned by contemporary Roman and Greek authors, are the oldest existing traces of any Germanic language. Wrested from their context, however, they throw but little light on the nature of the original northern tongue. But a series of linguistic monuments have come down to us dating from the end of the so-called Iron Age (about 450 A.D.),—the knowledge and the use of the oldest runic alphabet (with twenty-four characters) having at that period been propagated among the Scandinavians by the southern Germanic tribes. In fact we still possess, preserved down to our own times, primitive northern runic inscriptions, the oldest upon the utensils found at *Thorsbjerg*, dating back to about 300 A.D.,[10] which, together with the MS. fragments of Ulfila's Gothic translation of the Bible, about two hundred years later in date, constitute the oldest veritable monuments of any Germanic tongue. These runic inscriptions are for the most part found on stone-monuments (sometimes on rocks) and bracteates (gold coin stamped on one side and used for ornaments), as well as on metallic and wooden utensils weapons, and ornaments.[11] Up to this time there have been discovered more than one hundred, but of these only about one-half give us any information concerning the language, and most of them are only too short. The longest one, the stone-monument of *Tune*, in southeastern Norway, contains only sixteen words. Their language is somewhat later in character than that of the oldest words borrowed by the Lapps and Finns: accented *ê*, for example, is already changed into *a* (*cf.* *mariR* = Goth. *mêrs*, renowned; but the Finn. borrowed word *nêkla* = Goth. *nêpla*, needle), and the voiced *s* into a kind of *r* (*cf.* *dagaR* = Goth. *dags*, day; but Finn. *armas* = Goth. *arms*, poor). On the other hand, in all essential matters it is much earlier in character than the language of contemporary Gothic manuscripts, and no doubt approaches more nearly than any Germanic idiom the primitive form of the Germanic tongue. For the sake of comparison, we give a Gothic translation of one of the oldest of the primitive Scandinavian inscriptions, that on the golden horn of *Gallehus*, found on the Danish-German frontier, and dating from about 400 A.D.:

Scand.: EK HLEWAGASTI*R*. HOLTINGA*R*. HORNA.TAWIDO;
Goth.: *ik hliugasts. hultiggs. haurn. tawida;*
Engl.: I, HlewagastiR, son of Holta, made the horn;

as well as the inscription on the stone-monument of *Järsbärg* in western Sweden, which is at least a hundred years later:

Scand.: UBA*R* HITE. HARABANA*R* WIT IAH EK ERILA*R* RUNO*R* WARITU;
Goth.: *ufar hita, hrabns wit jah ik airils rûnôs writu;*
Engl.: In memory of HitaR. We both, HarabanaR and I ErilaR, wrote the runes.

Although very brief, and not yet thoroughly interpreted,[12] these primitive Scandinavian inscriptions are nevertheless sufficient to enable us to determine with some certainty the relation which the language in which they are written bears to other languages. Thus it is

The primitive Scandinavian language.

Borrowed words.

Runic inscriptions.

Relation to other languages.

[1] See A. O. Freudenthal, *Om Svenska allmogemålet i Nyland*, 1870; *Ueber den Närpesdialect*, 1878.
[2] A. O. Freudenthal, *Upplysningar om Rågö- och Wichterpalmålet*, 1875; H. Vendell, *Laut- und Formlehre der Schwedischen Mundarten in den Kirchspielen Ormsö und Nukkö*, 1881.
[3] H. Vendell, "Om och från Gammalsvenskby" (*Finsk Tidskrift*, 1882).
[4] H. Vendell, *Runömälets ljud- och formlära*, 1882–6.
[5] J. J. A. Worsaae, *Minder om de Danske og Nordmændene i England, Skotland, og Irland*, 1851; A. Laurensen and K. J. Lyngby, "Om sproget paa Hjaltlandsöerne" (*Anm.f. Nord. Oldkynd.*, 1860); P. A. Munch, *Samlede Afhandlinger*, iii., iv., 1875–76.
[6] Worsaae, *l.c.*; J. C. H. R. Steenstrup, *Danelag*, 1882; Es. Tegnér, "Norrmän eller Danskar i Normandie," and "Ytterligare om de nordiska ortnamnen i Normandie" (*Nordisk Tidskrift*, 1884).
[7] W. Thomsen, *Ryska rikets grundläggning genom Skandinaverna*, 1882 (*The Relations between Ancient Russia and Scandinavia*, 1877); S. Bugge, "Oldsvenske navne i Rusland" (*Arkiv for Nordisk Filologi*, ii. 1885).
[8] O. Montelius, "Om våra förfäders invandring till Norden" (*Nordisk Tidskrift*, 1884).
[9] W. Thomsen, *Ueber den Einfluss der Germ. Sprachen auf die Finnisch-Lappischen*, 1870.
[10] O. Montelius, *Die Kultur Schwedens in vorchristlicher Zeit*, 1885.
[11] See the plates in G. Stephens's *Handbook of Old Northern Runic Monuments*, 1884.
[12] For the interpretations we are principally indebted to Prof. S. Bugge's ingenious investigations, who, in 1865, satisfactorily succeeded in deciphering the inscription of the golden horn, and by this means gained a fixed starting-point for further researches. A short review of their most important results is given by F. Burg, *Die älteren Nordischen Runeninschriften*, 1885.

proved that it belongs to the Germanic family of the Indo-European stock of languages, of which it constitutes an independent and individual branch. Its nearest relation being Gothic, these two branches are sometimes taken together under the general denomination *Eastern Germanic*, as opposed to the other Germanic idioms (German, English, Dutch, etc.), which are then called *Western Germanic*. The most essential point of correspondence between the Gothic and Scandinavian branches is the insertion in certain cases of *gg* before *w* and *j* (*ggj* in Gothic was changed into *ddj*), as in gen. plur. O. H. G. *zweiio*, O. Engl. *twega* (two), compared with O. Icel., O. Norw. *tveggja*, O. Sw., O. Dan. *tviggjæ*, Goth. *twaddjê;* and, still, in Germ. *treu*, Engl. *true*, compared with Sw., Norw., Dan. *trygg*, Icel. *tryggr*, Goth. *triggws*. However, in the primitive Scandinavian age the difference between the Gothic and Scandinavian is more clearly marked than the resemblance; thus, for example—just to hint only at some of the oldest and most essential differences—Goth. nom. sing. ending in *-s* corresponds to primitive Scandinavian *-a*R, *-i*R (as Goth. *dags*, days, *gasts*, guest = Scand. *daga*R, *gasti*R); Goth. gen. sing. in *-is* to Scand. *-as* (as Goth. *dagis*, day's = Scand. *dagas*); Goth. dat. sing. in *-a* to Scand. *-e* (as Goth. *kaurna*, corn = Scand. *kurne*); Goth. 1st pers. sing. pret. in *-da* to Scand. *-do* (as Goth. *tawida*, did = Scand. *tawido*).

Transformation.

As early as the beginning of the so-called later Iron Age (about 700 A.D.) the primitive Scandinavian language had undergone a considerable transformation, as is proved for example by the remarkable runic stone at *Istaby* in the soutn of Sweden, with the inscription:

AFĄTR HARIWULĄFĄ HAÞUWULĄF*R* HAERUWULĄFI*R*
WĄRAIT RUNA*R* ÞAIA*R;*
Engl.: In memory of HariwulfR, HaÞuwulfR, son of HeruwulfR, wrote these runes.

Here, *e.g.* we find nom. sing. in *-a*R changed into *-r* (*cf. haþuwulaf*R with *holtinga*R on the golden horn), and the plural ending *-o*R into *-a*R (*cf. runa*R with *runo*R on the Järsbärg-stone). At the beginning of the so-called Viking Period (about 800 A.D.) the Scandinavian language seems to have undergone an extraordinarily rapid development, which in a comparatively short time almost completely transformed its character. This change is especially noticeable in the dropping of unaccented vowels, and in the introduction of a certain vowel harmony of different kinds ("Umlaut," vowel changes, caused by a following *i* (*j*) or *u* (*w*), as *kvœði* for *kwáði*, poem, and "Brechung," as *healpa* instead of *helpa*, to help), different assimilations of consonants (as *ll*, *nn* for *lþ*, *nþ*; *ll*, *nn*, *rr*, and *ss* for *l*R, *n*R, *r*R, and *s*R), dropping of *w* before *o* and *u* (as *orð*, *ulfr* for *worð*, word, *wulf*R, wolf), simplified inflection of the verbs, a new passive formed by means of affixing the reflective pronoun *sik* to the active form (as *kalla-sk*, to call one's self, to be called), etc.

Period of transition.

At this epoch, therefore, the primitive Scandinavian language must be considered as no longer existing. The next two centuries form a period of transition as regards the language as well as the alphabet which it employed. We possess some inscriptions belonging to this period in which the old runic alphabet of twenty-four characters is still used, and the language of which closely resembles that of the primitive Scandinavian monuments, as, for example, those on the stones of *Stentoften* and *Björketorp*, both from southern Sweden, probably dating from the 10th century, and being the longest inscriptions yet found with the old runic alphabet. On the other hand, inscriptions have come down to us dating from about the middle of the 9th century, in which the later and exclusively Scandinavian alphabet of sixteen characters has almost completely superseded the earlier alphabet, from which it was developed, while the language not only differs widely from the original Scandinavian, but also exhibits dialectical peculiarities suggesting the existence of a Danish-Swedish language as opposed to Norwegian, as the form *ruulf* on the stone at *Flemlöse* in Denmark, which in a Norwegian inscription would have been written *hruulf*, corresponding to *Hrolf* in Old Norwegian literature. These differences, however, are unimportant, and the Scandinavians still considered their language as one and the same throughout Scandinavia, and named it *Dǫnsk tunga*, Danish tongue. But when Iceland was colonized at the end of the 9th and the beginning of the 10th century, chiefly from western Norway, a separate (western) Norwegian dialect gradually sprang up, at first, of course, only differing slightly from the mother-tongue. It was not until the introduction of Christianity (about 1000 A.D.) that the language was so far differentiated as to enable us to distinguish, in runic inscriptions and in the literature which was then arising, four different dialects, which have ever since existed as the four literary languages—Icelandic, Norwegian, Swedish, and Danish. Of these the latter two, often comprehended within the name of *Eastern Scandinavian*, as well as the former two, *Western Scandinavian*, or, to use the Old Scandinavians' own name, *Norrǫnt mál*, Northern tongue, are very nearly related to each other. The most important differences between the two branches, as seen in the oldest preserved documents, are the following: (1) In E. Scand. far fewer cases of "Umlaut," as *vári*, W. Scand. *væri*, were; *land*, W. Scand. *lǫnd* (from *landu*), lands; (2) E. Scand. "Brechung" of *i* into *iu* (or *io*) before *ng*(*w*), *nk*(*w*), as *siungæ*, W. Scand. *syngva* (from *singwa*), to sing; (3) in E. Scand. *mp*, *nk*, *nt* are in many cases not assimilated into *pp*, *kk*, *tt*, as *krumpen*, W. Scand. *kroppenn*, shrunken; *ænkiæ*, W. Scand. *ekkja*, widow; *bant*, W. Scand. *batt*, he bound; (4) in E. Scand. the dative of the definite plural ends in *-omen* instead of W. Scand. *-onom*, as in *handomen*, *hǫndonom*, (to) the hands; (5) in E. Scand. the simplification of the verbal inflectional endings is far further advanced, and the passive ends in *-s* for *-sk*, as in *kallæs*, W. Scand. *kallask*, to be called. In several of these points, and indeed generally speaking, the Western Scandinavian languages have preserved the more primitive forms, as may be seen in the oldest Eastern Scandinavian runic inscriptions, dating from a period before the beginning of the literature, as well as in many modern Eastern Scandinavian dialects. For, having regard to the Scandinavian dialects generally, we must adopt quite a different classification from that indicated by the dialects which are represented in the literature. We now pass on to review the latter and their history.

Dialects.

Differences between Eastern and Western Scandinavian.

I. ICELANDIC.—In ancient times Icelandic was by far the most important of the Scandinavian languages, in form as well as in literature. To avoid ambiguity, the language before the Reformation (about 1530–40) is often called Old Icelandic.

ICELANDIC.

1. *Old Icelandic* was spoken not only in Iceland, but also in Greenland, where Icelandic colonists lived for a lengthened period (983–about 1400). Our knowledge of its character is almost exclusively derived from the remarkably voluminous literature,[1] dating from the middle of the 12th century, and written in the Latin alphabet, adapted to the special requirements of this language. Nothing is preserved of older runic literature.[2] Indeed, Old Icelandic possesses only very few runic monuments (about forty), all of them almost worthless from a philological point of view. The oldest, the inscription on the church door of Valþjófstaðr, dates from the beginning of the 13th

Old Icelandic.

Sources.

[1] A complete catalogue of the literature edited hitherto is given by Th. Möbius, *Catalogus Librorum Islandicorum et Norvegicorum Ætatis Mediæ*, 1856, and *Verzeichniss der . . . altisländischen und altnorwegischen . . . von* 1855 *bis* 1879 *erschienenen Schriften*, 1880. Compare ICELAND.

[2] See B. Magnússon Ólsen, *Runerne i den Oldislandske literatur*, 1883.

century,[1] and is consequently later than the oldest preserved manuscripts[2] in the Latin alphabet, some of which are as old as the end of the 12th century. A small fragment (Cod. AM. 237, fol.) of a *Book of Homilies* (of which a short specimen is given below) is considered the oldest of all. About contemporary with this is the oldest part of an inventory entitled *Reykjaholts máldage*. From about 1200 we possess a fragment (Cod. Reg. old sign. 1812) of the only existing Old Icelandic *glossary*, and from the first years of the 13th century the *Stockholm Book of Homilies* (Cod. Holm. 15, 4to), which from a philological point of view is of the greatest importance, chiefly on accouut of its very accurate orthography, which is especially noticeable in the indicatiou of quantity; from the early part of the same ceutury comes the fragment (Cod. AM. 325, 2, 4to) entitled *Ágrip* ("abridgment" of the history of Norway), probably a copy of a Norwegian original, also orthographically importaut. Among later manuscripts we may mention, as philologically iuteresting, the *Annals Regii* (Cod. Reg. 2087) from the beginning of the 14th century, orthographically of great value; the rich manuscript of miscellanies, *Hauksbók* (Codd. AM. 371, 544, 675, 4to), a great part of which is written with Haukr Erleudsson's (†1334) own hand; and, above all, three short essays, in which some Icelanders have tried to write a grammatical and orthographical treatise on their own mother-tongue, all three appearing as au appendix to the manuscripts of the *Prose Edda*. The oldest and most important of these essays (preserved in the Cod. Worm. from about 1330) is by an unkuown author of about 1150, and is probably inteuded to be a contiuuation of a lost work of the first grammarian of Iceland, Þóroddr Rúnameistari (who flourished at the beginning of the 12th century); the secoud (the oldest known manuscript of which is preserved in the Cod. Ups., *c.* 1290) is perhaps the work of the famous Snorri Sturloson (†1241); the third (the oldest manuscript in Cod. AM. 748, 4to, of the beginning of the 14th century) is by Suorri's nephew Olafr Hvítaskáld (†1259), and is no doubt based partly upon Þórodd's work above mentioned, partly and chiefly upon Priscian and Donatus.[3]

Form of the language.

The oldest form of the Icelandic language is, however, not preserved in the above-mentioned earliest mauuscripts of the end of the 12th century, which are written iu the language of their own age, but in far later oues of the 13th century, which contain poems by the oldest Icelandic poets, such as the renowned Egill Skallagrímson (about 930) and the unknown authors of the so-called Edda-songs. In spite of the late date of the manuscripts, the metrical form has been the means of preserving a good deal of the ancient language. But, as already remarked, during the 10th aud 11th centuries this dialect differs but little from Norwegian, though in the 12th this is no longer the case.

We may here contrast a specimen of the above-mentioned oldest Icelandic mauuscript (from the end of the 12th century) with an almost contemporary Norwegian one (Cod. AM. 619; see below):

Icel.—En þat es vitanda, at allt ma andlega merkiasc oc fyllasc í oss, þat es til kirkio bunings eþa þionosto þarf at hauá, ef ver liuom sva hreinlega at vér sem verþer at collasc goþs mustere

Norw.—En þat er vitanda, at allt ma andlega merkiasc oc fyllasc í os, þat er til kirkiu bunings eða til þionasto þarf at hafa, ef vér lifum sva ræinlega, at vér sem verðir at kallasc guðs mysteri.

Engl.—And that is to be known that all that is needed for the decoration of the church or the service may, spiritually, be found and imitated within us, if we live so cleanly that we are worthy to be called God's temple.

Apart from the fact that the language is, generally speakiug, archaic, we find in the Icelandic text two of the oldest and most essential characteristics of Icelandic as opposed to Norwegian, viz., the more complete vowel assimilation (*þionosto, þionasto; cf.* also, *e.g.*, Icel. *kollǫþom*, Norw. *kallaðum*, we called) aud the retention of initial *h* before *r* (*hreinlega, ræinlega*), *l*, and *n*. Other differences, some of which occur at this period, others a little later, are—in Icel. lengthening of *a, o, u* before *lf, lg, lk, lm*, and *lp* (as Icel. *hálfr*, Norw. aud oldest Icel. *halfr*, half); later still, also of *a, i, u*, and *y* before *ng* aud *nk;* Icel. *æ* aud *ey* for older *ǫ* and *ǫy* (as in Icel. *dæma, heyra*, Norw. and oldest Icel. *dǫma*, to deem *hǫyra*, to hear); Icel. termination of 2d plur. of verbs in *-ð* (*þ*) or *-t*, but Norw. often in *-r* (as Icel. *takið, -t*, Norw. *takir*, you take). These points may be sufficieut to characterize the language of the earlier "classical" period of Icelandic (about 1190–1350). At the middle of the 13th century the written language undergoes material changes, owing in a great measure, no doubt, to the powerful influence of Snorri Sturloson. Thus in unaccented syllables *i* now appears for older *e*, and *u* (at first only when followed by one or more consonants belonging to the same syllable) for *o;* the passive euds in *-z* for *-sk*. The other differences from Norwegian, mentioned above as occurriug later, are now completely established. With the beginning of the 14th century there appear several new linguistic phenomena; a *u* is inserted between final *r* and a preceding consonant (as in *ríkur*, mighty); *ǫ* (pronouuced as an open *o*) passes into *ö* (the character *ö* was not iutroduced till the 16th ceutury), or before *ng, nk* into *au* (as *lǫng, fiǫll*, pronounced *laung, fiöll*); *e* before *ng, nk* passes into *ei;* a little later *é* passes into *ie*, and the passive changes its termination from *-z*, oldest *-sk*, into *-zt* (or *-zst*) (as iu *kallazt*, to be called). The post-classical period of Old Icelandic (1350–1530), which is, from a literary point of view, of but little importance, already shows marked differences that are characteristic of Modern Icelandic; as early as the 15th century we find *ddl* for *ll* and *rl* (as *falla*, pronouuced *faddla*, to fall), *ddn* for *nn* and *rn* (as *horn*, pron. *hoddn*, horn); about the year 1500 *ve* after *h* passes into *vo*, in other positions to *vö* (as *hvelpr*, pron. *xvolpur*, whelp; *kvern*, prou. *kvörn*, mill), etc.

Dialects.

Although dialectical differeuces are uot altogether wantiug, they do not occur to any great extent in the Old Icelandic literary language. Thus, iu some manuscripts we fiud *ft* replaced by *fst* (*oft, ofst;* often); in manuscripts from the westeru part of the island there appears in the 13th and 14th centuries a tendency to change *lf, rf* into *lb, rb* (*tolf, tolb*, twelve; *þǫrf, þǫrb*, want), etc. To what extent the language of Greenland differed from that of Icelaud we cannot judge from the few runic monuments which have come down to us from that colony.

Grammatical treatment.

Apart from the comparatively inconsiderable attempts at a grammatical treatment of Old Icelandic in the Middle Ages which we have mentioned above, grammar as a science can only be said to have commenced in the 17th century. The first grammar, written by the Icelander Runolphus Jonas (†1654), dates from 1651. His contemporary aud compatriot Gudmund Andreæ (†1654) compiled the first dictionary, which was not, however, edited till 1683 (by the Dane Petrus Resenius, †1688). The first scholars who studied Old Icelandic systematically were H. K. Rask (1787–1832),[4] whose works[5] laid the foundatiou to our knowledge of the language, and his great contemporary Jac. Grimm, in whose *Deutsche Grammatik* (1819 *sq.*) particular attention is paid to Icelandic. Those who since the time of Rask and Grimm have priucipally deserved well of Icelandic grammar are—the ingeuious and learned Norwegian P. A. Munch, 1863,[6] to whom we really owe the normalized orthography that has hitherto been most in use in editiug Old Icelandic texts; the learned Icelander K. Gíslason, whose works are chiefly devoted to phonetic researches;[7] the Danish scholars K. J. Lyngby (†1871), the author of an essay[8] which is of fundamental importance in Icelandic orthography and phouctics, and L. F. A. Wimmer; who has rendered great serviccs to the study of the etymology.[9] The latest Icelandic grammar is by the Swede Ad. Noreen.[10] As lexicographers the first rank is held by the Icelanders Sv. Egilsson (†1852),[11] G. Vigfússou,[12] and J. Þorkelsson,[13] and the Norwegiau J. Fritzner.[14]

[1] See Kr. Kålund, "Islands fortidslevninger" (in the *Aarbǫger for Nordisk Oldkyndighed*, 1882).

[2] An account of all the oldest Icelandic manuscripts (to about 1230) is given by J. Hoffory in the *Gött. Gel. Anz.*, 1884, p. 478 *sq.*

[3] A short review of the most important Old Icelandic manuscripts (and their editions), classed according to subjects, is given by O. Brenner, *Altnordisches Handbuch*, pp 13 *sq.* The principal collections of manuscripts are: 1, the Árnamagnæan (AM.) in Copenhagen, founded by Arni Magnússon (†1730); 2, the collection of the Royal Library (Reg.) in Copenhagen, founded by Th. Torfæus (†1719) and Brynjólfr Sveinsson (†1674); 3, the Delagardian collection (Delag. or Ups.) at Upsala, founded in 1651 by Magnus Gabriel de la Gardie; 4, the Stockholm collection (Holm.), founded by Jón Rugman (in 1662) and Jón Eggertson (in 1682).

[4] [See RASMUS CHRISTIAN RASK, vol. XX. p. 298. The variation of initials arises from the use of linguistically equivalent names. —AM. ED.]

[5] *E.g., Veiledning til det Islandske sprog*, 1811; in a new, much improved Swedish edition, *Anvisning till Isländskan*, 1818.

[6] *Fornswenskans och Fornnorskans sprakbyggnad*, 1849, and (along with C. R. Unger) *Norrönasprogets grammatik*, 1847.

[7] Especially *Um frumparta Íslenzkrar túngu í fornöld*, 1846.

[8] *Den Oldnordiske udtale*, 1861.

[9] *Fornnordisk formlära*, 1874.

[10] *Altisländische und altnorwegische Grammatik unter Berücksichtigung des Urnordischen*, 1884.

[11] *Lexicon poeticum*, 1854–60.

[12] *An Icelandic-English Dictionary*, based on the MS. collection of the late R. Cleasby, 1869–74.

[13] *Supplement til Islandske ordbǫger*, 1876 and 1879–85.

[14] *Ordbog over det Gamle Norske sprog*, 1862–67; new ed., 1883 *sq.*

2. *Modern Icelandic* is generally dated from the introduction of the Reformation into Iceland; the book first printed, the New Testament of 1540, may be cousidered as the earliest Modern Icelandic document. Although, on account of the exceedingly conservative tendency of Icelandic orthography, the language of Modern Icelandic literature still seems to be almost identical with the language of the 17th century, it has iu reality undergone a constant and active development, and, phonetically regarded, has changed considerably. Indeed, energetic efforts to bring about an orthography more in accordance with phonetics were made during the years 1835–47 by the magazine entitled *Fjölnir*, where we find such authors as Jónas Hallgrímsson and Konr. Gíslasou; but these attempts proved abortive. Of more remarkable etymological changes iu Modern Icelandic we may note the following: already about the year 1550 the passive termination *-zt* (*-zst*) passes into the till theu very rare termination *-st* (as in *kallast*, to be called); *y*, *ý*, and *ey* at the beginning of the 17th century coiucided with *i*, *í*, and *ei*; the loug vowels *á*, *ǽ*, and *ó* have passed into the diphthongs *au* (at least about 1650), *ai* (about 1700), *ou* (as *mál*, language, *mœla*, to speak, *stóll*, chair); *g* before *i*, *j* is changed into *dj* (after a consonant) or *j* (after a vowel),—*e.g.*, *liggia*, to lie, *eigi*, not; iu certaiu other cases *g* has passed into *gw* or *w*,—*e.g.*, *lágur*, low, *ljúga*, to lie; initial *g* before *n* is silent,—*e.g.*, (*g*) *naga*, to gnaw; *kn* has passed into *hn*,—*e.g.*, *knútr*, knot; *ps*, *pt* into *fs*, *ft*; *bb*, *dd*, *gg* are pronounced as *bp*, *dt*, *gk*, and *ll*, *rl*, *nn*, *rn* now in most positions (not, however, before *d*, *t*, and *s*, and in abbreviated names) as *dtl*, *dtn*,—as *fjall*, mountain, *björn*, bear; *f* before *n* is now pronounced as *bp*,—as *hrafn*, raven, etc. Both in vocabulary and syntax we find early, *e.g.*, in the lawbook *Jónsbók*, printed in 1578(–80), Danish exercising an important influence, as might be expected from political circumstances. In the 18th century, however, we meet with purist tendencies. As one of the leading meu of this century may be mentioned the poet Eggert Ólafsson (†1768), whose poems were not printed till 1832. Worthy of mention in the history of Modern Icelandic languagc are the learned societies which appeared in the same century, of which the first, under the uame of "Hiðósýnilega," was established iu 1760. At this time archaic tendencies, going back to the Old Icelandic of the 13th and 14th centuries, were continually gaining ground. In our century the following have won especial renown in Icelandic literature: Bjarne Þórarensen (†1841), Iceland's greatest lyric poet, and Jónas Hallgrímsson (†1845), perhaps its most promiuent prose-author in modern times.[1]

Modern Icelandic. Sources. Form of the language.

The dialectical differences in Modern Icelandic are comparatively trifling and chiefly phonetic. The Westland dialect has, for example, preserved the Old Icelandic long *a*, while the other dialects have changed it to the diphthong *au*; in the Northland dialect initial *kn* is preserved, in the others changed into *hn*; in the northern and western parts of the island Old Icelandic *hv* appears as *kv*, in a part of southeastern Iceland as *χ*, in the other dialects as *χw*,—*e.g.*, *hvelpr*, whelp. As a matter of curiosity it may be noted that on the western and eastern coasts traces are found of a French-Icelandic language, which arose from the long sojourn of French fishermen there.

Dialects.

Owing to the exclusive interest taken in the ancieut language, but little attention is giveu even now to the grammatical treatment of Modern Icelaudic. Some notices of the language of the 17th century may be obtained from the above-mentioned grammar of Runolphus Jonas (1651), and for the language of the 18th from Rask's grammatical works. For the language of our own time there is hardly anything to refer to but N. Friðrikssou's works, *Íslenzk málmyndalýsing*, 1861, and *Skýring hinna almennu málfræðislegu hugmynda*, 1864, which, however, are not especially devoted to the modern state of philology; compare also B. Magnússou Ólsen's valuable paper "Zur neuisländischen Grammatik" (*Germania*, xxvii., 1882).[2] A dictiouary of merit was that of Björn Halldorsen (†1794), edited in 1814 by Rask. Cleasby-Vigfússon's dictionary mentioned above also pays some attention to the modern language. A really convenient Modern Icelandic dictionary is still wanting, the desideratum being only partly supplied by K. Gíslason's excellent Danish-Icelandic *Dönsk orðabók med Íslenzkum pýðingum*, 1851.

Gram-matical treatment.

[1] See R. Arpi, "islands yngre literatur och språk" (*Språkvetenskapliga sällskapets förhandlingar*, 1883–85).

[2] Notices of the Modern Icelandic pronunciation are also to be found in H. Sweet's *Handbook of Phonetics*, 1877, Chr. Vidsteen's *Oplysninger om Bygdemaalene i Hardanger*, 1885, and R. Arpi's above-quoted paper.

II. Norwegian or Norse.—The *Old Norwegian* language (till the Reformation) was not, like the modern language, confined to Norway and the Faroes, but was, as already stated, for some time spoken in parts of Ireland and the north of Scotland, the Isle of Man, the Hebrides, Shetland, and Orkney (in the last two groups of islands it continued to survive down to modern times), and also in certain parts of western Sweden as at present defined (Bohuslän, Särna in Dalarna, Jämtland, and Härjedaleu).

Norwegian. Old Norwegian.

Our knowledge of it is due only in a small measure to runic inscriptions,[3] for these are comparatively few in number (a little more than one hundred) and of trifling importance from a philological point of view, especially as they almost wholly belong to the period between 1050[4] and 1350, and consequently are contemporary with or at least not much earlier than the earliest literature. The whole literature preserved is written in the Latin alphabet. The earliest manuscripts are not much later thau the oldest Old Icelandic ones, and of the greatest interest. On the whole, however, the earliest Norwegian literature is iu quality as well as in quantity incomparably inferior to the Icelandic. It amounts merely to about a score of different works, and of these but few are of any literary value. A small fragment (Cod. AM. 655, 4to.. Fragm., ix.; A, B, C), a collection of legends, no doubt written a little before 1200, is regarded as the earliest extant manuscript. From the very beginning of the 13th century we have the *Norwegian Book of Homilies* (Cod. AM., 619, 4to.) and several fragments of law-books (the older *Gulaþingslaw* and the older *Eiðsivaþingslaw*). The chief manuscript (Cod. AM., 243B., fol.) of the principal work in Old Norwegian literature, the *Speculum Regale*, or *Konungsskuggsjá* ("Mirror for Kings"), is a little later. Of still later manuscripts the so-called legendary *Olafssaga* (Cod. Delag., 8, fol.), from about 1250, deserves mention. The masses of charters which—occurring throughout the whole Middle Age of Norway[5] from the beginning of the 13th century—afford much information, especially concerning the dialectical differences of the language, are likewise of great philological importance.

Sources.

As in Old Icelandic so in old Norwegian we do not find the most primitive forms iu the oldest MSS. that have come down to us; for that purpose we must recur to somewhat later ones, containing old poems from times as remote as the days of Brage Boddason (the beginning of the 8th century) and Þjóðolfr of Hvin (end of the same century). It has already been stated that the language at this epoch differed so little from other Scandinavian dialects that it could scarcely yet be called by a distinctive name, and also that, as Icelandic separated itself from the Norwegian mother-tongue (about 900), the difference between the two languages was at first infinitely small—as far, of course, as the literary language is concerned. From the 13th century, however, they exhibit more marked differences; for, while Icelandic develops to a great extent independently, Norwegian, owing to geographical and political circumstances, is considerably influenced by the Eastern Scandinavian languages. The most important differences between Icelandic and Norwegian at the epoch of the oldest MSS. (about 1200) have already been noted. The tendency in Norwegian to retain the use of the so-called *u*-Umlaut has already been mentioned. On the other hand, there appears in Norwegian in the 13th century another kiud of vowel-assimilation, almost unknown to Icelandic, the vowel iu terminations being in some degree influenced by the vowel of the preceding syllable. Thus, for instance, we find in some manuscripts (as the above-mentioned legendary *Olafssaga*) that the vowels *e*, *o* and long *a*, *æ*, *ϕ* are followed in terminations by *e*, *o*; *i*, *u*, *y*, and short *a*, *æ*, *ϕ*, on the other hand, by *i*, *u*,—as in *bǫ́ner*, prayers, *konor*, women; but *tíðir*, times, *tungur*, tongues. The same fact occurs in certain Old Swedish manuscripts. When Norway had been united later with Sweden under one crown (1319) we meet pure Suecisms in the Norwegian literary language. In addition to this, the 14th century exhibits several differeuces from the old language:[6] *rl*, *rn* are sometimes assimilated into *ll*, *nn*,—as *kall* (elder *karl*), man,

Form of the language.

[3] For these see especially Nicolaysen, *Norske fornlevninger*, 1862–66.

[4] The oldest are those on the Valdby- (Larvik) and Strand- (Aafjord) stones, both from pagan times. The latest rune-stones are from the end of the 14th century. Owing to influence of the learned such stones appear again in the 17th century, *e.g.*, in Telemarken.

[5] On the Old Norwegian manuscripts see the works cited in notes 2, 3, page 384; for the literature hitherto edited see note 1, page 383.

[6] The present writer is indebted to Prof. Joh. Storm for the following remarks on the history of the Norwegian language and its dialects during the 14th and 15th centuries.

konn (*korn*), corn, *prestanner* (*prestarnir*), the priests; *i* passes into *y* before *r, l*,—as *lyrðir* (*hirðir*), shepherd, *lykyl* (*lykill*), key; final *-r* after a consonant is changed into *-er* or *-ær*, sometimes only *-e, -æ*,—as *hester* (*hestr*), horse; *bǫker* (*bǫkr*), books; the names *þolleifær* (*þorleifr*), *Guðlæifæ* (*Guðleifr*). About the beginning of the 15th century initial *kv* occurs for old *hv* (not, however, in pronouns, which take *kv* only in western Norway), as the local name *Qviteseið* (*hvítr*, white). During the 15th century, Norway being united with Denmark, and at intervals also with Swedeu, a great many Danisms and a few Suecisms are imported into the language. As Suecisms we may mention the termination *-in* of the 2d pers. plur. instead of *-ir, -ið* (as *vilin*, you will), the pronoun *jak* instead of *ek*, I. The most important Danisms are the following: *b, d*, and *g* are substituted for *p, t*, and *k*,—as in the local names *Nabǫ* (earlier *Nąpa*), *Tvedæ sogn* (*þveita sókn*): *-a* in terminations passes into *-e*,—as *hǫre* (*hǫyra*), to hear, *sǫghe* (*sǫkja*), to seek; single Danish words are introduced,—as *jek* (*ek*), I, *se* (*sjá*), to see; *spǫrge* (*spyrja*), to ask, etc. Towards the end of the Middle Ages Danish influence shows an immense increase, which marks the gradual decline of Norwegian literature, until at last Norwegian as literary language is completely supplanted by Danish. During the 15th century Norway has hardly any literature except charters, and as early as the end of that century by far the greatest number of these are written in almost pure Danish. In the 16th century, again, charters written in Norwegian occur only as rare exceptions, and from the Reformation onward, when the Bible and the old laws were translated into Danish, not into Norwegian, Danish was not only the undisputed literary language of Norway, but also the colloquial language of dwellers in towns and of those who had learned to read. For the rise in recent times of a new Norwegian language, employed in literature and spoken by the educated classes, see p. 390.

Dialects.

Dialectical differences, as above hinted, occur in great number in the Norwegian charters of the 13th, 14th, and 15th centuries. Especially marked is the difference between the language of western Norway, which, in many respects, shows a development parallel to that of Icelandic, and the language of eastern Norway, which exhibits still more striking correspondences with contemporary old Swedish. The most remarkable characteristics of the eastern dialects of this epoch are the following: *a* is changed into *æ* in the pronouns *þænn*, this *þæt*, that, and the particle *þær*, there (the latter as early as the 13th century), and later on (in the 14th century) also in terminations after a long root syllable, —as *sendæ*, to send, *hǫyræ*, to hear (but *gera*, to do, *vita*, to know); *ia* passes (as in Old Swedish and Old Danish) into *iæ*—as *hiærta* (Icel. *hjarta*), heart; *y* sometimes passes into *iu* before *r, l*,—as *hiurder*, shepherd, *lykiul*, key, instead of *hyrðir, lykyl* (older still, *hirðir, lykill*; see above); final *-r* after a consonant often passes into *-ar*, sometimes only into *-a*,—as *prestar* (*prestr*), priest, *bǫkar* (*bǫkr*), books, dat. sing. *brǫðа* (*brǫðr*), (to a) brother; *tl* passes into *tsl, sl*, –as *lisla* (*litla*) (the) little, the name *Atsle, Asle* (*Atle*); *rs* gives a "thick" *s*-sound (written *ls*),—as *Bærdols*, genitive of the name *Bergþórr*; *nd, ld* are assimilated into *nn, ll*,—as *bann* (*band*), the local name *Westfoll* (*Vestfold*); and (as far back as the 13th century) traces occur of the vowel assimilation, "tiljævning," that is so highly characteristic of the modern Norwegian dialects,—as *voko, vuku*, for *vaku* (Iccl. *vǫko, -u*), accusative singular of *vaka*, wake, *mykyll* for *mykill*, much. On the other hand, as characteristics of the western dialects may be noted the following: final *-r* after a consonant passes into *-ur, -or*,—as *vetur* (*vetr*), winter, *rettur* (*réttr*), right, *aftor* (*aftr*), again; *sl* passes into *tl*,—as *sytlla* (*sýsla*), charge; *hv* is changed into *kv* also in pronouns, —as *kver* (*hverr*), who, *kvassu* (*hversu*), how.

This splitting of the language into dialects seems to have continued to gain ground, probably with greater rapidity as a Norwegian literary language no longer existed. Thus it is very likely that the present dialectical division was in all essentials accomplished about the year 1600; for, judging from the first work on Norwegian dialectology,[1] the Sǫndfjord (Western Norway) dialect at least possessed at that time most of its present features. A little clog-calendar of the year 1644 seems to prove the same regarding the Valders (Southern Norway) dialect. How far the Old Norwegian dialects on the Faroes, in Irelaud and Scotland, on the Scottish islands, and on the Isle of Man differed from the mother-tongue it is impossible to decide, on account of the few remnants of these dialects which exist apart from local names, viz., some charters (from the beginning of the 15th century onward) from the Faroes[2] and Orkneys,[3] and a few runic inscriptions from the Orkneys (thirty in number)[4] and the Isle of Man (fourteen in number).[5] These runic inscriptions, however, on account of their imperfect orthography, throw but little light on the subject. Of the Orkney dialect we know at least that initial *hl, hn, hr* still preserved *h* in the 13th century,—that is, two hundred years longer than in Norway.

Grammatical treatment.

Old Norwegian grammar has hitherto always been taken up in connection with Old Icelandic, and confined to notes and appendices inserted in works on Icelandic grammar. A systematic treatise on Old Norwegian grammar is still wanting, with the exception of a short work by the Danish scholar N. M. Peterson († 1862),[6] which, although brief and decidedly antiquated, deserves all praise. A most valuable collection of materials exists, however, in the Norwegian charters, carefully and accurately edited by the Norwegian scholars Chr. Lange († 1861) and C. R. Unger,[7] and in a few texts edited with diplomatic accuracy.[8]

III. Swedish.

III. Swedish.—The Pre-Reformation language is called Old Swedish.

Old Swedish.

1. *Old Swedish.*—The territory of the Old Swedish comprehended—(1) Sweden, except the most northerly part, where Lappish (and Finnish?) was spoken, the most southerly (Skåne, Halland, and Blekinge—see below, p. 389), and certain parts of western Sweden (see above, p. 385); (2) extensive maritime tracts of Finland, Esthonia, and Livonia, with their surrounding islands; and (3) certain places in Russia, where Swedish was spoken for a short time. The oldest but also the most meagre sources of our knowledge of Old Swedish are those words, almost exclusively personal names (nearly one hundred), which were introduced into the Russian language at the foundation of the Russian realm by Swedes (in 862), and which are for the most part somewhat influenced by Russian phonetic laws, preserved in two Russian documents of the years 912 and 945,[9]—as *Igor* (O. Sw. *Ingvar*), *Rurik* (*Hrǫrikr*), *Oleg* (*Hialge*, secondary form of *Helge*), *Olga* (*Hialga, Helga*). Of about the same date, but of an infinitely greater variety, are the runic inscriptions, amounting in number to about two thousand, which have been found cut on stones (rarely wood, metal, or other materials) almost all over Sweden, though they occur most frequently (about half of the total number) in the province of Upland, next to which come Södermanland, Östergötland, and Gotland, with about two hundred each. For the most part they are tombstones or monuments in memory of deceased relatives, rarely public notices. Their form is often metrical, in part at least. Most of them are anonymous, in so far, that we do not know the name of the engraver, though, as a rule, the name of the man who ordered them is recorded. Of the engravers named, about seventy in number, the three most productive are Ubir, Bali, and Asmundr Karasun, all three principally working in Upland; the first-mentioned name is signed on about forty, the others on nearly twenty stones each. These inscriptions vary very much in age, belonging to all centuries of Old Swedish, but by far the greatest number of them date from the 11th and 12th centuries. From heathen times—as well as from the last two centuries of the Middle Ages—we have comparatively few. The oldest are probably the Ingelstad inscription in Östergötland, and the Gursten one found in the north of Småland.[10] The rune stone from Rök in Östergötland probably dates from the first half of the 10th century. Its inscription surpasses all the others both in length (more than one hundred and fifty words) and in the importance of its contents which are equally interesting as regards philology and the history of culture; it is a fragment (partly in metrical form) of an Old Swedish heroic tale.[11] From about the year 1000 we possess the inscriptions of Asmundr Karasun, and from about 1050 the so-called Ingvar monuments (about twenty in number), erected most of them in Södermanland, in honor of the men who fell in a great war in eastern Europe under the command of a certain Ingvar; the stones cut by Bali belong to the same period. Somewhat later are

Sources.

[1] Chr. Jensen's *Norsk dictionarium eller glosebog*, 1646.
[2] See *Diplomatarium Norvegicum*, vol. i. n. 589 and 591.
[3] See *Dipl. Norv.*, i. n. 308.
[4] See P. A. Munch, *Samlede afhandlinger*, iv. 516 *sq.*
[5] See Munch, *Saml. afh.*, iii. 181 *sq.*
[6] *Det Danske, Norske, og Svenske sprogs historie*, part ii. pp. 1–96 (ed. 1830).
[7] *Diplomatarium Norvegicum*, 1857 *sq.*; 10 vols. have already appeared.
[8] Compare the prefaces to Vigfússon's edition of the *Eyrbyggja-saga* (1864), Keyser's and Unger's editions of the legendary *Olafs-saga* (1849), and *Barlaams Saga ok Josaphats* (1851), Unger's ed. of *Þidrekssaga* (1853), and Th. Möbius's essay *Ueber die altnordische Sprache*, pp. 15–18 (1872).
[9] See V. Thomsen, *Ryska rikets grundläggning*, especially p. 114 *sq.*; S. Bugge, "Oldsvenske navne i Rusland" (*Arkiv. f. Nord. Filol.*, ii.).
[10] Kindly communicated by Prof. S. Bugge.
[11] See S. Bugge, "Tolkning af runeindskriften pa Rökstenen" (*Antiqvarisk Tidskrift. f. Sverige*, v., 1878).

the inscriptions cut by Ubir, and about contemporary with them, viz., from the beginning of the 12th century, is the remarkable inscription on the door-ring of the church of Forsa in Helsingland, containing the oldest Scandinavian statute[1] now preserved, as well as other inscriptions from the same province, written in a particular variety of the common runic alphabet, the so-called "staflösa" (staffless, without the perpendicular staff) runes, as the long genealogical inscription on the Malstad-stone. The inscriptions[2] of the following centuries are of far less philological interest, because after the 13th century there exists another and more fruitful source for Old Swedish, viz., a literature in the proper sense of the word, which was only in a limited degree written in runes. Of the runic literature hardly anything has been preserved to our days,[3] while the literature in the Latin letters is both in quality and extent incomparably inferior to Old Icelandic, though it, at least in quantity, considerably surpasses Old Norwegian. In age, however, it is inferior to both of them, beginning only in the 13th century. The oldest of the extant manuscripts is a codex of the *Older Vestgötalaw* (Cod. Holm. B 59), written about the year 1290, and philologically of the greatest importance. Not much later is a codex of the *Uplandslaw* (Cod. Ups. 12) of the year 1300. Of other works of value from a philological point of view we only mention a codex of the *Södermannalaw* (Cod. Holm. B 53) of about 1330, the two manuscripts containing a collection of legends generally named *Cod. Bureanus* (written a little after 1350) and *Cod. Bildstenianus* (between 1420 and 1450), and the great Oxenstiernian manuscript, which consists chiefly of a collection of legends written for the most part in 1385. The very numerous Old Swedish charters, from 1343 downwards, are also of great importance.[4]

Form of the language.

Old Swedish, during its earliest pre-literary period (900–1200), retains quite as original a character as contemporary Old Icelandic and Old Norwegian. The first part of the inscription of the Rök-stone running thus:

AFT UAMUÞ STĄNTA RUNAR ÞAR IN UARIN FAÞI FAÞIR AFT FAIKIĄN SUNU,[5]

and probably pronounced:

æft Wámód ståndа rúnar þǽr; en Warenn fáðe faðer æft fæighiąn sunu,

would, no doubt, have had the same form in contemporary Icelandic, except the last word, which would probably have had the less original form *sun*. The formal changes of the Swedish language during this period are, generally speaking, such as appear about the same time in all the members of the group,—as the change of soft R into common *r* (the Rök-stone *runaR*, later *runar*, runes; this appeared earliest after dental consonants, later after an accented vowel), and the change of *sþ* into *st* (in the 10th century *raisþi*, later *reisti*, raised); or they are, at least, common to it with Norwegian,—as the dropping of *h* before *l*, *n*, and *r* (in the 10th century *hraur*, younger *rör*, cairn), and the changing of nasal vowels (the long ones latest) into non-nasalized. A very old specific Swedish characteristic, however, is the splitting up of *i* into *iu* before *ngw*, *nkw*,—as *siunga*, to sing, *siunka*, to sink, from primitive Scandinavian *singwan*, *sinkwan* (Icel.-Norw. *syngva*, *sǫkkva*). But the case is altogether different during what we may call the classical period of Old Swedish (1200–1350), the time of the later runic inscriptions and the oldest literature. During this period the language is already distinctly separate from the (literary) Icelandic-Norwegian (though not yet Danish). The words of the *Older Vestgötalaw*:

FALDER KLOCKÆ NIDER I HOVOÞ MANNI, BÖTI SOPCN MARCHUM ÞRIM, EN HAN FAR BANÆ AF—[6]

would in contemporary Icelandic be—

fellr klukka niðr í höfuð manni, bæti sókn mörkum, þrim, ef hann fær bana af.

These few words exhibit instances of the following innovations in Swedish: *d* is inserted between *ll* (*nn*) and a following *r* (as *b* between *m* and *l*, *r*, and *p* between *m* and *t*, *n*,—as *hambrar*, Icel. *hamrar*, hammers, *sampt*, Icel. *samt*, together with); an anxiliary vowel is inserted between final *r* and a preceding consonant; *a* in terminations is often changed into *æ*; a *u* in the final syllable causes no change of a preceding *a*; the present tense takes the vowel of the infinitive (and the preterite subjunctive that of preterite indicative plural). Other important changes, appearing at the same time, but probably, partly at least, of a somewhat older date, are the following: all diphthongs are contracted (as *ögha*, Icel. *auga*, eye; *dröma*, Icel, *drǫyma*, to dream; *sten*, Icel. *steinn*, stone—traces of which we find as early as the 12th century); *é* has passed into *æ* (as *knǽ*, Icel. *knér*, knee); *ia* into *iæ*, as in Eastern Norwegian (as *hiærta*, Icel. *hjarta*, heart); *iu* into *y* after *r*, and a consonant + *l* (as *flygha*, Icel. *fljúga*, to fly); the forms of the three persons singular of verbs have assimilated (except in the so-called strong preterite); the 2d pers. plur. ends in *-in* for *-ið*, and the passive voice in *-s* for the earlier *-sk*; the dat. plur. of substantives with suffixed article ends in *-umin* (Icel. *-onom*, as *sunumin*, *sunonom*, to the sons). The transition to the 14th century is marked by important changes: short *y*, *e.g.*, passed into *ö* in many positions (as *dör* for *dyr*, door, etc.), and the forms of the dative and the accusative of pronouns gradually become the same. The number of borrowed words is as yet very limited, and is chiefly confined to ecclesiastical words of Latin and Greek origin, introduced along with Christianity (as *kors*, cross, *bref*, epistle, *skoli*, school, *præster*, priest, *almosa*, alms). At the middle of the 14th century the literary language undergoes a remarkable reform, developing at the same time to a "riksspråk," a uniform language, common to the whole country. The chief characteristics of this later Old Swedish are the following: the long *a* has passed into *å* (that is, an open *o*), and *io* (except before *rd*, *rt*) into *iö* (as *siö*, sea, lake); at the same time there appears a so-called law of vowel balance, according to which the vowels *i* and *u* are always found in terminations after a short root syllable, and—at least when no consonant follows—*e* and *o* after a long one (as *Gudi*, to God, *til salu*, for sale, but *i garþe*, in the court, *for visso*, assuredly); *g* and *k* (*sk*) before palatal vowels are softened into *dj* and *tj* (*stj*); *k* and *t* in unaccented syllables often pass into *gh*, *dh* (as *Sverighe* for *Sverike*, Sweden, *litedh* for *litet*, a little); the articles *þæn* (or *hin*), the, and (a little later) *en*, a, come into use; the dual pronouns vanish; the relative *ær*, that, is changed with *sum*; the present participle takes a secondary form in *-s* (as *gangandes*, beside *gangande*, going). A little later the following changes appear: a short vowel is lengthened before a single consonant, first, when the consonant belongs to the same syllable (as *hat*, hate), afterwards also when it belongs to the following one (as *hata*, to hate); an auxiliary vowel is inserted between *l* or *n* and a preceding consonant (as *gavel*, gable, *öken*, desert); short *i*, ending a syllable, passes into *e*, (as *leva*, to live); *th* passes into *t*; a new conjugation is formed which has no infinitive termination, but doubles the sign of the preterite (as *bo*, *bodde*, *bott*, to dwell, dwelt, dwelt). Owing to the political and commercial state of the country the language at this period is deluged with borrowed words of Low German origin, mostly social and industrial terms, such as the great number of verbs in *-era* (*e. g.*, *hantera*, to handle), the substantives in *-eri* (*röveri*, robbery), *-inna* (*förstinna*, princess), *-het* (*fromhet*, piety), *be-* (*betala*, to pay), and a great many others (*klen*, weak, *smaka*, to taste, *grover*, big, *pung*, purse, *tukt*, discipline, *bruka*, to use, *tvist*, quarrel, *stövel*, boot, *arbeta*, to work, *frokoster*, lunch, etc.). Owing to the political circumstances, we find towards the end of the period a very powerful Danish influence, which extends also to phonetics and etymology, so that, for example, nearly all the terminal vowels are supplanted by the uniform Danish *e*, the hard consonants, *p*, *t*, *k* by *b*, *d*, *g* as in Danish, the second person plural of the imperative ends in *-er*, beside *-en* (as *tagher*, for older *takin*).

Dialects.

Dialectical differences incontestably occur in the runic inscriptions as well as in the literature; in the former, however, most of them are hidden from our eyes by the character of the writing, which is, from a phonetic point of view, highly unsatisfactory, indicating the most different sounds by the same sign (for example, *o*, *u*, *y*, and *ö* are denoted by one and the same rune); in the literature again they are reduced to a minimum by the awakening desire to form a uniform literary language for the whole country, and by the literary productivity and consequent predominant influence of certain provinces (as Östergötland). This question, moreover, has not hitherto been investigated with sufficient care.[7] Only one distinct dialect has been handed down to

[1] See S. Bugge, *Runeindskriften paa ringen i Forsa Kirke*, 1877.

[2] For the runic inscriptions in general, see above all J. G. Liljegren, *Runurkunder*, 1833; J. Göransson, *Bautil*, 1750; R. Dybeck, *Svenska runurkunder*, 1855–59, and *Sverikes runurkunder*, 1860–76; and the *Journals* of the antiquarian societies in Sweden.

[3] See L. F. Leffler, "Fornsvenska runhandskrifter" (*Nordisk Tidskrift*, 1879).

[4] The Old Swedish monuments are for the most part published in the following collections: *Svenska fornskriftsällskapets samlingar*, 84 parts, 1844–84; C. J. Schlyter, *Samling af Sveriges gamla lagar*, vols. i.–vii. and x.–xii., 1827–69; *Svenskt Diplomatarium*, 6 vols., 1829–78, new series, 2 vols., 1875–84.

[5] In memory of Wámód these runes stand; and Warenn, his father, wrote them in memory of his son, (by destiny) condemned to death.

[6] If the bell fall down on anybody's head, the parish pays a fine of three marks should he die from it.

[7] See especially K. J. Lyngby, *Antiqu. Tidskr.*, 1858–60, pp. 242 *sq.* and 260 *sq.*; J. E. Rydqvist, *Sv. Språkets lagar*, iv. 153 *sq.*;

us, that of the island of Gotland, which differs so essentially from the Old Swedish of the mainland that it has with good reasou been characterized, under the name *Forngutniska*, as in a certaiu seuse a separate language. Materials for its study are very abundant:[1] on one hand we possess more thau two hundred runic iuscriptions, among them a very remarkable one of the 12th or 13th century, couutiug upwards of three huudred runes, cut on a font (now in Aakirkeby on the island of Bornholm), and representing the life of Christ in a series of pictures and words; on the other hand a literature has been preserved consisting of a runic caleudar from 1328, the law of the island (from about 1350), a piece of traditional history, aud a guild statute. The language is distinguished from the Old Swedish of the mainland especially by the following characteristics: the old diphthongs are preserved (*e.g.*, *auga*, eye, *droyma*, to dream, *stain*, stone), and a new triphthoug has arisen by the change of *iú* iuto *iau* (as *fliauga*, to fly); the long vowels *e*, *æ*, *ö*, have passed into *i*, *e*, *y* (as *kni*, knee, *mela*, to speak, *dyma*, to deem); short *o* rarely occurs except before *r*, being in other positions changed into *u*; *w* is dropped before *r* (as *raiþi*, wrath); the genitive singular of feminines in *-a* ends in *-ur* for *-u* (as *kirkiur*, of the church). Owing to the entire absence of documentary evidence, it is impossible to determine how far the dialects east of the Baltic, which uo doubt had a separate individuality, differed from the mother-tongue.

Forngutniska.

The first to pay attention to the study of Old Swedish[2] was the Swedish savant J. Buræus († 1652), who by several works (from 1599 onwards) called attention to and excited a lively iutcrest in the runic monuments, and by his edition (1634) of the excelleut Old Swedish work *Um Styrilsi Konunga ok Höfþinga*, iu Old Swedish literature also. His uo longer extant *Specimen Primariæ Linguæ Scantzianæ* gave but a very short review of Old Swedish inflections, but is remarkable as the first essay of its kind, and is perhaps the oldest attempt in modern times at a grammatical treatment of any old Germanic language. The study of runes was very popular in the 17th century; M. Celsius († 1679) deciphered the "staffless" runes (see above, p. 387), and J. Hadorph († 1693), who also did good work in editing Old Swedish texts, copied more than a thousand runic iuscriptions. During the 18th century, again, Old Swedish was almost completely neglected; but in the present century the study of runes has beeu well represented by the collection of the Swede Liljegren († 1837) and by the Norwegian S. Bugge's ingenious interprctation and grammatical treatment of some of the most remarkable inscriptions. Old Swedish literature has also been made the object of grammatical researches. A first outline of a history of the Swedish lauguage is to be found in the work of N. M. Petersou (1830) mentioned above (p. 386), and a scheme of an Old Swedish grammar in P. A. Munch's essay, *Fornswenskans och Fornsnorskans språkþyggnad* (1849); but Old Swedish grammar was never treated as an independent branch of science until the appearance of J. E. Rydqvist's († 1877) monumental work *Svenska språkets lagar* (iu 6 vols., 1850–83), which was followed in Sweden by a whole literature on the same subject. Thus phonetics, which were comparatively neglected by Rydqvist, have been investigated with great success, especially by L. F. Leffler and A. Kock, while the other parts of grammar have been treated of above all by K. F. Söderwall, the chief of contemporary Old Swedish scholars. His principal work, *Ordbok öfver Svenska medeltidsspråket* (1884 *sq.*), now in course of publication, gives the list of words in the later Old Swedish language, and—taken along with the *Ordbok till samlingen af Sveriges gamla lagar* (1877), by C. J. Schlyter, the well-known editor of Old Swedish texts, which contains the vocabulary of the oldest literature—it worthily meets the demand for an Old Swedish dictionary. An Old Swedish grammar, answering the requiremeuts of modern philology, is still needed.[3]

The study of Old Swedish.

2. *Modern Swedish.*—The first complete trauslation of the Bible, edited in 1541 by the brothers Olaus and Laurentius Petri, and generally called the Bible of Gustavus I., may be regarded as the earliest important monument of this. Owing to religious and political circumstances, and to the learned influeuce of humanism, theological and historico-political works preponderate in the Swedish literature of the following period, which therefore affords but scauty material for philological research. It is not uutil the middle of the 17th century that Swedish literature adequately exemplifies the language, for at that period literature first began to be cultivated as a fine art, and its priucipal representatives, such as Stiernhielm, Columbus, and Spegel, were in reality the first to study it as a means of expression, and to develop its resources. Amongst the authors of the 18th century we have to mentiou in the first place Daliu, who was to some exteut the creator of the prose style of that epoch; while of the end of the century Kellgren and Bellmau are the most noteworthy examples, representing the higher and the more familiar style of poetry respectively. The language of the 19th ceutury, or at any rate of the middle of it, is best represented in the works of Wallin and Tegnér, which, ou account of their enormous circulation, have had a greater influence than those of any other authors.

Modern Swedish. Sources.

As to the language itself the earliest modern Swedish texts, as Gustavus I.'s Bible, differ cousiderably from the latest Old Swedish ones.[4] We find a decided tendency to exterminate Danisms and re-introduce native and partially antiquated forms. At the same time there appear several traces of a later state of the language: all genitives (singular and plural), *e.g.*, end in *-s*, which iu earlier times was the proper ending of only certain declensious. In spite of the archaistic efforts of mauy writers, both in forms aud iu vocabulary, the language nevertheless uuderwent rapid changes during the 16th and 17th ceuturies. Thus *sj* and *stj* (original as well as derived from *sk* before a palatal vowel), assimilate into a simple *sh*-souud; *dj* (original as well as derived from *g* before a palatal vowel), at least at the end of the 17th ceutury, dropped its *d*-sound (compare such spellings as *diufwer*, *giättar*, *envogé*, for *jufver*, udder, *jättar*, giauts, *envoyé* envoy); *hj* passes into *j* (such spellings are found as *jort* for *hjort*, hart, and *hjärpe* for *järpe*, hazel grouse); *b* and *p* inserted in such words as *himblar*, heavens, *hambrar*, hammers, *jämpn*, even, *sampt*, together with (see above, p. 387), are dropped; the first persou plural of the verb takes the form of the third person (as *vi fara*, *foro*, for *vi farom*, *forom*, we go, went); by the side of the pronoun *I*, you, there arises a secondary form *Ni*, in full use in the spoken language about 1650; the adjective gradually loses all the case-inflections; in substautives the nominative, dative, and accusative take the same form as early as the middle of the 17th century; in the declension with suffixed article the old method of expressing number aud case both in the substantive and the article is changed, so that the substantive alone takes the number-inflection and the article aloue the case-ending; neuter substantives ending iu a vowel, which previously had no plural ending, take the plural ending *-n*, some *-er*,—as *bi-n*, bees, *bageri-er*, bakeries. About the year 1700 the Old Swedish inflection may, in general, be considered as almost completely given up, although a work of such importauce in the history of the language as Charles XII.'s Bible (so-called) of 1703 (edited by Bishop J. Svedberg), by a kind of couscious archaism has preserved a good many of the old forms. To these archaistic tendencies of certain authors at the end of the 17th century we owe the great number of Old Swedish and Icelaudic borrowed words then iutroduced into the language,—as *fager*, fair, *härja*, to ravage, *later*, manners, *snille*, genius, *tärna*, girl, *tima*, to happen, etc. In additiou to this, owing to humanistic influence, learued expressions were borrowed from Latin during the whole 16th and 17th centuries; and from German, chiefly at the Reformation and during the Thirty Years' War, numberless words were introduced,—as *språk*, language, *tapper*, brave, *prakt*, magnificence, *hurtig*, brisk, etc.; among these may be noted especially a great number of words beginning in *an-*, *er-*, *för-*, and *ge-*. Owing to the constantly increasing political and literary predominance of France French words were largely borrowed in the 17th century, and to an equally great extent in the 18th; such are *affär*, business, *respekt*, respect, *talang*, talent, *charmant*, charming, etc. In the 19th ceutury, again, especially about the middle of it, we anew meet with conscious and energetic efforts after purism both iu the formation of uew words and iu the adoption of words from the old language (*id*, diligence, *mäla*, to speak, *fylking*, battle-array, etc.), and from the dialects (*bliga*, to gaze, *flis*, flake, *skrabbig*, bad, etc.). Consequently, the present vocabulary differs to a very great extent from that of the literature of the 17th century. As for the sounds and grammatical forms, on the other hand, comparatively few important changes have taken place during the last two centuries. In the 18th century, however, the aspirates *dh* and *gh* passed into *d* aud *g* (after *l* and *r* into *j*), as *lag*, for *lagh*, law, *bröd* for *brödh*, bread; *hv* passed into *v* (in dialects

Form of the language.

L. F. Leffler, *Om v-omljudet*, 1877, pp. 37 *sq.*, 55, 76; S. Bugge, *Runeindskriften fra Forsa*, p. 49 *sq.*; A. Kock, *Studieri Fornsvensk, judlära*, i., 1882, pp. 55 *sq.*, 144 *sq.*, 159 *sq.*, 238.

[1] See C. Säve, *Gutniska urkunder*, 1859; J. G. Liljegren, *Runurkunder*, 1833.

[2] See A. Noreen, "Aperçu de l'histoire de la science linguistique Suédoise" (*Le Muséon*, ii., 1883).

[3] A. Noreen has an Old Swedish grammar in preparation.

[4] The printed characters are also considerably changed by the introduction of the new letters å (with the transl. of the New Testament of 1526), and ä, ö (both already in the first print in Swedish of 1495) for *aa*, æ, ϕ.

already about the year 1600),—as *valp* for *hvalper*, whelp; *lj* likewise into *j*,—thus *ljuster*, leister, occurs written *juster*. In our time *rd*, *rl*, *rn*, *rs*, and *rt* are passing into simple sounds ("supradental" *d*, *l*, *n*, *s*, and *t*), while the singular of the verbs is gradually supplanting the plural. A vigorous reform, slowly but firmly carried on almost uniformly during all periods of the Swedish language, is the throwing back of the principal accent to the beginning of the word in cases where previously it stood nearer the end, a tendency that is characteristic of all the Scandinavian languages, but no doubt especially of Swedish. In the primitive Scandinavian age the accent was removed in most simple words; the original accented syllable, however, preserved a musically high pitch and stress. Thus there arose two essentially different accentuations,—the one, with unaccented final syllable, as in Icel. *stígr* (Gr. στείχεις), thou goest, the comparative *betre* (*cf.* Gr. τάσσων from ταχύς), better, the other, with secondary stress and high pitch on the final, as in Icel. pret. plur. *buðom* (Sanskr. *bubudhimá*), we bade, part. pret. *bitenn* (Sanskr. *bhinnás*), bitten. The same change afterwards took place in those compound words that had the principal accent on the second member, so that such contrasts as German *úrtheil* and *ertheílen* were gradually brought into conformity with the former accentuation. At the present day it is quite exceptionally (and chiefly in borrowed words of later date) that the principal accent in Swedish is on any other syllable than the first, as in *lekámen*, body, *välsígna*, to bless.

The study of Modern Swedish.

The scientific study of Modern Swedish[1] dates from Sweden's glorious epoch, the last half of the 17th century. The first regular Swedish grammar was written in 1684 (not edited till 1884) in Latin by Er. Aurivillius; the first in Swedish is by N. Tiällman, 1696. Nothing, however, of value was produced before the great work of Rydqvist mentioned above, which, although chiefly dealing with the old language, throws a flood of light on the modern also. Among the works of late years we must call special attention to the researches into the history of the language by K. F. Söderwall,[2] F. A. Tamm,[3] and A. Kock.[4] But little study, and that only in isolated parts, has been devoted to the grammar of the modern language, if the advanced state of philology is considered. A good though short abstract is given in H. Sweet's essay on "Sounds and Forms of Spoken Swedish" (*Trans. Phil. Soc.*, 1877–79). Attempts to construct a dictionary were made in the 16th century, the earliest being the anonymous *Variarum Rerum Vocabula cum Sueca Interpretatione*, in 1538, and the *Synonymorum Libellus* by Elavus Petri Helsingius, in 1587, both of which, however, followed German originals. The first regular dictionary is by H. Spegel, 1712; and in 1769 Joh. Ihre († 1780), probably the greatest philological genius of Sweden, published his *Glossarium Sviogoticum*, which still remains the most copious Swedish dictionary in existence. In the present century the diligent lexicographer A. F. Dalin has published several useful works. At present the Swedish Academy has in preparation a gigantic dictionary on about the same plan as Dr. Murray's *New English Dictionary;* there will also appear as soon as possible a complete list (with grammatical and etymological notes), drawn up by A. Andersson, Ad. Noreen, and F. A. Tamm, of the words in use in the present language. The characteristic differences between the Swedish literary language used in Finland and that of Sweden are exhibited in the *Finsk Tidskrift*, vol. xix. pts. 5, 6, 1885 ("Studier på Svensk språkbotten i Finland," by Karl Lindström).

Danish.

IV. Danish, like Swedish, is divided into the two great Pre- and Post-Reformation epochs of Old and Modern Danish.

Old Danish.

1. *Old Danish.*—The territory of Old Danish included not only the present Denmark, but also the southern Swedish provinces of Halland, Skåne, and Blekinge, the whole of Schleswig, and, as stated above, for a short period also a great part of England, and Normandy.

Sources.

The oldest mouuments of the language are runic inscriptions, altogether about 250 in number.[5] The oldest of them go as far back as to the beginning of the 9th century, the Snoldelev-stone for instance on Sealand, and the Flemløse-stone on Fünen. From about the year 900 date the very long inscriptions of Tryggevælde (Sealand) and Glavendrup (Fünen); from the 10th century we have the stones of Jællinge (Jutland), in memory of two of the oldest historical kings of Denmark (Gorm and Harald); while from about 1000 we have a stone at Dannevirke (Schleswig), raised by the conqueror of England, Sven Tjuguskægg. Relics of about the same age are the words that were introduced by the Danes into English, the oldest of which date from the end of the 9th century, the time of the first Danish settlement in England; most of these are to be found in the early English work *Ormulum*.[6] No Danish literature arose before the 13th century. The oldest manuscript that has come down to us dates from the end of that century, written in runes and containing the law of Skåne. From about the year 1300 we possess a manuscript written in Latin characters and containing Valdemar's and Erik's laws of Scaland, the Flensborg manuscript of the law of Jutland, and a manuscript of the municipal laws of Flensborg. These three manuscripts represent three different dialects,—that, namely, of Skåne, Halland, and Blekinge, that of Sealand and the other islands, and that of Jutland and Schleswig. There existed no uniform literary language in the Old Danish period, although some of the most important works of the 15th century, such as Michael's *Poems* and the *Rhymed Chronicle* (the first book printed in Danish, in 1495), on account of their excellent diction, contributed materially to the final preponderance of their dialect, that of Sealand, towards the Reformation.

Dialects.

Form of the language.

As to the form of the language, it hardly differs at all during the period between 800 and 1200 A.D. from Old Swedish. It is only in the oldest literature that we can trace any marked differences; these are not very important, and are generally attributable to the fact that Danish underwent a little earlier the same changes that afterwards took place in Swedish (*e.g.*, *h* in *hv* and *hj* in Danish was mute as early as the end of the 14th century; *cf.* pp. 388–9, above). The laws referred to above only agree in differing from the Swedish laws in the following points: the nominative already takes the form of the accusative (as *kalf*, calf, but Old Sw. nom. *kalver*, acc. *kalf*); the second person plural ends in *-æ* (as *köpæ*, but Old Sw. *köpin*, you buy); in the subjunctive no differences are expressed between persons and numbers. Among themselves, on the contrary, they show considerable differences; the law of Skåne most nearly corresponds with the Swedish law, those of Sealand keep the middle place, while the law of Jutland exhibits the most distinctive individuality. The Skåne law, *e. g.*, retains the vowels *a*, *i*, *u* in terminations, which otherwise in Danish have become uniformly *æ;* the same law inserts *b* and *d* between certain consonants (like Old Sw.; see p. 387), has preserved the dative, and in the present tense takes the vowel of the infinitive; the law of Jutland, again, does not insert *b* and *d*, and has dropped the dative, while the present tense (undergoing an "Umlaut") has not always accepted the vowel of the infinitive: in all three characteristics the laws of Sealand fluctuate. After 1350 we meet an essentially altered language, in which we must first note the change of *k*, *p*, *t* after a vowel into *g*, *b*, *d* (as *tag*, roof, *løbe*, to run, *æde*, to eat); *th* passes into *t* (as *ting*, thing), *gh* into *w* (as *law* for *lagh*, guild) and into *i* (as *vei* for *wægh*, way); *ld*, *nd* are pronounced like *ll*, *nn;* *s* is the general genitive ending in singular and plural, etc. The vocabulary, which in earlier times only borrowed a few and those mostly ecclesiastical words, is now—chiefly owing to the predominant influence of the Hanse towns—inundated by German words, such as those beginning with *be-*, *bi-*, *ge-*, *for-*, and *und-*, and ending in *-hed*, and a great number of others, as *blive*, to become, *ske*, to happen, *fri*, free, *krig*, war, *buxer*, pantaloons, *ganske*, quite, etc.

Grammatical treatment.

An Old Danish grammar is still wanting, and the preparatory studies which exist are, although excellent, but few in number, being chiefly essays by the Danes K. J. Lyngby and L. F. A. Wimmer, with N. M. Petersen's treatise *Det Danske, Norske, og Svenske sprogs historie*, vol. i. (1829), one of the first works that paid any attention to Old Danish, which till then had been completely neglected. A dictionary on a large scale covering the whole of Old Danish literature, except the very oldest, by O. Kalkar, has been in course of publication since 1881; older and smaller is Chr. Molbech's *Dansk Glossarium* (1857–66).

Modern Danish.

2. *Modern Danish.*—The first important monument of this is the translation of the Bible, by Chr. Pedersen, Peder Palladius, and others, the so-called Christian III.'s Bible (1550), famous for the unique purity and excellence of its language, the

[1] See A. Noreen, "Aperçu," etc.; H. Hernlund, *Förslag och åtgärder till Svenska skriftspråkets reglerande*, 1883.

[2] *Hufvudepokerna af Svenska sprakets utbildning*, 1870.

[3] Several essays on the borrowed words in Swedish.

[4] *Språkhistoriska undersökningar om Svensk akcent*, i., 1878, ii., 1884–5.

[5] See P. G. Thorsen, *De Danske runemindesmærker*, i., 1864, ii., 1879–81; L. F. A. Wimmer, "Runeskriftens Oprindelse" (*Aarbøger for Nordisk Oldkyndighed*, 1874).

[6] See E. Brate, "Nordische Lehnwörter im Orrmulum" (*Paul-Braune's Beiträge*, x., 1884).

dialect of Sealand, then incontestably promoted to be the language of the kingdom. The first secular work deserving of the same praise is Vedel's translation of Saxo (1575), The succeeding period until 1750 offers but few works in really good Danish; as perfectly classical, however, we have to mention the so-called Christian V.'s Law of Denmark (1683). For the rest, humanism has stamped a highly Latin-French character on the literature, striking even in the works of the principal writer of this period, Holberg. But about the year 1750 there begins a new movement, characterized by a reaction against the language of the preceding period and purist tendencies, or at least, efforts to enrich the language with new-formed words (not seldom after the German pattern), as *omkreds*, periphery, *selvstændighed*, independence, *valgsprog*, devise, *digter*, poet. The leading representatives of these tendencies were Eilschow and Sneedorf. From their time Danish may be said to have acquired its present essential features, though it cannot be denied that several later authors, as J. Ewald and Öhlenschläger, have exercised a considerable influence on the poetical style. As the most important differences between the grammatical forms of the 18th and 19th centuries on one hand and those of the 16th and 17th centuries on the other may be noted the following: most neuter substantives take a plural ending; those ending in a vowel form their plural by adding *-r* (as *riger*, for older *rige*, plural of *rige*, kingdom), and many of those ending in a consonant by adding *-e* (as *huse* for *hus*, of *hus*, house); substantives ending in *-ere* drop their final *-e* (as *dommer* for *dommere* judge); the declension with suffixed articles becomes simplified in the same way as in Swedish (see above, p. 388); the plural of verbs takes the singular form (as *drak* for *drukke*, we drank); and the preterite subjunctive is supplanted by the infinitive (as *var* for *vaare*, were). The first Modern Danish grammer is by E. Pontoppidan, 1668, but in Latin; the first in Danish is by the famous Peder Syv, 1685. The works of the self-taught J. Højsgaard (*e.g.*, *Accentueret og raisonneret grammatica*, 1747) possess great merit, and are of especial importance as regards accent and syntax. The earlier part of this century gave us Rask's grammar (1830). A thoroughly satisfactory Modern Danish grammar does not exist; perhaps the best is that by Th. Möbius (1871). The vocabulary of the 16th and 17th centuries is collected in Kalkar's *Ordbog*, mentioned above, that of the 18th and 19th centuries in the voluminous and yet unfinished dictionary of Videnskabernas Selskab, and in C. Molbech's *Dansk ordbog* (2d ed. 1859).[1]

Sources.

Form of the language.

Grammatical treatment.

As already mentioned (p. 386), Danish at the Reformation became the language of the literary and educated classes of Norway and remained so for three hundred years, although it cannot be denied that many Norwegian authors even during this period wrote a language with a distinct Norwegian color, as for instance the prominent prose-stylist Peder Claussøn Friis († 1614), the popular poet Peder Dass († 1708), and in a certain degree, also the two literary masters of the 18th century, Holberg and Wessel. But it is only since 1814, when Norway gained her independence, that we can clearly perceive the so-called Dano-Norwegian gradually developing as a distinct offshoot of the general Danish language. The first representatives of this new language are the writer of popular life M. Hansen († 1842), the poet H. Wergeland († 1845), and above all the tale-writer P. C. Asbjørnsen († 1885). In our own days it has been further developed, especially by the great poets Ibsen and Bjørnson and the novelist Lie; and it has been said, not without reason, to have attained its classical perfection in the works of the first-named author. This language differs from Danish particularly in its vocabulary, having adopted very many Norwegian provincial words (6000 to 7000), less in its inflections, but to a very great extent in its pronunciation. The most striking differences in this respect are the following: Norwegian *p*, *t*, *k* answer to Danish *b*, *d*, *g* in cases where they are of later date (see above),—as *løpe*, Danish *løbe*,, to run, *liten*, D. *liden*, little, *bak*, D. *bag*, back); to Danish *k*, *g* before palatal vowels answer Norwegian *tj*, *j*; *r* (point-trill, not back-trill as in Danish) is assimilated in some way with following *t* (*d*), *l*, *n*, and *s* into so-called supradental sounds (see p. 389); both the primitive Scandinavian systems of accentuation are still kept separate from a musical point of view, in opposition to the monotonous Danish. There are several other characteristics, nearly all of which are points of correspondence with Swedish.[2] Dano-Norwegian is grammatically treated by J. Løkke (*Modersmaalets formlære*, 1855), K. Knudson (*Dansk-Norsk sproglære*, 1856), and K. Brekke (*Bidrag til Dansk-Norskens lydlære*, 1881, and others.)

Dano-Norwegian.

Form of the language.

At the middle of this century, however, far more advanced pretensions were urged to an independent Norwegian language. By the study of the Modern Norwegian dialects and their mother language, Old Norwegian, the eminent philologist I. Aasen was led to undertake the bold project of constructing, by the study of these two sources, and on the basis of his native dialect (Søndmøre), a Norwegian-Norwegian ("Norsk-Norsk") language, the so-called "Landsmål." In 1853 he exhibited a specimen of it, and, thanks to such excellent writers as Aasen himself, the poets O. Vinge and K. Janson, and the novelist A. Garborg, as well as a zealous propagandism of the society "Det Norske Samlag" (founded in 1868), there has since arisen a valuable though not very large literature in the "Landsmål." But it is nowhere spoken.[3] Its grammatical structure and vocabulary are exhibited in Aasen's *Norsk grammatik*, 1864, and *Norsk ordbog*, 1873.

Norwegian-Norwegian.

Scandinavian Dialects.—As above remarked, the Scandinavian dialects are not grouped, so far as their relationship is concerned, as might be expected judging from the literary languages. Leaving out of account the Icelandic dialects and those of the Faroes, each of which constitutes a separate group, the remainder may be thus classified:

Dialects.

(1) *West-Norwegian Dialects*,—spoken on the western coast of Norway between Christiansand and Molde.
(2) *North-Scandinavian*,—the remaining Norwegian and the Swedish dialects of Vestmanland, Dalarna, Norrland, Finland, and Russia.
(3) The dialects on the island of Gotland.
(4) *Middle-Swedish*,—spoken in the rest of Sweden, except the southernmost parts (No. 5).
(5) *South Scandinavian*,—spoken in the greater part of Småland and Halland, the whole of Skåne, Blekinge, and Denmark, and the Danish-speaking part of Schleswig. This group is distinctly divided into three smaller groups,—the dialects of southern Sweden (with the island of Bornholm), of the Danish islands, and of Jutland (and Schleswig).

The study of the Modern Scandinavian dialects has been very unequally prosecuted. Hardly anything has been done towards the investigation of the Icelandic dialects, while those of the Faroes have been studied chiefly by Hammershaimb. The Norwegian dialects have been thoroughly examined by Aasen, whose works give a general account of them; while in our own days Joh. Storm, above all, displays an unwearying activity, especially in the minute investigation of their phonetic constitution, to which Aasen had paid but scant attention. The substance of these researches in the Norwegian dialects has recently been presented in a magazine, called *Norvegia*, of which the first volume is in course of publication; it employs an alphabet invented by Storm. For the study of Danish dialects but little has been done, Molbech's *Dialect-Lexicon* of 1841 being very deficient. The Schleswig dialect, on the contrary, has been admirably treated of by E. Hagerup (1854) and K. J. Lyngby (1858). At present two important works are in preparation,—H. F. Feilberg's great dictionary of the dialect of Jutland, and J. C. Espersen's of the dialect of Bornholm. There is no country in which the dialects have been and are studied with greater zeal and more fruitful results than in Sweden[5] during the last hundred and fifty years. Archbishop E. Benzelius the younger († 1743) made collections of dialect words, and on his work is based the dialectical dictionary of Ihre of 1766. An excellent work considering its age, is S. Hof's *Dialectus Vestrogothica*, 1772. The energy and zeal of C. Säve (essays on the dialects of Gotland and Dalarne) inspired these studies with extraordinary animation at the middle of the 19th century; in 1867 J. E. Rietz published a voluminous dialect dictionary; the number of special essays, too, increased yearly. From 1872 so-called "landsmålsföreningar" (dialect societies) were founded among the students at the universities of Upsala, Lund, and Helsingfors (at Upsala alone 13), for a systematic and thorough investigation of dialects. We find remarkable progress in scientific method—especially with regard to phonetics—in the constantly increasing literature; special mention may be made of the detailed de-

[1] See L(udvig) W(immer). "Det Danske Sprog," in *Nordisk Conversations-lexikon*, 3d. ed., 1885; T. Ström, *Dansk Literaturhistorie*, 2d ed., 1878.

[2] See J. A. Lundell, "Norskt språk" (*Nordisk Tidskrift*, 1882.

[3] See J. Storm, "Det Norske maalstræv" (*Nordisk Tidskrift*, 1878)

[4] See J. A. Lundell, "Om de Svenska folkmålens frändskaper" (*Antropologiska Sektionens Tidskrift*, 1880).

[5] See J. A. Lundell, "Öfversikt af de senaste årtiondenas värksamhet för kännedom om folkmål" *Svenska Landsmålen*, i., 1880).

scriptions of the dialects of Värmland, Gotland, and Dalarna by Ad. Noreen, and A. F. Freudenthal's monographs on the Finnish and Esthonian Swedish dialects. Since 1879 the Swedish dialect societies have published a magazine on a comprehensive plan, *De Svenska Landsmålen*, edited by J. A. Lundell, who has invented for this purpose an excellent phonetic alphabet (partially based on C. J. Sundevall's work *Om phonetiska bokstäfver*, 1855). (A. NO.)

SCARBOROUGH, a parliamentary borough of England, frequently called "the Queen of Watering Places," situated on the east coast of Yorkshire, in the North Riding, 40 miles from York, and between 54° 15′ 0″ and 54° 17′ 15″ N. lat. and 0° 22′ 25″ and 0° 26′ 24″ W. long. Its two parts, north and south, each with a fine stretch of sand and bay, are divided by a rocky pro-

Plan of Scarborough.

1. Old Town Hall.
2. Custom House.
3. Old Post Office.
4. Market Hall.
5. News Room.
6. Theatre Royal.
7. Police Station.
8. Museum.
9. St. Mary's Church.
10. Christ Do.
11. St. Thomas' Church.
12. Independent Do.
13. Rom. Catholic Do.
14. Post Office.
15. York City and County Bank.
16. Savings Bank.
17. Sea-Bathing Infirmary.
18. Theatre.

montory 300 feet above the sea, on which stand the remains of the castle. The cliff is much exposed to denudation by the sea, which has been proceeding during the present century at the rate of 1 yard in 17 years. The plateau forming the castle yard in 1190, according to William of Newburgh, comprised 60 acres, but it is not now more than 17 acres 10 perches, or 43 acres, including store yards, dykes, and holms. The first castle was built in the Anglo-Norman period, and is referred to as being in decay in 1154—a fact which throws back its origin earlier than 1136, the date assigned for its erection by William Le Gros, earl of Albermarle and Holderness, its first known governor. The list of its governors stretches from that date to 1832. The streets of the older part of the town, immediately south of the castle hill, come down to the sea, but the newer parts of the south as well as the north side are built upon rising ground. A deep valley (Ramsdale) which divides the south side is bridged from St. Nicholas Cliff to the South Cliff. The approach by rail is through the upper part of this valley, by the side of which there is a marsh known as the Mere. The town is thus situated in a kind of basin, which opens out to the north towards extensive and lofty moorland ranges. The modern period of its history dates from 1620, when Mrs. Farren, a lady resident, first discovered its mineral springs. The town contained 30,504 inhabitants in 1881, but during the season, which lasts from May to October, its population is augmented by from ten to twenty thousand visitors, for whose convenience there is increasingly ample accommodation. The Grand Hotel, fronting the sea on the south bay, stands on St. Nicholas Cliff, at the north side of Ramsdale valley, and is one of the largest in England. An aquarium (1877) stands beneath the Cliff Bridge, and close by is the museum, a Roman-Doric rotunda, built in 1828. The spa saloon, opened in 1800, contains a hall in the Italian-Renaissance style, a theatre, and refreshment rooms. There is a promenade in front protected by a sea wall. The south spring is aperient but contains some iron, while the north or chalybeate spring is more tonic in its properties. The waters, however, are seldom taken now, the town being mainly frequented for sea-bathing. The grounds of the present spa are tastefully laid out. A foreshore road, made in 1878 by the corporation, and shortly to be extended round the castle cliff to the north side, makes an excellent drive or promenade. The north side has fine sands, a hoist, and a promenade pier, but is not so attractive as the south side, nor are the houses there of so good a character and style. The salubrity of Scarborough is attested by its vital statistics. The mean annual mortality from 1873 to 1882 was 18.4 per 1000. The death-rate from consumption in all England is 2.4 per 1000 ; amongst the indigenous population of Scarborough from 1873 to 1882 it was 1.7 per 1000. The mean annual temperature is 47.9° Fahr. In December, January, and February it is only 0.6° colder than Brighton, whilst in the summer months Brighton is 3.6° warmer.

The town is a royal borough, its charter of incorporation dating from 1161. It returned two members to parliament from 1283 to 1885, when one of the seats was taken away. The limits of the municipal and parliamentary boroughs coincide,—the area being 2348 acres, the population 24,259 in 1871 and 30,504 in 1881.

Shipbuilding, salt-manufacture, and knife-making were formerly common, but the only craft now remaining is jet-manufacture. The fishing trade is, however, very considerable. Disputes about dues for the old pier and the fish-tithe occupy a conspicuous place in the town records ; the pier seems to have suffered greatly in the various sieges to which the town, after it was walled, became exposed. The old town-hall in St. Nicholas Street, the new town-hall in Castle Road, the market-hall in St. Helen's Square, in the Tuscan style, and the new post office in Huntriss Row are conspicuous amongst the public buildings. There are two theatres. Of the monastic buildings belonging to the Gray Friars, Dominicans, and Carmelites there are no remains, but the parish church of St. Mary, conspicuously situated on a mound to the south of Castle Hill, occupies the site of the old Cistercian monastery. The old church was made the site of a battery in the siege of the castle in 1644, and one of its towers fell in 1659. The restoration of the present building took place in 1850. There are other churches and chapels of a much more recent date, including a Roman Catholic church. The race-course is on the top of a hill, commanding fine views of the moors and of the sea.

The old name of the town was written Skardeburge. It is not mentioned in Domesday Book, but it was probably waste, as Tosti, count of Northumberland, had ravaged and burnt it some time previously. Thorklen mentions it as having been ravaged by Adelbrecht, king of Northumberland, and by Harold Hardrada. Douglas, the Scottish chief, also burnt it in 1318. Henry II. compelled the count of Aumale to surrender the castle in 1155. King John visited the castle in 1206 and 1216, and the "house and castle of Scarborough" are mentioned in 1223. When not used as a temporary royal residence the castle was a royal prison. In 1312 the earl of Pembroke besieged it, and in the Pilgrimage of Grace insurrection (1536) it was unsuccessfully besieged by Sir Robert Aske. A detailed survey of it, made in 1538, is still extant, the castle yard and land therein described, with the buildings, corresponding with a survey made in 1839. It was again besieged in 1644–45 and in 1648. In 1655 George Fox the Quaker was imprisoned in the castle. In 1645 the town was captured by assault, and in later years its inhabitants were much impoverished by military exactions and expenses. A view of the town and castle in 1485 is still extant. The precise date when the town-walls were dismantled is not known. In 1730 Daniel Defoe, writing from the place, said: "The town is well-built, pleasant, and populous, and we found a great deal of company here, drinking the waters, who have not only come from the north of England but from Scotland."

See *History of Scarborough Spaw*, 1679; Gent's *History of Scarborough*, 1735; Hinderwell's *History of Scarborough*, 1798; Cole's *Scarbrough Worthies*, 1820; *Constitution and Byelaws of the Corporation of Scarbrough*, 1827; *Brief History of St. Mary's, Scarbrough*, 1845; *The Geology of Scarbrough*, by C. Fox Strangways, 1880; *Flora of Scarbrough*, by G. Masser, 1881; and *Scarborough as a Health Resort*, by A. Haviland, 1883.

SCARLATTI, Alessandro (1659–1725), composer of sacred and dramatic music, was born at Trapani in Sicily in 1659, and became in early youth a pupil of Carissimi. In 1680 Queen Christina of Sweden appointed him her maestro di cappella, and commissioned him to write his first opera, *L' Onestà nell' Amore*, for performance at her palace in Rome. In 1693 he produced his first oratorio, *I Dolori di Maria sempre Vergine*. In the following year he was appointed maestro di capella to the viceroy of Naples, and from that time forward his works multiplied with astonishing rapidity, his time being spent partly in Naples and partly in Rome, where he entered the service of Cardinal Ottoboni, as private maestro di cappella. His prodigious fertility of invention did not, however, tempt him to write carelessly. On the contrary he did his best to neutralize the evil caused by the founders of the monodic school, whose insane hatred of counterpoint and form reduced their dramatic music to the dreary level of monotonous declamation. He was by far the most learned contrapuntist of his age; and it was to this circumstance that his compositions owed their resistless power. Moreover, his sense of form was as just as his feeling for harmony, and to this he was indebted for the originality of many of his finest conceptions. He has been credited with two very important inventions—accompanied recitative and the *da capo*. That he really did invent the first there is very little doubt. Instances of the latter have been found of earlier date than most of his works, but he was certainly the first to bring it into general use. He also struck out ideas in his orchestral accompaniments which must have seemed bold indeed to the musicians of the period, using *obbligato* passages and other combinations previously unknown, and introducing *ritornelli* and *sinfonie* with excellent effect. In 1707 Scarlatti was appointed principal maestro di cappella at Santa Maria Maggiore, and soon afterwards he was invested by the pope with the order of the Golden Spur, with which Gluck and Mozart were afterwards

honored. He resigned his appointment after two years' service, and died at Naples, October 24, 1725.

Very few of Scarlatti's works have been published. His compositions include 115 operas (41 only of which are now known to exist, and these only in MS.), 200 masses, 9 oratorios, more than 500 cantatas, and innumerable smaller pieces, both sacred and secular. MSS. of three of his operas, *Gerone, Il Flavio Cuniberto*, and *La Teodora Augusta*, are preserved in the library of Christ Church, Oxford; and *Il Prigioniero Fortunato* forms part of the "Dragonetti Collection" in the British Museum.

SCARLATTI, Domenico (1683–1757), son of the preceding, was born at Naples in 1683, and studied music first under his father and then under Gasparini. He began his career by composing a few operas, among them *Amleto*, produced at Rome in 1715, and remarkable as the earliest known attempt to pose Shakespeare's hero as the *primo uomo* of a *dramma per la musica*. But his real strength lay in the excellence of his performances on the harpsichord and organ. During Handel's first sojourn in Italy in 1708–9 D. Scarlatti was invited to a trial of skill with him on both instruments at the palace of Cardinal Ottoboni, and all present decided that the harpsichord performances terminated in a drawn battle, though Handel had a decided advantage on the organ. The justice of the verdict cannot be doubted, for, whenever Scarlatti was afterwards praised for his organ-playing, he used to cross himself devoutly and say, "You should hear Handel!"

On the death of Bai in 1715 D. Scarlatti was appointed maestro di capella of St. Peter's in Rome. In 1719 he conducted the performance of his *Narciso* at the King's Theatre in London, and in 1721 he played with great success in Lisbon. He then returned to Naples; but in 1729 he was invited to Madrid, with the appointment of teacher to the princess of Asturias, and remained there twenty-five years, returning in 1754 to Naples, where he died in 1757.

D. Scarlatti's compositions for the harpsichord are almost innumerable, and many of them have been published. In the character of their *technique* they are infinitely in advance of the age in which they were written and played; and many of them are difficult enough to tax the powers of the best performers of the present day.

SCARLET FEVER and Scarlatina are names applied indifferently to an acute, infectious disease, characterized by high fever, accompanied with sore throat and a diffuse red rash upon the skin. This fever appears to have been first accurately described by Sydenham in 1676, before which period it had evidently been confounded with small-pox and measles.

In connection with the causation of this disease, the following points have been ascertained. (1) It is a highly contagious malady, the infectious material being one of the most subtle, diffuse, and lasting known in fevers. It would seem that the disease is communicable from an early period of its occurrence, all through its progress, and especially during convalescence when the process of desquamation is proceeding, and when the shed-off epidermis which contains the germs of the disease in great abundance is apt to be inhaled, to become attached to articles of clothing, to find entrance into food, or to be transmitted in other ways to healthy persons. (2) It is a disease for the most part of early life, young children being specially susceptible; but adults may also suffer if they have not had this fever in childhood. (3) It occurs both in isolated cases (sporadically) and in epidemics. (4) One attack in general, though not always, confers immunity from a second. (5) Certain constitutional conditions act as predisposing causes favoring the development of the fever. Thus, where overcrowding prevails, and where the hygienic state of children is ill attended to, the disease is more likely to prevail and spread, and to assume unfavorable forms. Further, in the puerperal state in women there appears to be a special susceptibility to suffer in a dangerous manner should there be exposure to the infection of the fever. As to the nature of the infecting agent, nothing positive is known, although from the analogy of similar diseases it is probable that specific micro-organisms or germs are concerned in its production.

The period of incubation in scarlet fever (that is, the time elapsing between the reception of the poison and the development of symptoms) appears to vary. Sometimes it would seem to be as short as one or two days, but in most instances it is probably about a week. The invasion of this fever is generally sudden and sharp, consisting in rigors, vomiting, and sore throat, together with a rapid rise of temperature and increase in the pulse. Occasionally, especially in young children, the attack is ushered in by convulsions. These premonitory symptoms usually continue for about twenty-four hours, when the characteristic eruption makes its appearance. It is first seen on the neck, chest, arms and hands, but quickly spreads all over the body, although it is not distinctly marked on the face. This rash consists of minute thickly-set red spots, which coalesce to form a general diffuse redness, in appearance not unlike that produced by the application of mustard to the skin. In some instances the redness is accompanied with small vesicles containing fluid. In ordinary cases the rash comes out completely in about two days, when it begins to fade, and by the end of a week from its first appearance it is usually gone. The severity of a case is in some degree measured by the copiousness and brilliancy of the rash, except in the malignant varieties, where there may be little or no eruption. The tongue, which at first was furred, becomes about the fourth or fifth day denuded of its epithelium and acquires the peculiar "strawberry" appearance characteristic of this fever. The interior of the throat is red and somewhat swollen, especially the uvula, soft palate, and tonsils, and a considerable amount of secretion exudes from the inflamed surface. There is also tenderness and slight swelling of the glands under the jaw. In favorable cases the fever departs with the disappearance of the eruption and convalescence sets in with the commencement of the process of "desquamation" or peeling of the cuticle, which first shows itself about the neck, and proceeds slowly over the whole surface of the body. Where the skin is thin the desquamation is in the form of fine branny scales; but where it is thicker, as about the hands and feet, it comes off in large pieces, which sometimes assume the form of casts of the fingers or toes. The duration of this process is variable, but it is rarely complete before the end of six or eight weeks, and not unfrequently goes on for several weeks beyond that period. It is during this stage that complications are apt to appear, particularly those due to cold, such as inflammation of the kidneys; and all throughout its continuance there is the further danger of the disease being communicated to others by the cast-off epidermic scales.

Scarlet fever shows itself in certain well-marked varieties, of which the following are the chief:

1. *Scarlatina Simplex* is the most common form; in this the symptoms, both local and general, are moderate, and the case usually runs a favorable course. It is always, however, to be borne in mind that the duration and the infectiveness of the disease, including its convalescence, are uninfluenced by the mildness of the attack. In some rare instances it would seem that the evidences of the disease are so slight, as regards both fever and rash, that they escape observation and only become known by the patient subsequently suffering from some of the complications associated with it. In such cases the name *latent scarlet fever* (*scarlatina latens*) is applied.

2. *Scarlatina Anginosa* is a more severe form of the fever, particularly as regards the throat symptoms. The rash may be well marked or not, but it is often slow in developing and in subsiding. There is intense inflammation of the throat, the tonsils, uvula, and soft palate being swollen or ulcerated, or having upon them membranous

patches not unlike those of diphtheria, while externally the gland tissues in the neck are enlarged and indurated and not unfrequently become the seat of abscesses. There is difficulty in opening the mouth; an acrid discharge exudes from the nostrils and excoriates the lips; and the countenance is pale and waxy-looking. This form of the disease is marked by great prostration of strength, and it is much more frequently fatal than the preceding.

3. *Scarlatina Maligna* is the most serious form of all. The malignancy may be variously displayed. Thus a case of scarlatina anginosa may acquire such a severe character, both as to throat and general symptoms, as rapidly to produce profound exhaustion and death. But the typically malignant forms are those in which the attack sets in with great violence and the patient sinks from the very first. In such instances the rash either does not come out at all or is of the slightest amount and of livid rather than scarlet appearance, while the throat symptoms are often not prominent. Death in such cases may take place in from twenty-four to forty-eight hours, and is frequently preceded by great elevation of the temperature of the body and by delirium, coma, or other nervous symptoms. A further example of a malignant form is occasionally observed in cases where the rash, which had previously been well developed, suddenly recedes, and convulsions or other nervous phenomena and rapid death supervene.

The complications and effects of scarlet fever are, as already indicated, among the most important features in this disease, and, although their occurrence is exceptional, they appear with sufficient frequency, and are of such a nature, as ought to make the medical attendant carefully watch every case for any of their early indications. The most common and serious of these is inflammation of the kidneys, which may arise during any period in the course of the fever, but is especially apt to appear in the convalescence, while desquamation is in progress. Its onset is sometimes announced by a return of feverish symptoms, accompanied with vomiting and pain in the loins; but in a large number of instances it occurs without these and comes on insidiously. One of the most prominent symptoms is slight swelling of the face, particularly of the eyelids, which is rarely absent in this complication. If the urine is examined it will probably be observed to be diminished in quantity and of dark smoky or red appearance, due to the presence of blood; while it will also be found to contain a large quantity of albumen. This, together with the microscopic examination which reveals the presence of tube casts containing blood, epithelium, etc., testifies to a condition of acute inflammation of the kidney (glomerular and tubal nephritis). In favorable cases these symptoms may soon disappear, but they may on the other hand prove extremely serious,—the risks being the suppression of urine, leading to uræmic poisoning and causing convulsions which may terminate fatally, or, further, the rapid development of general dropsy, and death from this cause. Although thus a very formidable complication, it is yet one which is amenable to treatment, and by the prompt and judicious application of remedies lives may often be saved, even in desperate circumstances. Occasionally this condition does not wholly pass off, and consequently lays the foundation for Bright's Disease (*q.v.*). Another of the more common complications or results of scarlet fever is suppuration of the ears, due to the extension of the inflammatory process from the throat along the Eustachian tube into the middle ear. This not unfrequently leads to permanent ear-discharge, with deafness from the disease affecting the inner ear and temporal bone, a condition implying a degree of risk from its proximity to the brain. Other maladies affecting the heart, lungs, pleura, etc., occasionally arise in connection with scarlet fever, but they are of less common occurrence than those previously mentioned. Apart, however, from such definite forms of disease there may remain as the result of scarlet fever simply a general weakening of health, which may render the patient delicate and vulnerable for a long time.

In the treatment of scarlet fever, one of the first requirements is the isolation of the case, with the view of preventing the spread of the disease. In large houses this may be possible, but in most instances it can only be satisfactorily accomplished by sending away those other members of the family who have not suffered from the fever. The establishment in many large towns of hospitals for infectious diseases, which provide accommodation for patients of all classes, affords the best of all opportunities for thorough isolation. In large families, where few or none of the members have had the disease, the prompt removal of a case to such an hospital will in many instances prevent the spread of the fever through the household, as well as beyond it, and at the same time obviate many difficulties connected with the cleansing and purification of the house, which, however carefully done, may still leave remaining some risk in the case of a fever the contagious power of which is so intense.

When, however, the patient is treated at home, the sick room should contain only such furniture as may be required, and the attendants should come as little as possible in contact with other members of the household. Should other children be in the house, they should be kept away from school during all the time that the risk of infection continues. The possibility of the fever being communicated by letters sent from the sick room should not be forgotten by those in attendance. Disinfectants, such as carbolic acid, Condy's fluid, etc., may be used freely in the room and passages, and all body or bed clothes when removed should be placed at once in boiling water, or in some disinfecting fluid. In convalescence, with the view of preventing the transmission of the desquamated cuticle, the inunction of the body with carbolized oil (1 in 40) and the frequent use of a bath containing soda are to be recommended.

All books, toys, etc., used by the patient during the illness should be carefully destroyed or given to fever hospitals,[1] as their preservation has frequently been known to cause an outbreak of the disease at a subsequent time. With respect to the duration of the infective period, it may be stated generally that it is seldom that a patient who has suffered from scarlet fever can safely go about before the expiry of eight weeks, while on the other hand the period may be considerably prolonged beyond this, the measure of the time being the completion of the process of desquamation in every portion of the surface of the body. As to general management during the progress of the fever,—in favorable cases little is required beyond careful nursing and feeding. The diet all through the fever and convalescence should be of light character, consisting mainly of milk food. Soups may be taken, but solid animal food should as far as possible be avoided. During the febrile stage a useful drink may be made by a weak solution of chlorate of potash in water (1 drachm to the pint), and of this the patient may partake freely. In the more severe forms of the disease, where the throat is much affected, the application with a brush of a strong solution of Condy's fluid or other disinfectant, such as boroglyceride, glycerine of carbolic acid, quinine, etc., may be required, or gargling with these substances when this can be done. In the malignant variety, where the eruption is not appearing, or is but ill developed, stimulants internally, and the hot bath or pack, may sometimes afford a chance, or the hypodermic use of pilocarpin,—although it must be confessed that in such cases little can be expected from any remedies. The treatment of the kidney complication and its accompanying dropsy is similar to that of acute Bright's disease. Depletion by leeching or cupping the loins, and the promotion of cutaneous action by a hot air bath or a hot wet pack, or by pilocarpin, are the most useful measures, and will often succeed in saving life. The abscesses of the neck which occasionally occur as complications should be opened

[1] [They would hardly be acceptable to the hospitals.—Am. Ed.]

antiseptically, while the ear disorders, which are apt to continue long after the termination of convalescence, will demand the special attention of the aurist.

(J. O. A.)

SCARRON, PAUL (1610–1660), poet, dramatist, novelist, and husband of Madame de Maintenon, was born or at least baptized on the 4th July, 1610. His father, of the same name was a man of position, and a member of the parlement of Paris. Paul the younger (who is said to have quarrelled with his stepmother) became an abbé, was not ill-allowanced, and travelled to Rome in 1634. He returned and became a well-known figure in literary and fashionable society. A wild story used to be told of his having (when in residence at his canonry of Le Mans) tarred and feathered himself as a carnival freak, of his having been obliged to take refuge from popular wrath in a swamp and of his consequent deformity from rheumatism. The simple fact seems to be that in 1637 he had an attack of fever with the usual sequelæ of rheumatic attacks, and that he put himself into the hands of a quack doctor. This at least is how Tallemant tells the story, though he substitutes a less creditable disease for fever. What is certain is that Scarron, after having been in perfect health for over thirty years, passed twenty more in a state of miserable deformity and pain. His head and body were twisted, and his legs became useless. Nevertheless he bore up against his sufferings with invincible courage, though they were complicated by his inheriting nothing from his father, and by the poverty and misconduct of his sisters, whom he supported. For a few years he really held a benefice at Le Mans, but was then in no case to play pranks. It is said, however, that here he conceived the idea of the *Roman Comique* and wrote the drama of *Jodelet*, which gave a nickname to the actor who performed it. In 1646 he returned to Paris and worked hard for the booksellers, from the name of one of whom he is said to have called literature pleasantly his "marquisat de Quinet." He had also a pension from Mazarin and one from the queen, but lost both from being accused of "Frondeur" sentiments. The most singular action of his life remains to be told. In his early years he had been, as hinted, something of a libertine, and a young lady of some family, Céleste Palaiseau, had openly lived with him. But in 1652, sixteen years after he had become almost entirely paralyzed, he married a girl of much beauty and no fortune, Françoise or Francine d'Aubigné, granddaughter of Agrippa d'Aubigné, afterwards famous as Madame de Maintenon. Scarron's house was, both before and after the marriage, a great centre of society, despite his narrow means. Yet only the most malignant and unscrupulous libellers of the future favorite accuse her of light conduct during the eight years of her marriage to this strange husband, and the well-informed author of the *Historiettes* distinctly acquits her of any such. But Scarron, who had long been able to endure life only by the aid of constant doses of opium, was at length worn out, and died on the 6th October, 1660.

Scarron's work is very abundant, and, written as it was under pressure of want and pain, it is very unequal. The piece most famous in his own day, his *Virgile Travesti* (1648–53), is now thought, and not unjustly, a somewhat ignoble and unprofitable waste of singular powers for burlesque. But the *Roman Comique* (1651) is a work the merit of which can be denied by no competent judge who has read it. Unfinished, and a little desultory, this history of a troop of strolling actors is almost the first French novel, in point of date, which shows real power of painting manners and character, and is singularly vivid. It furnished Théophile Gautier with the idea and with some of the details of his *Capitaine Fracasse*. Scarron also wrote some shorter novels of merit, which are thought to have inspired Molière and Sedaine. Of his plays *Jodelet* (1645) and *Don Japhet d'Arménie* (1653) are the best. Both these and the others which he wrote are of course somewhat antiquated in style, but with Corneille's *Menteur* they stand above everything else in comedy before Molière. He also produced many miscellaneous pieces.

Scarron is generally spoken of and thought of as a representative writer of burlesque, but in reality he possessed in abundance the faculty of true comedy. The most complete edition of his works is held to be that of 1737 (10 vols., Amsterdam), but his more celebrated pieces, including all those mentioned above, have been frequently reprinted.

SCAUP,—the wild-fowler's ordinary abridgment of SCAUP-DUCK, meaning a Duck so called "because she feeds upon *Scaup*, *i. e.*, broken shellfish," as may be seen in Willughby's *Ornithology* (p. 365); but it would be more proper to say that the name comes from the "Musselscaups," or "Mussel-scalps," [1] the beds of rock or sand on which Mussels (*Mytilus edulis*, and other species) are aggregated,—the *Anas marila* of Linnæus and *Fuligula marila* of modern systematic writers, a very abundant bird around the coasts of most parts of the northern hemisphere, repairing inland in spring for the purpose of reproduction, though so far as is positively known hardly but in northern districts, as Iceland, Lapland, Siberia, and the fur-countries of America. It was many years ago believed (*Edin. N. Philos. Journal*, xx., p. 293) to have been found breeding in Scotland, but assertions to that effect have not been wholly substantiated, though apparently corroborated by some later evidence (*Proc. N. H. Soc. Glasgow*, ii., p. 121, and *Proc. Phys. Soc. Edinburgh*, vii., p. 203). The Scaup-Duck has considerable likeness to the POCHARD (vol. xix. p. 264), both in habits and appearance; but it much more generally affects salt-water, and the head of the male is black, glossed with green, and hence the name of "Blackhead," by which it is commonly known in North America, where, however, a second species or race, smaller than the ordinary one, is also found, the *Fuligula affinis*. The female Scaup-Duck can be readily distinguished from the Dunbird or female Pochard by her broad white face. (A. N.)

SCEPTICISM signifies etymologically a state of doubt or indecision in the face of different mutually conflicting statements (σκέπτομαι, I consider, reflect, hesitate, doubt). It is implied, moreover, that this doubt is not merely a stage in the road to certainty and true knowledge. The provisional suspense of judgment recommended by Descartes and others as the true beginning of philosophy is no more than a passing phase of the individual's mind in his search for truth. But the doubt of the sceptic is professedly the last result of investigation; it is the renunciation of the search for truth on the ground that truth or knowledge is unattainable by man. An account of the chief historical appearances of scepticism and its different motives will serve to illustrate and amplify this statement, and will lead up to any further considerations of a general nature. At the outset, and in general terms, scepticism may be summarily defined as a thorough-going impeachment of man's power to know—as a denial of the possibility of objective knowedge.

Historical appearances.

Trust, not distrust, is the primitive attitude of the mind. What is put before us, whether by the senses or by the statements of others, is instinctively accepted as a veracious report, till experience has proved the possibility of deception. In the history of philosophy, in the same way, affirmation precedes negation; dogmatism goes before scepticism. And this must be so, because the dogmatic systems are, as it were, the food of scepticism; without them it would be without motive, without a *basis operandi*. Accordingly, we find that sceptical thought did not make its appearance till a succession of positive theories as to the nature of the real, by their mutual inconsistency, had suggested the possibility that they might all alike be false. The Sophistic epoch of Greek philosophy was, in great part, such a negative reaction against the luxuriance of self-confident

[1] "Scalp" primarily signifies a shell; *cf.* Old Dutch *schelpe* and Old Fr. *escalope* (Skeat, *Etymol. Dictionary*, p. 528).

assertion in the nature-philosophies of the preceding age. Though scepticism as a definite school of opinion may be said, in accordance with old precedent, to date only from the time of Pyrrho of Elis, there can be no doubt that the main currents of Sophistic thought were sceptical in the wider sense of that term. The Sophists were the first in Greece to dissolve knowledge into individual and momentary opinion (Protagoras), or dialectically to deny the possibility of knowledge (Gorgias). In these two examples we see how the weapons forged by the dogmatic philosophers to assist in the establishment of their own theses are sceptically turned against philosophy in general. As every attempt to rationalize nature implies a certain process of criticism and interpretation to which the data of sense are subjected, and in which they are, as it were, transcended, the antithesis of reason and sense is formulated early in the history of speculation. The opposition, being taken as absolute, implies the impeachment of the veracity of the senses in the interest of the rational truth proclaimed by the philosophers in question. Among the pre-Socratic nature philosophers of Greece, Heraclitus and the Eleatics are the chief representatives of this polemic against the "lying witness" of the senses. The diametrical opposition of the grounds on which the veracity of the senses is impugned by the two philosophies (viz., by Heraclitus because they testify to an apparent permanence and identity in things, by the Eleatics because they testify to an apparent multiplicity and change) was in itself suggestive of sceptical reflection. Moreover, although these philosophers are not in any sense themselves sceptical, their arguments are easily susceptible of a wider application. Accordingly we find that the arguments by which Heraclitus supported his theory of the universal flux are employed by Protagoras to undermine the possibility of objective truth, by dissolving all knowledge into the momentary sensation or persuasion of the individual. The idea of an objective flux or law of change constituting the reality of things, is abandoned, and subjective points of sense alone remain,—which is tantamount to eliminating the real from human knowledge.

The Sophists.

Still more unequivocal was the sceptical nihilism expressed by Gorgias in his three celebrated theses: (1) nothing exists; (2) if anything existed, it would be unknowable; (3) if anything existed and were knowable, the knowledge of it could not be communicated. The arguments of his book, "Concerning the Non-existent, or Nature," were drawn from the dialectic which the Eleatics had directed against the existence of the phenomenal world. But they are no longer used as indirect proofs of a universe of pure and unitary Being. The prominence given by most of the Sophists to rhetoric, their cultivation of a subjective readiness as the essential equipment for life, their substitution of persuasion for conviction, all mark the sceptical undertone of their teaching. This attitude of indifference to real knowledge passed in the younger and less reputable generation into a corroding moral scepticism which recognized no good but pleasure and no right but might.

What Socrates chiefly did was to recreate the instinct for truth and the belief in the possibility of its attainment. The scientific impulse thus communicated was sufficient to drive scepticism into the background during the great age of Greek philosophy (*i.e.*, the hundred years preceding Aristotle's death, 323 B.C.). The captious logic of the Megaric school,—in which the Eleatic influence was strong,—their devotion to eristic and the elaboration of fallacies, was indeed in some cases closely related to skeptical results. The school has been considered with some truth to form a connecting link with the later scepticism, just as the contemporary Cynicism and Cyrenaicism may be held to be imperfect preludes to Stoicism and Epicureanism. The extreme nominalism of some of the Cynics also, who denied the possibility of any but identical judgments, must be similarly regarded as a solvent of knowledge. But with these insignificant exceptions it holds true that, after the sceptical wave marked by the Sophists, scepticism does not reappear till after the exhaustion of the Socratic impulse in Aristotle.

The first man in antiquity whose scepticism gave name to his doctrine was Pyrrho of Elis (about 360–270 B.C.). Pyrrho proceeded with the army of Alexander the Great as far as India, in the company of Anaxarchus, the Democritean philosopher. He afterwards returned to his native city, where he lived in poor circumstances, but highly honored by his fellow-citizens. Pyrrho himself left no writings, and the accounts of his doctrine are mainly derived from his pupil Timon of Phlius (about 325-235 B.C.). Timon is called the Sillographist, from his satirical poem (Σίλλοι), in which all the philosophers of Greece are held up to ridicule, with the exception of Xenophanes, who honestly sought, and Pyrrho, who succeeded in finding, the truth. Other disciples are mentioned besides Timon, but the school was short-lived, its place being presently taken by the more moderate and cultured doubt of the New Academy. Zeller sums up Pyrrho's teaching in three propositions: We know nothing about the nature of things; hence the right attitude towards them is to withhold judgment; the necessary result of withholding judgment is imperturbability. The technical language of the school expresses the first position by the word *ἀκαταληψία*: things are wholly incomprehensible or inaccessible; against every statement the opposite may be advanced with equal justice (*ἰσοσθένεια τῶν λόγων*). The sceptical watchword which embodies the second position is *ἐποχή*, reserve of judgment, or, as it is put by Timon, *οὐδὲν μᾶλλον*, that is, no one assertion is truer than another. This complete suspense of opinion is also expressed by the terms *ἀῤῥεψία*, or equilibrium, and *ἀφασία*, or refusal to speak, as well as by other expressions. The Pyrrhonists were consistent enough to extend their doubt even to their own principle of doubt. They thus attempted to make their scepticism universal, and to escape the reproach of basing it upon a fresh dogmatism. Mental imperturbability (*ἀταραξία*) was the result to be attained by cultivating such a frame of mind. The happiness or satisfaction of the individual was the end which dominated this scepticism as well as the contemporary systems of Stoicism and Epicureanism, and all three philosophies place it in tranquillity or self-centred indifference. Scepticism withdraws the individual completely into himself from a world of which he can know nothing. It is men's opinions or unwarranted judgments about things, say the sceptics, which betray them into desire, and painful effort, and disappointment. From all this a man is delivered who abstains from judging one state to be preferable to another. But, as complete inactivity would have been synonymous with death, it appears to have been admitted that the sceptic, while retaining his consciousness of the complete uncertainty enveloping every step, might follow custom in the ordinary affairs of life.

Pyrrho.

The scepticism of the New Academy (or, to speak more strictly, of the Middle Academy, under Arcesilaus and Carneades, founders respectively of the so-called second and third Academies) differed very little from that of the Pyrrhonists. The differences asserted by later writers are not borne out on investigation. But the attitude maintained by the Academics was chiefly that of a negative criticism of the views of others, in particular of the somewhat crude and imperious dogmatism of the Stoics. They also, in the absence of certainty, allowed a large scope to probability as a motive to action, and defended their doctrine on this point with greater care and skill. The

Scepticism of the Academy.

whole position was stated with more urbanity and culture, and was supported, by Carneades in particular, by argumentation at once more copious and more acute. It seems also true that the Academics were less overborne than the Pyrrhonists by the practical issue of their doubts (imperturbability); their interest was more purely intellectual, and they had something of the old delight in mental exercitation for its own sake. Arcesilas or Arcesilaus (about 315–240 B.C.) made the Stoic theory of irresistible impressions (*φαντασίαι καταληπτικαί*) the special object of his attack. Mere irresistibleness (*κατάληψις*), he maintained, is no criterion of truth, since false perceptions may equally possess this power to sway the mind. He seems chiefly to have supported his position by adducing the already well-known arguments of former philosophers against the veracity of the senses, and he evidently held that by these arguments the possibility of knowledge in general was sufficiently subverted. We can know nothing, he concluded,—not even this itself, that we know nothing. He denied that the want of knowledge reduces us to inaction. Notions influence the will immediately, apart from the question of their truth, and, in all questions of conduct, probability (*τὸ εὔλογον*) is our sufficient guide, as it is our highest attainable standard. It is stated that Arcesilaus made his negative criticism merely a preliminary to the inculcation of a modified Platonism. But this account, though not in itself incredible, is not borne out by any evidence at our disposal. The theory of Carneades (213–129 B.C.) represents the highest development of Academic scepticism. The dogmatic system which Carneades had in view was that of Chrysippus, the Stoic, whose main positions, whether in the theory of knowledge, in morals, or in theology, he subjected to an acute and thorough-going criticism. As to the criterion of truth, Carneades denied that this could be found in any impression, as such; for in order to prove its truth an impression must testify, not only to itself, but also to the objects causing it. We find, however, admittedly, that in many cases we are deceived by our impressions; and, if this is so, there is no kind of impression which can be regarded as guaranteeing its own truth. According to his own examples, it is impossible to distinguish objects so much alike as is one egg to another; at a certain distance the painted surface seems raised, and a square tower seems round; an oar in water seems broken, and the neck-plumage of a pigeon assumes different colors in the sun; objects on the shore seem moving as we pass by, and so forth. The same applies, he argued, to purely intellectual ideas. Many fallacies cannot be solved, and we cannot, for example, draw any absolute distinction between much and little, or, in short, between any quantitative differences. Our impressions. therefore, furnish us with no test of truth, and we can derive no aid from the operations of the understanding, which are purely formal, combining and separating ideas without giving any insight into their validity. Besides this general criticism of knowledge, Carneades attacked the cardinal doctrines of the Stoic school,—their doctrine of God and their proof of divine providence from the evidences of design in the arrangements of the universe. Many of his arguments are preserved to us in Cicero's *Academics* and *De Natura Deorum*. His criticism of the contradictions involved in the Stoic idea of God really constitutes the first discussion in ancient times of the personality of God, and the difficulty of combining in one conception the characters of infinity and individuality. As a positive offset against his scepticism, Carneades elaborated more fully the Academic theory of probability, for which he employed the terms *ἐμφασις* and *πιθανότης*. Being necessarily ignorant of the relation of ideas to the objects they represent, we are reduced to judging them by the relation to ourselves, *i.e.*, by their greater or less clearness and appearance of truth. Though always falling short of knowledge, this appearance of truth may be strong enough to determine us to action. Carneades recognized three degrees of probability. The first or lowest is where our impression of the truthfulness of an idea is derived simply from the idea itself; the second degree is where that impression is confirmed by the agreement of related ideas; if a careful investigation of all the individual ideas bears out the same conclusion, we have the third and highest degree of probability. In the first case, an idea is called probable (*πιθανή*); in the second, probable and undisputed (*πιθανὴ καὶ ἀπερίσπαστος*); in the third, probable, undisputed, and tested (*πιθανὴ καὶ ἀπερίσπαστος καὶ περιωδευμένη*). The scepticism of Carneades was expounded by his successor Clitomachus, but the Academy was soon afterwards (in the so-called fourth and fifth Academies) invaded by the Eclecticism which about that time began to obliterate the distinctions of philosophical doctrine which had hitherto separated the schools. Cicero also, who in many respects was strongly attracted by the Academic scepticism, finally took refuge in a species of Eclecticism based upon a doctrine of innate ideas, and on the argument from the *consensus gentium*.

Arcesilaus.

Carneades.

The later scepticism—which is sometimes spoken of as the third sceptical school—claimed to be a continuation of the earlier Pyrrhonism. Ænesidemus, though not absolutely the first to renew this doctrine, is the first of whose doctrine anything is known. He appears to have taught in Alexandria about the beginning of the Christian era. Among the successors of Ænesidemus, the chief names are those of Agrippa, whose dates cannot be determined, and the physician Sextus Empiricus (about 200 A.D.), whose *Pyrrhonic Hypotyposes*, and his work *Adversus Mathematicos*, constitute a vast armory of the weapons of ancient scepticism. They are of the utmost value as an historical record. With Saturninus, the pupil of Sextus, and Favorinus, the grammarian, ancient scepticism may be said to disappear from history. What speculative power remained was turned entirely into Neoplatonic channels. To Ænesidemus belongs the first enumeration of the ten so-called tropes (*τρόποι*), or modes of sceptical argument, though the arguments themselves were, of course, current before his time. The first trope appeals to the different constitution of different animals as involving different modes of perception; the second applies the same argument to the individual differences which are found among men; the third insists on the way in which the senses contradict one another, and suggests that an endowment with more numerous senses would lead to a different report as to the nature of things; the fourth argues from the variability of our physical state and mental moods; the fifth brings forward the diversities of appearance due to the position and distance of objects; the sixth calls attention to the fact that we know nothing directly, but only through some medium, such as air or moisture, whose influence on the process cannot be eliminated; the seventh refers to the changes which the supposed object undergoes in quantity, temperature, color, motion, etc.; the eighth really sums up the thought which underlies the whole series, when it argues from the relativity of all our perceptions and notions; the ninth points out the dependence of our impressions on custom, the new and strange impressing us much more vividly than the customary; the tenth adduces the diversity of customs, manners, laws, doctrines, and opinions among men. Ænesidemus likewise attacked the notion of cause at considerable length, but neither in his arguments nor in the numerous objections brought against the notion by Sextus Empiricus do we meet with the thought which furnished the nerve of modern scepticism in Hume. The practical result of this scepticism Ænesidemus sought, like the Pyrrhonists, in *ἀταραξία*. He is somewhat strangely said to have combined his

Later scepticism of antiquity.

Sceptical tropes.

scepticism with a revival of the philosophy of Heraclitus; but the assertion perhaps rests, as Zeller contends, on a confusion. To Agrippa is attributed the reduction of the sceptical tropes to five. Of these, the first is based on the discrepancy of human opinions; the second on the fact that every proof itself requires to be proved, which implies a *regressus in infinitum;* the third on the relativity of our knowledge, which varies according to the constitution of the percipient and the circumstances in which he perceives. The fourth is really a completion of the second, and forbids the assumption of unproven propositions as the premises of an argument. It is aimed at the dogmatists, who, in order to avoid the *regressus in infinitum*, set out from some principle illegitimately assumed. The fifth seeks to show that reasoning is essentially of the nature of a *circulus in probando*, inasmuch as the principle adduced in proof requires itself to be supported by that which it is called in to prove. The attack made in several of these five tropes upon the possibility of demonstration marks this enumeration as distinctly superior to the first, which consists in the main of arguments derived from the fallibility of the senses. The new point of view is maintained in the two tropes which were the result of a further attempt at generalization. Nothing is self-evident, says the first of these tropes, for, if all things were certain of themselves, men would not differ as they do. Nor can anything be made certain by proof, says the second, because we must either arrive in the process at something self-evident, which is impossible, as has just been said, or we must involve ourselves in an endless regress.

When we review the history of ancient thought, we find, as Zeller puts it, that "the general result of all sceptical inquiries lies in the proposition that every assertion may be opposed by another, and every reason by reasons equally strong—in the ἰσοσθένεια τῶν λόγων. Or, as the same thing may be expressed, what all sceptical proofs come back to is the relativity of all our ideas. We can never know the nature of things as they are, but always only the manner in which they appear to us. The criterion of the sceptic is the appearance. Not even his own proof can claim truth and universal validity; he does not assert; he only seeks to relate how a thing strikes him at the present moment. And even when he expresses his doubts in the form of universal statements they are intended to be included in the general uncertainty of knowledge" (*Phil. d. Griechen*, iii. 2, p. 58). Both Zeller and Hegel, it may be added, remark upon the difference between the calm of ancient scepticism and the perturbed state of mind evinced by many modern sceptics. Universal doubt was the instrument which the sceptics of antiquity recommended for the attainment of complete peace of mind; rest and satisfaction can be attained, they say, in no other way. By the moderns, on the other hand, doubt is portrayed, for the most part, as a state of unrest and painful yearning. Even Hume, in various noteworthy passages of his *Treatise*, speaks of himself as recovering cheerfulness and mental tone only by forgetfulness of his own arguments. His state of universal doubt, so far from being painted as a desirable goal, is described by him as a "malady" or as "philosophical melancholy and delirium." The difference might easily be interpreted either as a sign of sentimental weakness on the part of the moderns or as a proof of the limitation of the ancient sceptics which rendered them more easily satisfied in the absence of truth. It seems to prove, at all events, that the ancient sceptics were more thoroughly convinced than their modern successors of the reasonableness of their own attitude. But whether the ancients were the better or the worse sceptics on that account is a nice question which need not be decided here. It may be doubted, however, whether the thorough-going philosophical scepticism of antiquity has any exact parallel in modern times, with the single exception possibly of Hume's *Treatise on Human Nature*. It is true we find many thinkers who deny the competency of reason when it ventures in any way beyond the sphere of experience, and such men are not unfrequently called sceptics. This is the sense in which Kant often uses the term, and the usage is adopted by others,—for example, in the following definition from Ueberweg's *History of Philosophy:* "The principle of scepticism is universal doubt, or at least doubt with regard to the validity of all judgments respecting that which lies beyond the range of experience." The last characteristic, however, is not enough to constitute scepticism, in the sense in which it is exemplified in the ancient sceptics. Scepticism, to be complete, must hold that even within experience we do not rationally conclude but are irrationally induced to believe. "In all the incidents of life," as Hume puts it, "we ought still to preserve our scepticism. If we believe that fire warms, or water refreshes, 'tis only because it costs us too much pains to think otherwise" (*Treatise*, bk. i. iv. 7). This tone, which fairly represents the attitude of ancient sceptics, is rare among the moderns, at least among those who are professed philosophers. It is more easily matched in the unsystematic utterances of a man of the world like Montaigne.

Comparison of ancient and modern scepticism.

One form of scepticism, however, may be claimed as an exclusively modern growth, namely, philosophical scepticism in the interests of theological faith. These sceptics are primarily Apologists. Their scepticism is not "de bonne foy"; it is simply a means to the attainment of a further end. They find that the dogmas of their church have often been attacked in the name of reason, and it may be that some of the objections urged have proved hard to rebut. Accordingly, in an access of pious rage, as it were, they turn upon reason to rend her. They deny her claim to pronounce upon such matters; they go further, and dispute her prerogative altogether. They endeavor to show that she is in contradiction with herself, even on matters non-theological, and that everywhere this much vaunted reason of man (la superbe raison) is the creature of custom and circumstance. Thus the "imbecility" of reason becomes their warrant for the reception by another organ—by faith—of that to which reason had raised objections. The Greeks had no temptation to divide man in two in this fashion. When they were sceptics, their scepticism had no ulterior motives; it was an end in itself. But this line of argument was latent in Christian thought from the time when St. Paul spoke of the "foolishness" of preaching. Tertullian fiercely re-echoed the sentiment in his polemic against the philosophers of antiquity: "Crucifixus est Dei filius; non pudet, quia pudendum est. Et mortuus est Dei filius; prorsus credibile est, quia ineptum est. Et sepultus resurrexit; certum est, quia impossibile est." But, as Christianity became firmly established, Christian writers[1] became more tolerant of speculation; and, instead of flaunting the irreconcilable opposition of reason and dogma, they labored to reduce the doctrines of the church to a rational system. This was the long task essayed by Scholasticism; and, though the great Schoolmen of the 13th century refrained from attempting to rationalize such doctrines as the Trinity and the Incarnation, they were far from considering them as essentially opposed to reason. It was not till towards the close of the Middle Ages that a sense of conflict between

Scepticism in the interest of faith.

[1] This turn of thought is not confined, however, to Christian thinkers; it appears also in the Arabian philosophy of the East. Al-Ghazzáli (Algazel) (1059-1111) in his *Tahâfot al-Filâsifa* ("The Collapse of the Philosophers") is the advocate of complete philosophical scepticism in the interests of orthodox Mohammedanism—an orthodoxy which passed, however, in his own case into a species of mysticism. He did his work of destruction so thoroughly that Arabian philosophy died out after his time in the land of its birth.

reason and revelation became widely prevalent and took shape in the essentially sceptical theory of the twofold nature of truth. Philosophical truth, as deduced from the teaching of Aristotle, it was said, directly contradicts the teaching of the church, which determines truth in theology; but the contradiction leaves the authority of the latter unimpaired in its own sphere. It is difficult to believe that this doctrine was ever put forward sincerely; in the most of those who professed it, it was certainly no more than a veil by which they sought to cover their heterodoxy and evade its consequences. Rightly divining as much, the church condemned the doctrine as early as 1276. Nevertheless it was openly professed during the period of the break up of Scholastic Aristotelianism. Pomponatius, the Alexandrist of Padua (*ob.* 1525), was one of its best known advocates.

Theory of the twofold nature of truth.

The typical and by far the greatest example of the Christian sceptic is Pascal (1623–1662). The form of the *Penssées* forbids the attempt to evolve from their detached utterances a completely coherent system. For, though he declares at times "Le pyrrhonisme est le vrai," "Se moquer de la philosophie c'est vraiment philosopher," or, again, "Humiliez-vous, raison impuissante, taisez-vous, nature imbécile," other passages might be quoted in which he assumes the validity of reason within its own sphere. But what he everywhere emphatically denies is the possibility of reaching by the unassisted reason a satisfactory theory of things. The contradictions which meet us everywhere are summed up and concentrated in the nature of man. Man is a hopeless enigma to himself, till he sees himself in the light of revelation as a fallen creature. The fall alone explains at once the nobleness and the meanness of humanity; Jesus Christ is the only solution in which the baffled reason can rest. These are the two points on which Pascal's thought turns. "There is nothing which is more shocking to our reason" than the doctrine of original sin; yet, in his own words, "le nœud de notre condition prend ses replis et ses tours dans cet abîme; de sorte que l'homme est plus inconcevable sans ce mystère que ce mystère n'est inconcevable à l'homme." Far, therefore, from being able to sit in judgment upon the mysteries of the faith, reason is unable to solve its own contradictions without aid from a higher source. In a somewhat similar fashion, in the present century, Lamennais (in the first stage of his speculations, represented by the *Essai sur l'Indifférence en Matière Religieuse*, 1817–21) endeavored to destroy all rational certitude in order to establish the principle of authority; and the same profound distrust of the power of the natural reason to arrive at truth is exemplified (though the allegation has been denied by the author) in the writings of Cardinal Newman. In a different direction and on a larger scale, Hamilton's philosophy of the conditioned may be quoted as an example of the same religious scepticism. Arguing from certain antinomies, said to be inherent in reason as such, Hamilton sought to found theology (in great part at least) upon our nescience, and to substitute belief for knowledge. He also imitated Pascal at times in dilating upon the "impotence" and "imbecility" of our faculties; but, as with Pascal, this was rather in reference to their incapacity to evolve an "absolute" system than to their veracity in the ordinary details of experience. The theological application and development of Hamilton's arguments in Mansel's Bampton Lectures *On the Limits of Religious Thought* marked a still more determined attack, in the interests of theology, upon the competency of reason.

Pascal.

Passing from this particular vein of sceptical or semi-sceptical thought, we find, as we should expect, that the downfall of Scholasticism, and the conflict of philosophical theories and religious confessions which ensued, gave a decided impetus to sceptical reflection. One of the earliest instances of this spirit is afforded by the book of Agrippa of Nettesheim (1487–1535), *De Incertitudine et Vanitate Scientiarum*. Sceptical reflection rather than systematic scepticism is what meets us in Michel de Montaigne (1533–1592), though the elaborate presentation of sceptical and relativistic arguments in his "Apologie de Raimond Sebond" (*Essais*, ii. 12), and the emblem he recommends—a balance with the legend, "Que scay-je?"—might allowably be adduced as evidence of a more thorough-going Pyrrhonism. In his "tesmoynages de nostre imbécillité," he follows in the main the lines of the ancients, and he sums up with a lucid statement of the two great arguments in which the sceptical thought of every age resumes itself—the impossibility of verifying our faculties, and the relativity of all impressions.[1] The argument from the mutability of opinions and customs was probably the one which appealed most strongly to himself. In the concluding lines of this essay, Montaigne seems to turn to "nostre foy chrestienne" as man's only succor from his native state of helplessness and uncertainty. But undoubtedly his own habitual frame of mind is better represented in his celebrated saying—"How soft and healthful a pillow are ignorance and incuriousness . . . . for a well-ordered head." More inclined than Montaigne to give a religious turn to his reflections was his friend Pierre Charron (1541–1603), who in his book *De la Sagesse* systematized in somewhat Scholastic fashion the train of thought which we find in the *Essais*. François Sanchez (1562–1632), professor of medicine and philosophy in Toulouse, combated the Aristotelianism of the schools with much bitterness, and was the author of a book with the title *Quod nihil scitur*. Of more or less isolated thinkers, somewhat later in point of time, who wrote in the same sceptical spirit, may be mentioned the names of François de la Mothe le Vayer (1588–1672), whose *Cinq Dialogues* appeared after his death under the pseudonym of Orosius Tubero; Samuel Sorbière (1615–1670), who translated the *Hypotyposes Pyrrhoneæ* of Sextus Empiricus; Simon Foucher (1644–1696), canon of Dijon, who wrote a *History of the Academics*, and combated Descartes and Malebranche from a sceptical standpoint. The work of Hieronymus Hirnhaim of Prague (1637–1679), *De Typho Generis Humani sive Scientiarum Humanarum Inani ac Ventoso Tumore*, was written in the interests of revelation. This is still more the case with the bitter polemic of Daniel Huet (1630–1721), *Censura Philosophiæ Cartesianæ*, and his later work, *Traité Philosophique de la Faiblesse de l'Esprit Humain*. The scepticism of Joseph Glanvill (1636–1680), in his two works, *The Vanity of Dogmatizing* (1661) and *Scepsis Scientifica* (1665), has more interest for Englishmen. Glanvill was not a sceptic at all points, seeing that he was full of enthusiasm for the advance of physical science and for the newly-founded Royal Society. But he attacked unsparingly the Aristotelianism of the schools, which was still dominant at Oxford. Against this, and also against the materialistic dogmatism of Hobbes, he invoked the weapons of scepticism; and he was led by his own arguments to query "whether there be any science in the sense of the dogmatists." He based this conclusion partly upon the ground that our knowledge of causes, being derived simply from "concomitancy," is far from being "infallibly conclusive." "The causality itself," he says, anticipating Hume, "is in-

Sceptics in 16th and 17th centuries.

[1] "Pour juger des apparences que nous recevons des subjects, il nous fauldra un instrument judicatoire; pour verifier cet instrument, il nous y fault de la demonstration; pour verifier la demonstration, un instrument; nous voylà au rouet. . . Finalement il n'y a aulcune constante existence, ny de nostre estre ny de celuy des objects; et nous, et nostre jugement, et toutes choses mortelles, vont coulant et roulant sans cesse; ainsin, il ne se peult establir rien de certain de l'un à l'aultre, et le jugeant et le jugé estants en continuelle mutation et bransle" (*Essais*, Garnier, i. 570).

sensible;" accordingly, "the foundation of scientifical procedure is too weak for so magnificent a superstructure." More celebrated than any of the above was Pierre Bayle (1647–1706), whose scepticism lay more in his keen negative criticism of all systems and doctrines which came before him as literary historian than in any theoretic views of his own as to the possibility of knowledge. Bayle also paraded the opposition between reason and revelation; but the argument in his hands is a double-edged weapon, and when he extols the merits of submissive faith his sincerity is at least questionable.

Hume. Hume, the most illustrious and indeed the typical sceptic of modern times, is treated at length in a separate article. Here, therefore, it is only necessary to point out shortly in what his scepticism consists. It is sometimes placed, as we have seen it is by Kant, in his distrust of our ability and right to pass beyond the empirical sphere. But the mere denial of the possibility of "divinity or school metaphysics," as we find it in the *Inquiry*, combined with an apparent confidence in "experimental reasoning concerning matter of fact and existence," does not constitute scepticism, but rather what would now be called agnosticism or positivism. It is essential to the sceptical position that reason be dethroned within experience as well as beyond it, and this is undoubtedly the result at which Hume arrives in his larger and more thorough-going work. More generally, therefore, his scepticism may be considered to lie in his relation to preceding philosophy. The *Treatise* is a *reductio ad absurdum* of the principles of Lockianism, inasmuch as these principles, when consistently applied, leave the structure of experience entirely "loosened" (to use Hume's own expression), or cemented together only by the irrational force of custom. Hume's scepticism thus really arises from his thorough-going empiricism. Starting with "particular perceptions" or isolated ideas let in by the senses, he never advances beyond these "distinct existences." Each of them exists on its own account; it is what it is, but it contains no reference to anything beyond itself. The very notion of objectivity and truth therefore disappears; the *Schein* or appearance of the moment is the only reality. Hume's analysis of the conceptions of a permanent world and a permanent self reduces us to the sensationalistic relativism of Protagoras. He expressly puts this forward in various passages as the conclusion to which reason conducts us. The fact that the conclusion is in "direct and total opposition" to the apparent testimony of the senses is a fresh justification of philosophical scepticism. For, indeed, scepticism with regard to the senses is considered in the *Inquiry* to be sufficiently justified by the fact that they lead us to suppose "an external universe which depends not on our perception," whereas "this universal and primary opinion of all men is soon destroyed by the slightest philosophy." Scepticism with regard to reason, on the other hand, depends on an insight into the irrational character of the relation which we chiefly employ, viz., that of cause and effect. It is not a real relation in objects but rather a mental habit of belief engendered by frequent repetition or custom. This point of view is applied in the *Treatise* universally. All real connection or relation, therefore, and with it all possibility of an objective system, disappears; it is, in fact, excluded by Hume *ab initio*, for "the mind never perceives any real connection among distinct existences." Belief, however, just because it rests, as has been said, on custom and the influence of the imagination,[1] survives such demonstrations. "Nature," as Hume delights to reiterate, "is always too strong for principle." "Nature, by an absolute and uncontrollable necessity, has determined us to judge as well as to breathe and feel." The true philosopher, therefore, is not the Pyrrhonist, trying to maintain an impossible equilibrium or suspense of judgment, but the Academic, yielding gracefully to the impressions or maxims which he finds, as matter of fact, to have most sway over himself. "I may—nay, I must—yield to the current of nature, in submitting to my senses and understanding; and in this blind submission I show most perfectly my sceptical principles," for, after all, "if we believe that fire warms or water refreshes, 'tis only because it costs us too much pains to think otherwise."[2]

Sceptical side of Kantianism. The system of Kant, or rather that part of his system expounded in the *Critique of Pure Reason*, though expressly distinguished by its author from scepticism, has been included by many writers in their survey of sceptical theories. The difference between Kant, with his system of pure reason, and any of the thinkers we have passed in review is obvious; and his limitation of reason to the sphere of experience suggests in itself the title of agnostic or positivist rather than that of sceptic. Yet, if we go a little deeper, there is substantial justification for the view which treats agnosticism of the Kantian type as essentially sceptical in its foundations and in its results. For criticism not only limits our knowledge to a certain sphere, but denies that our knowledge within that sphere is real: we never know things as they actually are, but only as they appear to us. Our knowledge, in Kant's language, does not show us "the inward essence of the object in itself, but only the relation of the object to the subject." But this doctrine of relativity really involves a condemnation of our knowledge (and of all knowledge), because it fails to realize an impossible and self-contradictory ideal. The man who impeaches the knowing faculties because of the fact of relation which they involve is pursuing the phantom of an apprehension which, as Lotze expresses it, does not apprehend things, but is itself things; he is desiring not to know but to *be* the things themselves. If this dream or prejudice be exploded, then the scepticism originating in it—and a large proportion of recent sceptical thought does so originate—loses its *raison d' être*.[3]

Prejudices on which scepticism rests. The prejudice, however, which meets us in Kant is, in a somewhat different form, the same prejudice which is found in the tropes of antiquity—what Lotze calls "the inadmissible relation of the world of ideas to a foreign world of objects." For, as he rightly points out, whether we suppose idealism or realism to be true, in neither case do the things themselves pass into our knowledge. No standpoint is possible from which we could compare the world of knowledge with such an independent world of things, in order to judge of the conformity of one to the other. But the abstract doubt "whether after all things may not be quite other in themselves than that which by the laws of our thought they necessarily appear" is a scepticism which, though admittedly irrefutable, is as certainly groundless. No arguments can be brought against it, simply because no arguments can be brought to support it; the scepticism rests on nothing more than the empty possibility of doubting. This holds true, even if we admit the "independent" existence of such a world of things. But the independence of things may with much greater

[1] "Belief is more properly an act of the sensitive than of the cogitative part of our nature."

[2] Much the same conclusion is reached in what is perhaps the ablest English exposition of pure philosophic scepticism since Hume—Mr. Arthur Balfour's *Defence of Philosophic Doubt* (1879). "The reader may wish to know," says Mr. Balfour, "what constitute the 'claims on our belief' which I assert to be possessed alike by science and theology, and which I put forward as the sole practical foundation on which our convictions ultimately rest. . . . Whatever they may be, they are not rational grounds of conviction. . . . It would be more proper to describe them as *a kind of inward inclination or impulse*" (pp. 316–17).

[3] It may be as well to add that the sceptical side of Kantianism is mainly confined to the *Critique of Pure Reason*, but this side of Kantian thought has been most widely influential. The remarks made above would not apply to the coherent system of idealism which may be evolved from Kant's writings and which many would consider alone to deserve the name of Kantianism or Criticism.

reason be regarded as itself a fiction or prejudice. The real "objective" to which our thoughts must show conformity is not a world of things in themselves, but the system of things as it exists for a perfect intelligence. Scepticism is deprived of its persistent argument if it is seen that, while our individual experiences are to be judged by their coherence with the context of experience in general, experience as a whole does not admit of being judged by reference to anything beyond itself.

To the attack upon the possibility of demonstration, inasmuch as every proof requires itself a fresh proof, it may quite fairly be retorted that the contradiction really lies in the demand for proof of the self-evident, on which all proof most ultimately depend. It is of course always possible that in any particular case we may be deceived; we may be assuming as self-evidently true what is in reality not so. But such incidental lapses are found to correct themselves by the consequences in which they involve us, and they have no power to shake our trust in the general validity of reason. It may, however, be granted that the possibility of lapse throws us open to the objections, ingenuous or disingenuous, of the sceptic; and we must remain exposed to them so long as we deal with our first principles as so many isolated axioms or intuitions. But the process of self-correction referred to points to another proof—the only ultimately satisfactory proof of which first principles admit. Their evidence lies in their mutual interdependence and in the coherence of the system which they jointly constitute.

Of a scepticism which professes to doubt the validity of every reasoning process and every operation of all our faculties it is, of course, as impossible as it would be absurd to offer any refutation. Here, as Butler incisively put it, "we can go no further. For it is ridiculous to attempt to prove the truth of those very perceptions whose truth we can no otherwise prove than by other perceptions of exactly the same kind with them, and which there is just the same ground to suspect, or to attempt to prove the truth of our faculties, which can no otherwise be proved than by means of those very suspected faculties themselves." This absolute scepticism, indeed, can hardly be regarded as more than empty words; the position which they would indicate is not one which has ever existed. In any case, such scepticism is at all times sufficiently refuted by the imperishable and justifiable trust of reason in itself. The real function of scepticism in the history of philosophy is relative to the dogmatism which it criticises. And, as a matter of fact, it has been seen that many so-called sceptics were rather critics of the effete systems which they found cumbering the ground than actual doubters of the possibility of knowledge in general. And even when a thinker puts forward his doubt as absolute it does not follow that his successors are bound to regard it in the same light. The progress of thought may show it to be, in truth, relative, as when the nerve of Hume's scepticism is shown to be his thorough-going empiricism, or when the scepticism of the *Critique of Pure Reason* is traced to the unwarrantable assumption of things-in-themselves. When the assumptions on which it rests are proved to be baseless, the particular scepticism is also overcome. In like manner, the apparent antinomies on which such a scepticism builds will be found to resolve themselves for a system based on a deeper insight into the nature of things. The serious thinker will always repeat the words of Kant that, in itself, scepticism is "not a permanent resting-place for human reason." Its justification is relative and its function transitional.

Function of scepticism.

Authorities.—Ancient scepticism is fully treated in the relative parts of Zeller's *Philosophie der Griechen*, with which may be compared Zimmermann's *Darstellung d. Pyrrhonischen Philosophie* (1841), and *Ueber Ursprung u. Bedeutung d. Pyrrh. Phil.* (1843); Wachsmuth, *De Timone Phliasio* (1859); Geffers, *De Arcesila* (1849); Norman MacColl, *Greek Sceptics from Pyrrho to Sextus* (1869); Haas, *De Philosophorum Scepticorum Successionibus* (1875). Among other works may be mentioned Ständlin, *Geschichte und Geist d. Scepticismus, vorzüglich in Rücksicht auf Moral u. Religion* (1794); Tafel, *Geschichte d. Scepticismus* (1834); E. Saisset, *Le Scepticisme: Ænésidème, Pascal, Kant* (1875). (A. SE.)

SCEPTRE. Though the sceptre is now used principally as one of the insignia of royalty, the word originally had a more extended meaning. Among the early Greeks the *σκῆπτρον* was simply a long staff used by aged men (*Il.* xviii. 416; Herod., i. 196), and thus came to be used as a sign of authority by officials of many kinds—judges, military leaders, priests, heralds, and others. It is frequently represented on Greek painted vases as a long staff, tipped with metal in some ornamental fashion, and is borne by some of the gods. Among the Etruscans sceptres of great magnificence were used by the kings and also by the upper orders in the priesthood. Many representations occur on the walls of the painted tombs of Etruria. Some specimens which still exist are among the finest examples known of ancient jewellery. The British Museum, the Vatican, and the Louvre possess Etruscan gold sceptres of the most minute and elaborate workmanship. Some of these are hollow gold batons, about nine to twelve inches long and half an inch in diameter, completely covered with that very delicate ornament for which the Etruscan goldsmiths were so famed, produced by soldering thousands of microscopically minute globules of gold arranged in rich patterns on to the plain gold cylinder which forms the ground. One magnificent specimen in the gold-ornament room of the British Museum has its top formed like a flower, with outer petals of beaten gold and an inner core made by a large emerald; it is of the greatest beauty both in workmanship and design.

The sceptre of the Romans, like most of their insignia of rank, is said to have been derived from the Etruscans. An old and more Latinized form of the word is *scipio* (see Liv. v. 41). Under the republic an ivory sceptre (*sceptrum eburneum*) was one of the marks of consular rank. It was also used by victorious generals who received the title of *imperator*, and this use still survives in the modern marshal's baton. In Roman paintings the long staff-like sceptre is frequently represented in the hands of Jupiter and Juno, as chief of the gods.

Under the empire the *sceptrum Augusti* (Suet., *Galba*, i.) was specially used by the emperors. It was often of ivory, tipped with a gold eagle (Juv., *Sat.* x. 43), and is frequently shown on medallions of the later empire, which have on the obverse a half-length figure of the emperor, holding in one hand the short eagle-tipped sceptre and in the other the orb surmounted by a small figure of Victory. The older staff-like form of sceptre still survived under the name *hasta pura;* it is shown on the reverses of many Roman coins in the hand of deities and of the emperor or empress, though originally the *hasta pura* had a very different use, being simply a mark of distinction given by Roman generals to soldiers who had shown unusual bravery (Tac., *Ann.* iii. 21). After the introduction of Christianity as the state religion, the imperial sceptre was frequently tipped with a cross instead of the eagle, though both were used. All through the Middle Ages both these forms survived, and sceptres of gold studded with jewels were used by most sovereigns of Europe. The gold sceptre of Charlemagne, a magnificent specimen of early jeweller's work, still exists among the regalia at Vienna. Some mediæval sceptres were of crystal or ivory mounted in gold. Several fine ancient examples existed among the regalia of England till after the death of Charles I., when the whole set were broken up and melted by order of the Parliament.

At the Restoration, four new sceptres were made for the coronation of Charles II. (see *Archæologia*,

xxix., p. 262); and these still exist among the regalia in the Tower. They are—(1) the so-called St. Edward's staff of gold, 4 feet 7 inches long, set with jewels, and surmounted with a cross and orb—a copy of the older one which contained in the orb a fragment of the true cross (this sceptre is borne in front of the sovereign during the processional part of the ceremony of coronation); (2) a gold sceptre tipped with a cross, which at the coronation is placed in the sovereign's right hand by the archbishop of Canterbury; (3) a similar sceptre tipped with a gold dove, which is placed in the sovereign's left hand;[1] (4) a small gold jewelled sceptre for the queen consort. Nos. (1) and (2) are both studded with diamonds. In addition to these four, there is a gold-mounted ivory sceptre, which was made for the queen of James II.; it is tipped with a gold dove and is studded with jewels. A sixth gold sceptre is that which was made for the queen at the coronation of William and Mary.

Among the Scottish regalia at Edinburgh a fine 15th-century gold sceptre still exists; and others of the same or earlier date are preserved among the royal insignia of several European countries.

SCHADOW, a distinguished name in the annals of German art.

I. Johann Gottfried Schadow (1764–1850), an eminent sculptor, was born in 1764 in Berlin, where his father was a poor tailor. His first teacher was an inferior sculptor, Tassaert, patronized by Frederick the Great; the master offered his daughter in marriage, but the pupil preferred to elope with a girl to Vienna, and the father-in-law not only condoned the offence but furnished money wherewith to visit Italy. The young man made the most of advantages which in those days fell to the lot of few: he gained in competition a prize for a group of Perseus and Andromeda; three years' study in Rome formed his style, and in 1788 he returned to Berlin to succeed his former master, Tassaert, as sculptor to the court and secretary to the Academy. Prussia in rising into a great kingdom had need for much sculpture, and Schadow brought timely talent and exceptional training. Over half a century, crowded with commissions, he persistently produced upwards of two hundred works, varied in style as in subjects. Among his ambitious efforts are Frederick the Great in Stettin, Blücher in Rostock, and Luther in Wittenberg. His portrait statues include Frederick the Great playing the flute, and the crown-princess Louise and her sister. His busts which reach a total of more than one hundred, comprise seventeen colossal heads in the Walhalla, Ratisbon; from the life were modelled Goethe, Wieland, and Fichte. Of church monuments and memorial works thirty are enumerated; yet Schadow hardly ranks among Christian sculptors. He is claimed by classicists and idealists: the quadriga on the Brandenburger Thor and the allegorical frieze on the façade of the Royal Mint, both in Berlin, are judged among the happiest growths from the antique. Fauns, nymphs, cupids, and figures of fancy, scattered among plain portrait work, kept alive to an advanced age early associations formed in Italy. Schadow, as director of the Berlin Academy, gave proof of intellectual powers which made him a leader and secured many and devoted followers. Personal influence he extended and fortified by his books. He wrote on the proportions of the human figure, on natural physiognomy, etc.; and many volumes by himself and others describe and illustrate his method and his work. He died, full of honors, at Berlin in 1850.

II. Rudolph Schadow (1786–1822), sculptor, son of the preceding, was born in Rome in 1786. His father, who returned to Berlin in 1788, was his first master. Rudolph in 1810 obtained the pension for Rome and received kindly help from Canova and Thorwaldsen. His talents were versatile: his first independent work was a figure of Paris, and it had for its companion a spinning girl. Following the example set by leading German artists then settled in Rome, he exchanged the Protestant for the Catholic faith, and gave pledge of his convictions by statues of John the Baptist and of the Virgin and Child. In England he became known by bas-reliefs executed for the duke of Devonshire and for the marquis of Lansdowne. His last composition, commissioned by the king of Prussia, was a colossal group, Achilles with the Body of Penthesilea; the model, universally admired for its antique character and the largeness of its style, had not been carried out in marble when in 1822 the artist died in Rome.

III. Friedrich Wilhelm Schadow (1789–1862), painter, born in 1789 in Berlin, was the second son of Johann Gottfried Schadow the sculptor, from whom he received his earliest instruction. In 1806–7 he served as a soldier; in 1810 he went with his elder brother Rudolph to Rome. He became one of the leaders among the German pre-Raphaelite brethren who eschewed classicism and the Italian Renaissance and sought to rebuild Christian art on the principles and practice of early and purer times. Following the examples of Overbeck and others, he joined the Catholic Church, and held that an artist must believe and live out the truths he essays to paint. The sequel showed that Schadow was qualified to shine less as a painter than as a teacher and director. The Prussian consul, General Bartholdi, befriended his young compatriots by giving them a commission to decorate with frescos a room 24 feet square in his house on the Pincian Hill. The artists engaged were Schadow, Cornelius, Overbeck, and Veit; the subject selected was the story of Joseph and his brethren, and two scenes, the Bloody Coat and Joseph in Prison, fell to the lot of Schadow. These well-studied and sound wall-paintings brought renown to the brethren, who were further fortified by the friendship of Niebuhr and Bunsen; the former writes: "They are all men of talent," and "Schadow is particularly refined and intellectual." Schadow was in 1819 appointed professor in the Berlin Academy, and his ability and thorough training gained devoted disciples. To this period belong pictures for churches. In 1826 the professor was made director of the Düsseldorf Academy, and so highly were his character and teachings esteemed that some of the best scholars accompanied their master. The high and sacred art matured in Rome Schadow transplanted to Düsseldorf; he reorganized the Academy, which in a few years grew famous as a centre of Christian art to which pupils flocked from all sides. In 1837 the director selected, at request, those of his scholars best qualified to decorate the chapel of St. Apollinaris on the Rhine with frescos, which when finished were accepted as the fullest and purest manifestation of the Düsseldorf school on its spiritual side. To 1842 belong the Wise and Foolish Virgins, in the Städel Institute, Frankfort; this large and important picture is carefully considered and wrought, but lacks power. Schadow's fame indeed rests less on his own creations than on the school he formed; he imparted to others nobility of conception, beauty of form, refinement and delicacy in expression and execution. Yet the master in Düsseldorf encountered opposition: a reaction set in against the spiritual and sacerdotal style he had established; a younger generation rose who stigmatized his system as narrow and bigoted; and in 1859 the party of naturalism and realism after a severe struggle drove the venerable director from his chair. Schadow died at Düsseldorf in 1862, and a monument in the platz which bears his name was raised at the jubilee held to commemorate his directorate. (J. B. A.)

SCHAFARIK (in Bohemian Safařík), Paul Joseph (1795–1861), was by origin a Slovak, and was born in 1795 at Kobeljarova, a village of northern

[1] Both these sceptres (or rather the older ones) were shown, one in each hand of the fine bronze effigy of Edward III. in Westminster Abbey, but as a rule royal effigies were represented with only one sceptre.

Hungary, where his father was a Protestant clergyman. It was not till his sixteenth year that any enthusiasm was aroused in him for the language and literature of his race. At this time an essay of Jungmann's fell into his hands, and at once gave a direction to his studies. His first production was a volume of poems in Bohemian entitled *The Muse of Tatra with a Slavonic Lyre*, published at Levocza in 1814. After this we find him collecting Slovak songs. In 1815 he began a course of study at the university of Jena, and while there translated into Czech the *Clouds* of Aristophanes and the *Maria Stuart* of Schiller. In 1817 he came to Prague and joined the literary circle of which Dobrovsky, Jungmann, and Hanka were members. In 1819 he was appointed headmaster of the high school at Neusatz (Novi Sad) in the south of Hungary; he remained occupied with the duties of this office till 1833. But besides his educational functions he busied himself with the study of Servian literature and antiquities, and acquired many rare books and manuscripts. In 1826 his *Geschichte der Slawischen Sprache und Literatur nach allen Mundarten* appeared at Pesth. This may truly be called an epoch-making book in the history of Slavonic studies. It was the first attempt to give anything like a systematic account of the Slavonic languages, the knowledge of which was at that time in such a rudimentary state that even Schafarik is not able to classify properly the Bulgarian language, but has grouped it with Servian. In 1833 appeared his *Serbische Lesekörner oder historisch-kritische Beleuchtung der Serbischen Mundart*, and in 1837 his great work *Slovanské Starožitnosti* ("Slavonic Antiquities"), by which he is at the present time best known. The "Antiquities" have been translated into Polish, Russian, and German, and we are promised an English version shortly from the pen of Mrs. Alexander Kerr. This valuable work was enlarged and improved in the second edition, which appeared among the collected works of Schafarik, edited by Jireček after the author's death. In 1840 he published in conjunction with Palacký *Die ältesten Denkmäler der Böhmischen Sprache*, in which he defended the authenticity of those Bohemian documents which have been declared spurious by some scholars. In the year 1837 poverty compelled him to accept the uncongenial office of censor of Czech publications, which he abandoned in 1847 on becoming custodian of the Prague public library. In 1842 he published his valuable work *Slovenský Národopis*, which gives a complete account of Slavonic ethnology. In 1848 he was made professor of Slavonic philology in the university of Prague, but resigned it in the following year, probably from causes in some way connected with the political troubles of that period, of which Prague was one of the centres. He was then made keeper of the university library, in which office he continued till his death in 1861. He had long been in broken health,—his pains of body being augmented by brain disease, which had been brought on by his severe literary labors and also by family anxieties. His latter days were devoted to philology, one of the chief subjects treated of by him being the antiquity of the Glagolitic alphabet, about which he held very different opinions at various periods of his life. He was also for some time conductor of the "Journal" of the Bohemian Museum, and edited the first volume of the *Vybor*, or selections from old Czech writers, which appeared under the auspices of the literary society in 1845. To this he prefixed a grammar of the Old Bohemian language. His correspondence with Pogodin has been published by Prof. Nil Popoff of Moscow among the letters of that eminent scholar.

Schafarik was a man of the purely literary type,—an indefatigable worker, an enthusiast, and a sincere patriot. The study of Slavonic philology and ethnology has advanced since his time, but the greater part of his work is permanent and monumental. Besides his collected writings (*Sebrané Spisy*), which were reprinted at Prague after his death during the years 1862–1865, a posthumous work by him also made its appearance, edited by J. Jireček, *Geschichte der Südslawischen Literatur*.

SCHAFFHAUSEN, in area (111.7 square miles) and actual population (38,348) the 19th and in relative density of population the 7th of the cantons of Switzerland, forms the most northern angle of the Swiss territory, and lies on the right or German side of the Rhine, which separates it from the cantons of Thurgau and Zurich. It is divided into three distinct portions by spurs of the grand-duchy of Baden, which also possesses the small enclave of Büsingen on the Rhine. Geologically it belongs for the most part to the Swabian Jura, and directly or indirectly it all drains to the Rhine, which forms its famous falls in the neighborhood of the chief town (see RHINE, vol. xx. p. 533). In the broad straths of the Klettgau vine-growing and agriculture go hand in hand (the wines of Hallau being in high repute); the more elevated districts of Rauden and Reyat (highest point 3040 feet above the sea) raise the grain-production of the canton above the home demand, and also provide large quantities of potatoes, hemp, and fruit. Under a careful régime the forests are recovering from a state of comparative exhaustion. The Schaffhausen cattle are partly Swabian and partly Swiss; Klettgau has a special breed of pigs of its own. Manufacturing industries have their best development at Schaffhausen-Neuhausen. The population, which increased from 35,300 in 1850 to 38,348 in 1880, is almost exclusively of German speech (230 individuals only using other languages). Protestants are to Roman Catholics as 8 to 1 (33,897 and 4154); the later are attached to the bishopric of Basel. Schaffhausen has been a member of the Swiss confederation since 1501. By the new constitution of 1876 it became remarkably democratic. The great council consists of representatives of the people elected for four years at the rate of one for every five hundred inhabitants. On the petition of any thousand of the electors, a measure may be introduced to the chamber or submitted to the direct vote of the citizens. The five members of the administration are also popularly elected. Education is well endowed, primary education being compulsory. A reformatory for destitute children is maintained at Friedeck, near Buch.

SCHAFFHAUSEN, the capital of the above canton, is situated on the bank of the Rhine, 30½ miles by rail west of Constance and 60 east of Basel, and communicates by a bridge with the village of Feuerthalen (1000 inhabitants) in Zurich. It is a city of contrasts —mediæval architecture of the true Swabian type and modern manufactures mingling curiously together. The cathedral, formerly the church of the abbey of All Saints (Allerheiligen), is a massive basilica founded in 1104 and completed in 1453; its great bell (1486) bears the inscription *Vivos voco, mortuos plango, fulgura frango*, which suggested Schiller's "Song of the Bell" and the opening of Longfellow's *Golden Legend*. On the Rebhügel above the town rises the castle of Munoth (1564–1590) with bomb-proof casemates, and a tower whose top is reached by a spiral ascent up which one can ride or drive. In Herrenacker Platz stands the Imthurneum, a building erected (1864) and presented to the town by a Swiss citizen, resident in London, for the "promotion of æsthetic and scientific culture;" it contains a theatre, concert-rooms, etc. The public library (28,000 volumes) possesses the printed and MS. collections of Johann von Müller, who was born at Schaffhausen in 1752, and his monument adorns the promenade of the Vessenstaub. In the museum is preserved the famous Keszlerlock "find." Among the industrial establishments of the city and vicinity are ironworks, wagon and carriage factories, woollen and cotton factories, breweries, distilleries, and champagne factories. The population of the commune was 10,303 in 1870 and 11,795 in 1880.

Schaffhausen (Latinized as *Scafusia* or Græcized into *Probatopolis*) first appears in the 9th century, and had already attained the rank of an imperial city in 1264.

SCHALCKEN, Godfried (1643–1706), genre and portrait painter, was born at Dort in 1643, and studied under Van Hoogstraten, and afterwards under Gerhard Douw, whose works his earlier genre-pictures very closely resemble. He visited England and painted several portraits, of which the half-length of William III., now in the Museum, Amsterdam, is a good example. In this work he shows an effect of candle-light, which he also introduced—frequently with fine effect—in many of his subject-pictures. These may be studied in the collections at Buckingham Palace, the Louvre, Vienna, and Dresden. He executed several Scriptural subjects—such as that of the Wise and Foolish Virgins, at Munich—of very indifferent merit. He died at The Hague in 1706.

SCHAMYL (*i.e.*, Samuel), prophet and hero of the Caucasian mountaineers, was born in 1797. See Caucasus, vol. v., p. 225. After his defeat and capture he passed ten years in Russia, where he was well treated. In 1870 he went on pilgrimage to Mecca, and died at Medina in March of the following year.

SCHANDAU, a small town of Saxony, is situated on the right bank of the Elbe, at the mouth of the little valley of the Kirnitzsch, 21 miles to the south-east of Dresden, and 4 miles from the Bohemian frontier. Its position in the heart of the romantic "Saxon Switzerland" gives it an importance to which on other grounds it is not entitled, and thousands of tourists make it their headquarters in summer. The stationary population in 1880 was 3301.

SCHARNHORST, Gerhard Johann David von (1756–1813), Prussian general, celebrated as the author of the so-called "Krümpersystem," or short-service system (see vol. ii., p. 519), by which the Prussian nation was prepared for the war of liberation, was a Hanoverian by birth, and served in the Hanoverian army from 1778 to 1801, when he passed into Prussian service, and soon became the leader in the reconstruction of its forces. In the war with France in 1813 he accompanied Blücher as chief of the general staff, but received a severe wound in the first battle (Grossgörschen), which soon after was followed by his death. The first part of an extensive and important biography of Scharnhorst by Lehmann has recently appeared (Leipsic, 1886).

SCHÄSSBURG (Hung. *Segesvár*), chief town of the Transylvanian county of Nagy-Küküllö, Hungary, stands on the river Nagy-Küküllö, 24 miles east-south-east of Maros-Vásárhely, in 46° 10′ N. lat., 24° 47′ E. long. It consists of two parts,—the one which formerly served as a fortress on the top of a hill, and the other in the valley below,—the two being connected by a covered passage. Schässburg is the seat of various public offices and of a district court of justice; its other institutions include a Franciscan convent, a Protestant upper gymnasium, a teachers' institute and seminary, two savings banks, a free library, hospital, barracks, etc. As a station on the eastern system of the Hungarian State Railways, Schässburg has a good woollen and linen trade, as well as exports of wine and fruit. Among its principal buildings an old Gothic church and the lofty town-hall are specially worthy of mention. The population in 1884 amounted to 8810, the majority being Germans (Saxons), and the remainder Roumanians and Hungarians.

Schässburg was founded by Saxon colonists at the end of the 12th century; its Latin name was *Castrum Sex*. The most important event in its history was the battle on the 31st July, 1849, in which the Hungarian army under Bem was defeated by the overwhelming numbers of the Russian General Lüders. The great national poet, Petöfi, was last seen, and is generally believed to have met his end, in this engagement.

SCHAUMBURG-LIPPE. See Lippe.

SCHEELE, Karl Wilhelm (1742–1786), an eminent chemist, was born at Stralsund, the capital of Pomerania, which then belonged to Sweden, on the 19th December, 1742. His father was a merchant, and Karl Wilhelm was the seventh of a family of eleven. In due time the boy was sent to school, but he did not care for the languages, and as he showed a strong taste for pharmacy he was apprenticed at the age of fourteen to an apothecary in Gothenburg, called Bauch, with whom he stayed for eight years. He was thoughtful and silent, and very punctual and precise in discharge of his duties. His spare time and great part of his nights were devoted to the experimental examination of the different bodies which he dealt with, and the careful study of the standard works on chemistry. By these means he acquired a large store of knowledge and great practical skill and manipulative dexterity. In 1765 he removed to Malmö, and resided for five years with Kalström, an apothecary, whence he removed to Stockholm, to Scharenberg, also an apothecary. While here he wrote out an account of his experiments with cream of tartar, from which he had isolated tartaric acid, and sent it to Bergman, the leading chemist in Sweden. Bergman somehow, neglected it, and this caused for a time a reluctance on Scheele's part to become acquainted with that savant, but the paper through the instrumentality of Retzius, was ultimately communicated to the Academy of Sciences at Stockholm. In 1771 Scheele finished an elaborate inquiry into the composition of the beautiful mineral fluor-spar, and showed that it consisted of lime and a peculiar acid which he called fluor acid. He misunderstood, however, the true character of the decomposition he had effected, and gave an erroneous explanation of it. His experiments had been conducted in glass vessels, and he was not aware that what he actually got was the fluo-silicic acid. This mistake was subsequently pointed out and corrected by some other chemists. He left Stockholm in 1773 and took up his residence at Upsala. Here he made the acquaintance of Gahn, assessor of mines at Fahlun, through whose mediation he was at length introduced to Bergman; the two soon became excellent friends. In 1774 Scheele published his epoch-making investigation into the black oxide of manganese, which had occupied him for two or three years, and in 1775 his memoirs on benzoic and arsenic acids. In the same year he left Upsala, in order to settle at Köping, a small place at the western extremity of Lake Mälar. Having heard that an apothecary's shop was vacant, he applied for it, passed a brilliant examination before the medical college, and was appointed. But, instead of a small flourishing business, he found that he had to face confusion and debt. Undismayed he set to work, introduced order and some prosperity, and in two years bought the business from the widow of the former proprietor. During this unfortunate period Scheele must have worked very hard, for in spite of debt and difficulties he published in 1777 his treatise upon *Air and Fire*, one of the most remarkable books in the whole range of chemical literature, whether its originality, its close reasoning, the number of discoveries which it contains, or the enormous amount of experimental work it represents be considered. About this time Bergman obtained for him from the Academy a grant, Scheele's appreciation of which was shown by his reserving one-sixth for his personal wants and devoting the remainder to his experiments.

Subsequent to this period, and for the remaining nine years of his life, the only events to be recorded are the papers which he composed. Every year he published two or three, and almost every one contained a capital discovery, either the explanation of a phenomenon or reaction previously misunderstood or the description of some new compounds. He was at the zenith of his now European fame as a profound chemist and unfailing experimenter, and in the best years of his life, when his career was suddenly arrested.

The common account is that his unremitting work, especially at night, exposing him to cold and draughts, induced a rheumatic attack, to which in the course of a couple of months he succumbed. Possibly his strength had been exhausted by long years of privation and neglect of himself. He had intended, as soon as his circumstances should enable him, to marry the widow of his predecessor. His illness, however, increased very fast, and it was on his death-bed that he carried out his design on the 19th May, 1786. Two days later he died, bequeathing to his wife what property he had acquired. He was only forty-four years of age.

The discoveries with which Scheele enriched chemistry are numerous and important. Reference has been already made to the discovery of tartaric acid and of the composition of fluor-spar. The analysis of manganese oxide in 1774 led him to the discovery of chlorine and of baryta (*terra ponderosa*, as it was called), to individualizing the salts of manganese itself, including the green and purple compounds with potash, and to the explanation of how manganese colors and decolorizes glass. In 1775 he showed how to prepare benzoic acid by precipitating it from a solution in lime, and he investigated arsenic acid and its reactions with differeut substauces discovering arseniuretted hydrogen and the green color "Scheele's green,"—a process for preparing which ou the large scale he published in 1778. Other researches of this period were concerned with the nature of quartz, clay, and alum, and with an animal concretion or calculus from which he got for the first time uric acid.

The treatise on *Air and Fire* appeared in 1777. It is unnecessary now to enter into Scheele's argument, for, however admirably it be worked out, it started from an erroneous basis, and it is equally impossible in limited space even to enumerate the experiments and the discoveries which fill this book, and which have remained as permanent acquisitions to science through all subsequent changes of theory. Amoug the most important of these is his demonstration that the air consists mainly of two gases, —one which supports the burning of bodies, the other which prevents it. This he showed both analytically and synthetically. His "empyreal," or "fire-air," or oxygen, he obtained for his synthesis from acid of nitre, from saltpetre, from black oxide of manganese, and from several other bodies. After the discovery of this substance Scheele applied it to account for a great number of actions, and especially for its function in respiration and the growth of plants. He went through a long series of actions, seemingly the most diverse in character, trying to bring them under one general law and making at every step the most acute and far-reaching observations and discovering new compounds and new reactions. Thus he incidentally made and described sulphuretted hydrogen gas, and he explained the chemical effect of light upon compounds of silver and other substances.

In 1778 he proposed a new method of making calomel and powder of algaroth. He also examined a mineral, *molybdæna nitens*, which had been supposed to contain lead, but which he showed was quite distinct, and he got from it molybdic acid. He demonstrated in 1779 that plumbago consists almost solely of carbon, and he published a record of estimations of the amount of pure air, *i. e.*, of oxygen, contained in the atmosphere, which he had carried on daily during the entire year of 1778. In 1780 he showed that the acidity of sour milk was due to a peculiar acid, now called lactic acid; and from milk sugar, by boiling it with nitric acid, he obtained mucic acid. His next discovery, in 1781, was the composition of tungsten, since called scheelite, which he found consisted of lime combined with a peculiar acid—tungstic acid. The following year he examined the mode of producing ether, and in 1783 discovered glycerin, the sweet principle of fats and oils. In 1782-1783 appeared a research which—of all those Scheele conducted—exhibits his experimental genius at its very best. By a wonderful succession of experiments he showed that the coloring matter of Prussian blue could not be produced without the presence of a substance of the nature of an acid, to which was ultimately given the name of prussic acid. He showed how this body was composed, described its properties and compounds, and mentioned its smell and taste, utterly unaware of its deadly character. Nothing but a study of Scheele's own memoir can give an adequate notion of the manner in which he attacked and solved a problem so difficult and complicated as this was at the period in the history of chemistry when Scheele lived. In 1784-85-86 he returned to the subject with which he had begun his career, that of the vegetable acids, and described four new ones—citric, malic, oxalic, and gallic acids.

The preceding is a bare list of the more prominent of Scheele's discoveries, for it must be remembered that he was not merely the first to prepare these bodies, but that he made all the compounds of them possible at the time and explained the conditions under which he produced them. Notable as is the list, and of supreme importance as are most of the bodies themselves, no conception can be gathered from it of Scheele's immense power of experimental research,—a power that has seldom, if ever, been surpassed. His natural endowments were cultivated by unwearied practice and undivided attention; for scientific work was at once his occupation and his relaxation. To appreciate this fully his own account of his researches must be studied. It will thus be seen that his discoveries were not made at haphazard, but were the outcome of experiments carefully planned to substantiate the accuracy of theoretical views at which he had arrived. He thus saved himself unnecessary labor; his experiments tell decisively on the question at issue, and he reached his conclusions by the shortest and simplest means. At the same time he left nothing in doubt if experiment would establish it; he grudged no labor to make the truth indisputable; and he evidently never considered his work complete about any body unless he could both unmake and remake it. For him chemistry was both an analytic and a synthetic science, and he shows this prominently in his researches on Prussian blue.

His accuracy, qualitative and quantitative,—considering his primitive apparatus, his want of assistance, his place of residence, the undeveloped state of chemical and physical science,—was unrivalled. The work he executed left hardly anything to be added to it; it was as thoroughly done as it was in the power of an all-conscientious man to do. The one aim of Scheele's life—and he never swerved from it—was the experimental discovery of the truth in nature. Like many other short-lived men of genius he compressed into his few years an amount of work of the greatest originality; but how he managed to do it is a mystery to the less-gifted. What he might have achieved had he lived a little longer can only be surmised; but it may be supposed that, under the newer theory of combustion to which he himself had unwittingly contributed so much, he would have made certainly no fewer and no less important discoveries than those which were the outcome of its erroneous predecessor.

Scheele's papers appeared first in the *Transactions* of the Swedish Academy of Sciences, in Crell's *Neue Entdeckungen* and *Annalen*, and in other periodicals. A list of them is given in Fuch's *Repertorium der chemischen Litteratur*, Jena, 1806 1808; in Renss's *Repertorium Commentationum*, vol. iii., Göttingen, 1803; and in Poggendorff's *Biographisch-literarisches Handwörterbuch*, 1863. They were collected and published in French, English, Latin, and German; *Memoires de Chymie*, 2 vols., Paris, 1785-88; *Chemical Essays*, by Thomas Beddoes, 1 vol., London, 1786; *Opuscula*, translated by Schäfer, edited by Hebenstreit, 2 vols., Leipsic, 1788-89; *Sämmtliche Werke*, edited by Hermbstädt, 2 vols., Berlin, 1793. The *Treatise on Air and Fire* appeared in German, Upsala and Leipsic, 1777, and again in 1782; in English, by J. R. Forster, London, 1780; in French, by Dietrich, Paris, 1781. (J. F.)

SCHEFFER, Ary (1795-1858), Dutch painter, who was born at Dort on 10th February, 1795, represents the sentimental phase of the Romantic movement in France. After the early death of his father, a poor painter, Ary was taken to Paris and placed in the studio of Guérin by his mother, a woman of great energy and character. The moment at which Scheffer left Guérin coincided with the commencement of the Romantic movement. He had little sympathy with the directions given to it by either of its most conspicuous representatives, Sigalon, Delacroix, or Gericault, and made various tentative efforts—Gaston de Foix (1824), Suliot Women (1827)—before he found his own path. Immediately after the exhibition of the last-named work he turned to Byron and Goethe, selecting from *Faust* a long series of subjects which had an extraordinary vogue. Of these, we may mention Margaret at her Wheel; Faust Doubting: Margaret at the Sabbat; Margaret Leaving Church; the Garden Walk; and lastly, perhaps the most popular of all, Margaret at the Well. The two Mignons appeared in 1836; and Francesca da Rimini, which is on the whole Scheffer's best work, belongs to the same period. He now turned to religious subjects: Christus Consolator (1836) was followed by Christus Remunerator,

the Shepherds Led by the Star (1837), The Magi Laying Down their Crowns, Christ in the Garden of Olives, Christ Bearing his Cross, Christ Interred (1845), St. Augustine and Monica (1846), after which he ceased to exhibit, but, shut up in his studio, continued to produce much which was first seen by the outer world after his death, which took place at Argenteuil on the 15th June, 1858. At the posthumous exhibition of his works there figured the Sorrows of the Earth, and the Angel Announcing the Resurrection, which he had left unfinished. Amongst his numerous portraits those of La Fayette, Béranger, Lamartine, and Marie Amélie were the most noteworty. His reputation, much shaken by this posthumous exhibition, was further undermined by the sale of the Paturle Gallery, which contained many of his most celebrated achievements; the charm and facility of their composition could not save them from the condemnation provoked by their poor and earthy color and vapid sentiment. Scheffer, who married the widow of General Baudrand, was only made commander of the Legion of Honor in 1848,—that is, after he had wholly withdrawn from the Salon. His brother Henri, born at The Hague 27th September, 1798, was also a fertile painter.

See Vitet's notice prefixed to Bingham's publication of works of A. Scheffer; Étex, *Ary Scheffer;* Mrs. Grote, *Life of A. Scheffer;* Julius Meyer's *Geschichte der französischen Kunst.*

SCHELDT, or SCHELDE (Fr. *Escaut*, Lat. *Scaldis*, O. Dutch *Schoude* or *Schouwe*), a river of north-west Europe, belonging for 75 miles of its course to France, 137 to Belgium, and 37 to the Netherlands. Rising at a height of 295 feet above the sea, in a small lake (7 square miles) at the old Abbey of St. Martin, near Catelet, in the French department of Aisne (Picardy), it becomes navigable by the junction of the St. Quentin Canal, below Catelet, and passes by Cambray, Denain (where it receives the Selle), Valenciennes, at the mouth of the Rouelle, Condé, at the mouth of the Haisne or Henne, and Château l'Abbaye, at the mouth of the Scarpe. Entering Belgium between Mortagne and Hollain, it continues by Fontenoy, Tournay, and Oudenarde to Ghent, where it is joined by the Lys from the left, and by the canals which unite this town with Sas and Bruges. At Ghent the tide rises 3½ feet and lasts for four hours; and it would ascend much farther were it not for sluices. But the river, instead of proceeding straight towards the sea, as it appears to have done perhaps as late as the time of Charlemagne, makes a great bend towards the east to Dendermonde (the mouth of the Dender) and Antwerp, whence it again turns north-west and loses itself in the estuaries among the islands of Zealand. The whole of the lowlands to the north of Ghent are so intersected with canals, and the natural channels are so intermingled with those partially or entirely artificial, that it is impossible to discover with certainty what has been the real history of the lower course of the Scheldt.[1] The Hont or Western Scheldt, the principal estuary by which nearly all Belgium commerce is conveyed, was probably opened up by a storm in 1173, and about 1058 must have been a mere narrow creek. The Eastern Scheldt, which then received most of the river, has gradually diminished in importance, and since the construction of the railway bridge across it between the mainland and South Beveland in 1867 has become completely obstructed with sands. At Antwerp the depth at high water is 49 feet.

Between 1648 and 1792 the Dutch closed the mouths of the Scheldt against foreign commerce. The emperor Joseph of Austria, at that time ruler of Antwerp, protested against this action in 1783, but in 1784, by the treaty of Fontainebleau, he recognized, in return for concessions of territory and 9½ million florins [$3,895,000], the right of the Dutch to adhere to the terms of the peace of Westphalia. In 1792 by conquest of Dumouriez, and in 1795 by treaty between France and Holland, the Scheldt was declared open. During the union of Holland and Belgium the question naturally lay in abeyance. When Belgium became independent (1839)[2] Holland so far resumed her exclusive policy, but in 1863 the dues which she was allowed to levy by the treaty of separation were capitalized by Belgium paying 17,141,640 florins [$7,028,072.40], a sum which was largely repaid to Belgium by twenty other countries who felt they had an interest in the free navigation of the Scheldt. Great Britain's share was 8,782,320 francs [$1,694,987.76].

See Vifquain, *Des Voies Navigables en Belgique*, 1842; Wauvermans, "Sur les Variations de l'Escaut au XVI. siècle," in *Bull. de la Soc. de Géogr. d'Anvers*, vol. i.; Raemdonck, "L'Hist. du Cours de l Escaut," and Verstraete, "Cours Primitif de l'Escaut," both in *Bull. de la Soc. Belge de Géogr.*, 1878.

SCHELLING, FRIEDRICH WILHELM JOSEPH VON (1775–1854), a distinguished German philosopher, was born on 27th January, 1775, at Leonberg, a small town of Würtemberg, otherwise notable as scene of the early years of Kepler's life. Through both parents he was connected with familes of distinction in the Protestant church community. His father, a solidly trained scholar of Oriental languages, was called in 1777 as chaplain and professor to the cloister school of Bebenhausen, near Tübingen, a preparatory seminary for intending students of theology at Tübingen. Here Schelling received his earliest education and gave the first evidences of what afterwards so eminently distinguished him, remarkable precocity and quickness of intellect. From the Latin school at Nürtingen, whither he had been sent in his tenth year, he was returned in two years as having already acquired all the school could give him, and his father with regret was compelled to allow him at so abnormally a young age to study with the seminarists at Bebenhausen. In 1790, with special permission, for he was yet three years under the prescribed age, Schelling entered the theological seminary at Tübingen, where he had as fellow students, contemporary as scholars though elder in years, Hegel and Hölderlin. The character and direction of his studies may be gathered sufficiently from the titles of the essays which for various purposes were accomplished during the five years of his student career. In 1792 he graduated in the philosophical faculty with a thesis *Antiquissimi de prima malorum humanorum origine philosophematis explicandi tentamen criticum et philosophicum;* in 1793 he contributed to Paulus's *Memorabilien* a paper *Ueber Mythus, historische Sagen, und Philosopheme der ältesten Welt;* and in 1795 his thesis for his theological degree was *De Marcione Paullinarum epistolarum emendatore.* The influence of these early studies over his later literary career has been often exaggerated, but doubtless they contributed to strengthen his natural tendency to dwell rather on the large historico-speculative problems than on the difficulties of abstract thinking. Before the date of his last essay noted above, a new and much more important influence had begun to operate on him. In conjunction with some of his fellow-students he was in 1793 studying the Kantian system. The difficulties or imperfections of that system he claims soon to have perceived, and no doubt the perception was quickened by acquaintance with the first of those writtings in which Fichte put forward his amended form of the critical philosophy. The "Review of Æneside-mus" and the tractate *On the Notion of Wissenschaftslehre* found in Schelling's mind most fruitful soil. With characteristic zeal and impetuosity Schelling had no sooner grasped the leading ideas of Fichte's new mode of treating philosophy than he threw together the thoughts suggested to him in the form of an essay, which appeared, under the title *Ueber die Möglichkeit einer Form der Philosophie überhaupt*, towards the end of 1794. There was

[1] Bylandt, Belpaire, Renard, and Wauvermans impugn, and Des Roches, Vifquain, Van Raemdonck and Verstraete maintain, the existence within historic times of a direct main-river channel from Ghent northward to the sea.

[2] [Belgium declared her independence in 1830 and Leopold I. began to reign the next year. See vol. iii. pp. 456—AM. ED.]

nothing original in the treatment, but it showed such power of appreciating the new ideas of the Fichtean method that it was hailed with cordial recognition by Fichte himself, and gave the author immediately a place in popular estimation as in the foremost rank of existing philosophical writers. The essay was followed up in 1795 by a more elaborate writing, *Vom Ich als Princip der Philosophie, oder über das Unbedingte im menschlichen Wissen*, which, still remaining within the limits of the Fichtean idealism, yet exhibits unmistakable traces of a tendency to give the Fichtean method a more objective application, and to amalgamate with it Spinoza's more realistic view of things.

The reputation so quickly gained led soon to its natural result. In midsummer, 1798, Schelling was called as extraordinary professor of philosophy to Jena, and thus stepped into the most active literary and philosophical circle of the time. The intervening period had not been unfruitful. While discharging for two years at Leipsic the duties of companion or tutorial guardian to two youths of noble family, Schelling had contributed various articles and reviews to Fichte and Niethammer's *Journal*, and had thrown himself with all his native impetuosity into the study of physical and medical science. From 1796 date the *Briefe über Dogmatismus und Kriticismus*, an admirably written critique of the ultimate issues of the Kantian system, which will still repay study; from 1797 the essay entitled *Neue Deduction des Naturrechts*, which to some extent anticipated Fichte's treatment in the *Grundlage des Naturrechts*, published in 1796, but not before Schelling's essay had been received by the editors of the *Journal*. The reviews of current philosophical literature were afterwards collected, and with needful omissions and corections appeared under the title "Abhandlungen zur Erläuterung des Idealismus der Wissenschaftslehre" in Schelling's *Philos. Schriften*, vol. i., 1809. The studies of physical science bore rapid fruit in the *Ideen zu einer Philosophie der Natur*, 1797, and the treatise *Von der Weltseele*, 1798, the drift of which will be noted later.

Schelling's professoriate in Jena lasted till the early part of 1803. His lectures were extraordinarily attractive; his productive powers were at their best; and the circumstances of his surroundings developed forcibly the good and evil qualties of his character. Of his writings during this period a merely chronological notice will meanwhile suffice. In 1799 appeared the *Erster Entwurf eines Systems der Naturphilosophie*, with an independent and subsequent *Einleitung;* in 1800 the *System des transcendentalen Idealismus*, in form one of the most finished, in substance one of the most satisfactory of his works; in the same year, in the *Zeitschrift für spekulative Physik*, edited by him, "Allgemeine Deduction des dynamischen Processes"; and in 1801 the *Darstellung meines Systems der Philosophie;* in 1802, in the *Neue Zeitschr. für spek. Physik*, the "Fernere Darstellungen aus dem System der Philosophie"; also in 1802 the dialogue *Bruno* and the excellently written *Vorlesungen über die Methode des akademischen Studiums.* In conjunction with Hegel, who in 1801 at Schelling's invitation had come to Jena, he edited the *Kritisches Journal für Philosophie*, the greater part of which was written by Hegel. Regarding the authorship of certain articles in the volume and a half of this *Journal* a discussion of no great significance has arisen, concerning which perhaps the best statement is that by Schelling's son in the preface to vol. v. of the *Sämmtliche Werke*, Abth. i.

The philosophical renown of Jena reached its culminating point during the years of Schelling's residence there, in no small measure through the imposing force of his character and teaching. Recognized as of the first rank among living thinkers he was received with every mark of distinction, and his intellectual sympathies soon united him closely with some of the most active literary tendencies of the time. With Goethe, who viewed with interest and appreciation the poetical fashion of treating fact characteristic of the *Naturphilosophie*, he continued on excellent terms, while on the other hand he was repelled by Schiller's less expansive disposition, and failed altogether to understand the lofty ethical idealism that animated his work. By the representatives of the Romantic school, then in the height of their fervor and beginning their downward course, he was hailed as a most potent ally, and quickly became *par excellence* the philosopher of the Romantic type. The Schlegels and their friends who had found at least one fundamental principle of Romantic strain in Fichte, had begun to be dissatisfied with the cold and abstract fashion of viewing nature that seemed necessarily to follow from the notion of the *Wissenschaftslehre*, and at the same time the deep-seated antagonism of character between Fichte and the impetuous literatteurs of the Romantic school was beginning to be felt. In Schelling, essentially a self-conscious genius, eager and rash, yet with undeniable power, they hailed a personality of the true Romantic type, and in his philosophy a mode of conceiving nature adequate to the needs of poetic treatment. During the Jena period the closest union obtained between Schelling and those who either at Jena or at Berlin carried on warfare for the Romantic idea. With August Wilhelm Schlegel and his gifted wife Caroline, herself the embodiment of the Romantic spirit, Schelling's relations were of the most intimate kind. Personal acquaintance made at Dresden before Schelling began his professorial career at Jena rapidly developed into a warm friendship, to which circumstances soon gave a new and heightened color. Caroline Schlegel, a woman of remarkable receptive and appreciative power, emotional to excess, and full of the ardent ill-balanced sympathies that constituted the Romantic tone, felt for Schelling unbounded admiration. In him she found the philosophic view which gave completeness and consistency to the tumultuous literary and personal feelings that animated her, and she was not less attracted by the dominating force of his personal character. It is probable that in the early stages of their friendship a future marriage between Schelling and Caroline's young daughter, Auguste Böhmer, was, if not definitely understood, yet vaguely contemplated by both, and that in consequence neither was fully aware of the nature of the feelings springing up between them. The untimely death of Auguste in the summer of 1800, a death in which Schelling's rash confidence in his medical knowledge was unfortunately involved, while a severe blow to both, drew them much more closely together, and in the following year, A. W. Schlegel having removed to Berlin, and Caroline remaining in Jena, affairs so developed themselves that quietly, amicably, and in apparently the most friendly manner, a divorce was arranged and carried to its completion in the early summer of 1803. On the 2d June of the same year Schelling and Caroline, after a visit to the former's father, were married, and with the marriage Schelling's life at Jena came to an end. It was full time, for Schelling's undoubtedly overweening self-confidence and most arrogant mode of criticism had involved him in a series of virulent disputes and quarrels at Jena, the details of which are in themselves of little or no interest, but are valuable as illustrations of the evil qualities in Schelling's nature which deface much of his philosophic work. The boiling fervor which the Romanticists prized is deplorably ineffective in the clear cold atmosphere of speculation.

A fresh field was found in the newly-constituted university of Würzburg, to which he was called in September, 1803, as professor of "Naturphilosophie," and where he remained till April, 1806, when the Napoleonic conquests compelled a change. The published writings of this period (*Philosophie und Religion*,

1804, and *Ueber das Verhältniss des Realen und Idealen in der Natur*, 1806), and still more the unpublished draft of his lectures as continued in volumes v. and vi. of the *Sämmtliche Werke*, exhibit an important internal change in his philosophic views, a change which was accentuated by the open breach on the one hand with Fichte and on the other hand with Hegel. Schelling's little pamphlet *Darlegung des wahren Verhältnisses der Naturphilosophie zur verbesserten Fichtischen Lehre* was the natural sequel to the difference which had brought the correspondence of the former friends to a close in 1803, and to Fichte's open condemnation in the *Grundzüge d. gegenwärt. Zeitalters.* Hegel's preface to the *Phänomenologie des Geistes* was in like manner the sequel to the severe treatment which in his Jena lectures he had bestowed on the emptiness of the Schellingian method, and with the appearance of that work correspondence and friendship between the two ceased, and in Schelling's mind there remained a deeply rooted sense of injury and injustice.

The Würzburg professoriate had not been without its inner trials. Schelling had many enemies, and his irreconcilable and lofty tone of dealing with them only increased the virulence of their attacks. He embroiled himself with his colleagues and with the Government, so that it was doubtless with a sense of relief that he found external events bring his tenure of the chair to a close. In Munich, to which with his wife he removed in 1806, he found a long and quiet residence. A position as state official, at first as associate of the academy of sciences and secretary of the academy of arts, afterwards as secretary of the philosophical section of the academy of sciences, gave him ease and leisure. Without resigning his official position he lectured for a short time at Stuttgart, and during seven years at Erlangen (1820–27). In 1809 Caroline died, and three years later Schelling married one of her closest, most attached friends, Pauline Gotter, in whom he found a true and faithful companion.

During the long stay at Munich (1806–1841) Schelling's literary activity seemed gradually to come to a standstill. The "Aphorisms on Naturphilosophie" contained in the *Jahrbücher der Medicin als Wissenshaft* (1806–8) are for the most part extracts from the Würzburg lectures; and the *Denkmal der Schrift von den gottlichen Dingen des Herrn Jacobi* was drawn forth by the special incident of Jacobi's work. The only writing of significance is the "Philosophische Untersuchungen über das Wesen der menschlichen Freiheit," which appeared in the *Philosophische Schriften*, vol. i. (1809), and which carries out, with increasing tendency to mysticism, the thoughts of the previous work, *Philosophie und Religion.* In 1815 appeared the tract *Ueber die Gottheiten zu Samothrake*, ostensibly a portion of the great work, *Die Weltalter*, on which Schelling was understood to be engaged, a work frequently announced as ready for publication, but of which no great part was ever written. Probably it was the overpowering strength and influence of the Hegelian system that constrained Schelling to so long a silence, for it was only in 1834, after the death of Hegel, that, in a preface to a translation by H. Beckers of a work by Cousin, he gave public utterance to the antagonism in which he stood to the Hegelian and to his own earlier conceptions of philosophy. The antagonism certainly was not then a new fact; the Erlangen lectures on the history of philosophy (*Sämmt. Werke*, x. 124–5) of 1822 express the same in a pointed fashion, and Schelling had already begun the treatment of mythology and religion which in his view constituted the true positive complement to the negative of logical or speculative philosophy. Public attention which had been from time to time drawn to Schelling's prolonged silence, was powerfully attracted by these vague hints of a new system which promised something more positive, as regards religion in particular, than the apparent results of Hegel's teaching. For the appearance of the critical writings of Strauss, Feuerbach, and Bauer, and the evident disunion in the Hegelian school itself, had alienated the sympathies of many from the then dominant philosophy. In Berlin particularly, the headquarters of the Hegelians, the desire found expression to obtain officially from Schelling a treatment of the new system which he was understood to have in reserve. The realization of the desire did not come about till 1841, when the appointment of Schelling as Prussian privy councillor and member of the Berlin Academy, gave him the right, a right he was requested to exercise, to deliver lectures in the university. The opening lecture of his course was listened to by a large and most appreciative audience; and thus, in the evening of his career, Schelling found himself, as often before, the centre of attraction in the world of philosophy. The enmity of his old foe H. E. G. Paulus, sharpened by Schelling's apparent success, led to the surreptitious publication of a verbatim report of the lectures on the philosophy of revelation, and, as Schelling did not succeed in obtaining legal condemnation and suppression of this piracy, he in 1845 ceased the delivery of any public courses. No authentic information as to the nature of the new positive philosophy was obtained till after his death in 1854, when his sons began the issue of his collected writings with the four volumes of Berlin lectures: vol. i., *Introduction to the Philosophy of Mythology* (1856); ii., *Philosophy of Mythology* (1857); iii. and iv., *Philosophy of Revelation* (1858).

Whatever judgment one may form of the total worth of Schelling as a philosopher, his place in the history of that important movement called generally German philosophy is unmistakable and assured. It happened to him, as he himself claimed, to turn a page in the history of thought, and one cannot ignore the actual advance upon his predecessor achieved by him or the brilliant fertility of the genius by which that achievement was accomplished. On the other hand it is not to be denied that Schelling, to whom an unusually long period of activity was accorded, nowhere succeeds in attaining the rounded completeness of scientific system. His philosophical writings, extended over more than half a century, lie before us, not as parts of one whole, but as the successive manifestations of a restless highly endowed spirit, striving continuously but unsuccessfully after a solution of its own problems. Such unity as they possess is a unity of tendency and endeavor; they are not parts of a whole, and in some respects the final form they assumed is the least satisfactory of all. Hence it has come about that Schelling remains for the philosophic student but a moment of historical value in the development of thought, and that his works have for the most part ceased now to have more than historic interest. Throughout his thinking bears the painful impress of hurry, incompleteness, and spasmodic striving after an ideal which could only be attained by patient, laborious, and methodic effort. Brilliant contributions there are without doubt to the evolution of a philosophic idea, but no systematic fusion of all into a whole. It is not unfair to connect the apparent failings of Schelling's philosophizing with the very nature of the thinker and with the historical accidents of his career. In the writings of his early manhood, for example, more particularly those making up *Naturphilosophie*, one finds in painful abundance the evidences of hastily-acquired knowledge, impatience of the hard labor of minute thought, over-confidence in the force of individual genius, and desire instantaneously to present even in crudest fashion the newest idea that has dawned upon the thinker. Schelling was prematurely thrust into the position of a foremost productive thinker; and when the lengthened period of quiet meditation was at last forced upon him there unfortunately lay before him a system which achieved what had dimly been involved in his ardent and impetuous desires. It is not possible to acquit Schelling of a certain disingenuousness in regard to the Hegelian philosophy; and if we claim for him perfect disinterestedness of view we can do so only by imposing on him the severe condemnation of deficient insight.

It was a natural concomitant of this continuous hurry under which Schelling's successive efforts at constructive work were carried out that he should have been found at all stages supporting himself by calling to his aid the forms of some other system. The successive phases of his development might without injustice be characterized by reference to these external supports. Thus Fichte, Spinoza,

Jakob Boehme and the Mystics, and finally, the great Greek thinkers with their Neoplatonic, Gnostic, and Scholastic commentators, give respectively coloring to particular works in which Schelling unfolds himself. At the same time it would be unjust to represent Schelling as merely borrowing from these external sources. There must be allowed to him genuine philosophic spirit and no small measure of philosophic insight. Of the philosophic *afflatus* he was in no want; and it might be fairly added that, under all the differences of exposition which seem to constitute so many differing Schellingian systems, there is one and the same philosophic effort and spirit. But what Schelling did want was power to work out scientifically, methodically, the ideas with which his spirit was filled and mastered. Hence he could only find expression for himself in forms of this or that earlier philosophy, and hence, too, the frequent formlessness of his own thought, the tendency to relapse into mere impatient despair of ever finding an adequate vehicle for transmitting thought.

It is thus, moreover, a matter of indifference how one distributes or classifies the several forms and periods of Schelling's philosophic activity. Whether one adopts as basis the external form, *i.e.*, the foreign mode of speculation laid under contribution, or endeavors to adhere closely to inner differences of view, the result is very much the same. There is one line of speculative thought, in the development of which inevitable problems call for new methods of handling, while the results only in part can claim to have a place accorded to them in the history of philosophy. It is fair in dealing with Schelling's development to take into account the indications of his own opinion regarding its more significant momenta. In his own view the turning points seem to have been—(1) the transition from Fichte's method to the more objective conception of nature,—the advance, in other words, to *Naturphilosophie;* (2) the definite formulation of that which implicitly, as Schelling claims, was involved in the idea of *Naturphilosophie*, viz., the thought of the identical, indifferent, absolute substratum of both nature and spirit, the advance to *Identitätsphilosophie;* (3) the opposition of negative and positive philosophy, an opposition which is the theme of the Berlin lectures, but the germs of which may be traced back to 1804, and of which more than the germs are found in the work on freedom of 1809. Only what falls under the first and second of the divisions so indicated can be said to have discharged a function in developing philosophy; only so much constitutes Schelling's philosophy proper. A very brief notice of the characteristic features of the three studia must here suffice.

(1) *Naturphilosophie.*—The Fichtean method had striven to exhibit the whole structure of reality as the necessary implication of self-consciousness. The fundamental features of knowledge, whether as activity or as sum of apprehended fact, and of conduct had been deduced as elements necessary in the attainment of self-consciousness. Fichtean idealism therefore at once stood out negatively, as abolishing the dogmatic conception of the two real worlds, subject and object, by whose interaction cognition and practice arise, and as amending the critical idea which retained with dangerous caution too many fragments of dogmatism; positively, as insisting on the unity of philosophical interpretation and as supplying a key to the form or method by which a completed philosophic system might be constructed. But the Fichtean teaching appeared on the one hand to identify too closely the ultimate ground of the universe of rational conception with the finite, individual spirit, and on the other hand to endanger the *reality* of the world of nature by regarding it too much after the fashion of subjective idealism, as mere moment, though necessitated, in the existence of the finite thinking mind. It was almost a natural consequence that Fichte never succeeded in amalgamating with his own system the æsthetic view of nature to which the *Kritik of Judgment* had pointed as an essential component in any complete philosophy.

From Fichte's position Schelling started. From Fichte he derived the ideal of a completed whole of philosophic conception; from Fichte he derived the formal method to which for the most part he continued true. The earliest writings tended gradually towards the first important advance. Nature must not be conceived as merely abstract limit to the infinite striving of spirit, as a mere series of necessary thoughts for mind. It must be that and more than that. It must have reality for itself, a reality which stands in no conflict with its ideal character, a reality the inner structure of which is ideal, a reality the root and spring of which is spirit. Nature as the sum of that which is objective, intelligence as the complex of all the activities making up self-consciousness, appear thus as equally real, as alike exhibiting ideal structure, as parallel with one another. The philosophy of nature and transcendental philosophy are the two complementary portions of philosophy as a whole.

Animated with this new conception Schelling made his hurried rush to *Naturphilosophie*, and with the aid of Kant and of fragmentary knowledge of contemporary scientific movements, threw off in quick succession the *Ideen*, the *Weltseele*, and the *Erster Entwurf*. *Naturphilosophie*, which thus became an historical fact, has had scant mercy at the hands of modern science; and undoubtedly there is much in it, even in that for which Schelling alone is responsible, for which only contempt can be our feeling. Schelling, one must say, had neither the strength of thinking nor the acquired knowledge necessary to hold the balance between the abstract treatment of cosmological notions and the concrete researches of special science. His efforts after a construction of natural reality are bad in themselves and gave rise to a wearisome flood of perfectly useless physical speculation. Yet it would be unjust to ignore the many brilliant and sometimes valuable thoughts that are scattered throughout the writings on *Naturphilosophie*,—thoughts to which Schelling himself is but too frequently untrue. Regarded merely as a criticism of the notions with which scientific interpretation proceeds, these writings have still importance and might have achieved more had they been untainted by the tendency to hasty, ill-considered, *a priori* anticipations of nature.

Nature, as having reality for itself, forms one completed whole. Its manifoldness is not then to be taken as excluding its fundamental unity; the divisions which our ordinary perception and thought introduce into it have not absolute validity, but are to be interpreted as the outcome of the single formative energy or complex of forces which is the inner aspect, the soul of nature. Such inner of nature we are in a position to apprehend and constructively to exhibit to ourselves in the successive forms which its development assumes, for it is the same spirit, though unconscious, of which we become aware in self-consciousness. It is the realization of spirit. Nor is the variety of its forms imposed upon it from without; there is neither external teleology in nature, nor mechanism in the narrower sense. Nature is a whole and forms itself; within its range we are to look for no other than natural explanations. The function of *Naturphilosophie* is to exhibit the ideal as springing from the real, not to deduce the real from the ideal. The incessant change which experience brings before us, taken in conjunction with the thought of unity in productive force of nature, leads to the all-important conception of the duality, the polar opposition through which nature expresses itself in its varied products. The dynamical series of stages in nature, the forms in which the ideal structure of nature is realized, are matter, as the equilibrium of the fundamental expansive and contractive forces; light, with its subordinate processes,—magnetism, electricity, and chemical action; organism, with its component phases of reproduction, irritability, and sensibility.[1]

Just as nature exhibits to us the series of dynamical stages of processes by which spirit struggles towards consciousness of itself, so the world of intelligence and practice, the world of mind, exhibits the series of stages through which self-consciousness with its inevitable oppositions and reconciliations develops in its ideal form. The theoretical side of inner nature in its successive grades from sensation to the highest form of spirit, the abstracting reason which emphasizes the difference of subjective and objective, leaves an unsolved problem which receives satisfaction only in the practical, the individualizing activity. The practical, again, taken in conjunction with the theoretical, forces on the question of the reconciliation between the free conscious organization of thought and the apparently necessitated and unconscious mechanism of the objective world. In the notion of a teleological connection and in that which for spirit is its subjective expression, viz., art and genius, the subjective and objective find their point of union.

(2) Nature and spirit, *Naturphilosophie* and *Transcendentalphilosophie*, thus stand as two relatively complete, but complementary parts of the whole. It was impossible for Schelling, the animating principle of whose thought was ever the reconciliation of differences, not to take and to take speedily the step towards the conception of the uniting basis of which nature and spirit are manifestations, forms, or consequences. For this common basis, however, he did not succeed at first in finding any other than the merely negative expression of indifference. The identity, the absolute, which underlay all difference, all the relative, is

[1] The briefest and best account in Schelling himself of *Naturphilosophie* is that contained in the *Einleitung zu dem Erster Entwurf* (*S. W.*, iii.). The fullest and most lucid statement of *Naturphilosophie* is that given by K. Fischer in his *Gesch. d. n. Phil.*, vi. 433–692.

to be characterized simply as *neutrum*, as absolute undifferentiated self-equivalence. It lay in the very nature of this thought that Spinoza should now offer himself to Schelling as the thinker whose form of presentation came nearest to his new problem. The *Darstellung meines Systems*, and the more expanded and more careful treatment contained in the lectures on *System der gesammten Philosophie und der Naturphilosophie insbesondere* given in Würzburg, 1804 (published only in the *Sämmtliche Werke*, vol. vi. p. 131–576), are thoroughly Spinozistic in form, and to a large extent in substance. They are not without value, indeed, as extended commentary on Spinoza. With all his efforts, Schelling does not succeed in bringing his conceptions of nature and spirit into any vital connection with the primal identity, the absolute indifference of reason. No true solution could be achieved by resort to the mere absence of distinguishing, differencing feature. The absolute was left with no other function than that of removing all the differences on which thought turns. The criticisms of Fichte, and more particularly of Hegel (in the "Vorrede" to the *Phänomenologie des Geistes*), point to the fatal defect in the conception of the absolute as mere featureless identity.

(3) Along two distinct lines Schelling is to be found in all his later writings striving to amend the conception, to which he remained true, of absolute reason as the ultimate ground of reality. It was necessary, in the first place, to give to this absolute a *character*, to make of it something more than empty sameness; it was necessary, in the second place, to clear up in some way the relation in which the actuality or apparent actuality of nature and spirit stood to the ultimate real. Schelling had already (in the *System der ges. Phil.*) begun to endeavor after an amalgamation of the Spinozistic conception of substance with the Platonic view of an ideal realm, and to find therein the means of enriching the bareness of absolute reason. In *Bruno*, and in *Philos. u. Religion*, the same thought finds expression. In the realm of ideas the absolute finds itself, has its own nature over against itself as objective over against subjective, and thus is in the way of overcoming its abstractness, of becoming concrete. This conception of a difference, of an internal structure in the absolute, finds other and not less obscure expressions in the mystical contributions of the *Menschliche Freiheit* and in the scholastic speculations of the Berlin lectures on mythology. At the same time it connects itself with the second problem, how to attain in conjunction with the abstractly rational character of the absolute an explanation of actuality. Things,—nature and spirit,—have an actual being. They exist not merely as logical consequence or development of the absolute, but have a stubbornness of being in them, an antagonistic feature which in all times philosophers have been driven to recognize, and which they have described in varied fashion. The actuality of things is a defection from the absolute, and their existence compels a reconsideration of our conception of God. There must be recognized in God as a completed actuality, a dim, obscure ground or basis, which can only be described as not yet being, but as containing in itself the impulse to externalization, to existence. It is through this ground of Being in God Himself that we must find explanation of that independence which things assert over against God. And it is easy to see how from this position Schelling was led on to the further statements that not in the rational conception of God is an explanation of existence to be found, nay, that all rational conception extends but to the form, and touches not the real,—that God is to be conceived as act, as will, as something over and above the rational conception of the divine. Hence the stress laid on will as the realizing factor, in opposition to thought, a view through which Schelling connects himself with Schopenhauer and Von Hartmann, and on the ground of which he has been recognized by the latter as the reconciler of idealism and realism. Finally, then, there emerges the opposition of negative, *i.e.*, merely rational philosophy, and positive, of which the content is the real evolution of the divine as it has taken place in fact and in history and as it is recorded in the varied mythologies and religions of mankind. Not much satisfaction can be felt with the exposition of either as it appears in the volumes of Berlin lectures.

Schelling's works were collected and published by his sons, in 14 vols., 1856–61. For the life good materials are to be found in the three vols., *Aus Schelling's Leben in Briefen*, 1869–70, in which a biographical sketch of the philosopher's early life is given by his son, and in Waitz, *Karoline*, 2 vols., 1871. An interesting little work is Klaiber, *Hölderlin, Hegel, u. Schelling in ihren Schwäbischen Jugendjahren*, 1877. The biography in Kuno Fischer's volume is complete and admirable. Apart from the expositions in the larger histories of modern philosophy, in Michelet, Erdmann, Willm, and Kuno Fischer, and in Haym's *Romantische Schule*, valuable studies are—Rozenkranz, *Schelling*, 1843; Noack, *Schelling und die Philosophie der Romantik*, 2 vols., 1859; Frantz, *Schelling's positive Philosophie*, 3 vols., 1879–80; Watson, *Schelling's Transcendental Idealism*, 1882. (R. AD.)

SCHEMNITZ (Hung. *Selmeczbánya*), a mining town in the Cis-Danubian county of Hont, Hungary, lies about 65 miles north from Budapest, in 48° 27′ N. lat., 18° 52′ E. long., on an elevated site, 2300 feet above the level of the sea. Its institutions include a Roman Catholic and a Protestant gymnasium, a high school for girls, a court of justice, a hospital, and several benevolent and scientific societies. Schemnitz owes its chief importance to the fact of its being the mining centre of the kingdom. Connected with this local industry are important Government institutions, such as various mining superintendencies, a chemical analytical laboratory, and an excellent academy of mining and forestry (with a meteorological observatory and a remarkable collection of minerals), attended by pupils from all countries of Europe and also from America. The mines are chiefly the property of the state and the corporation; the average yield annually is—gold, 232 lbs.; silver, 45,000 lbs.; lead, 11,600 cwt.; copper, 180 cwt. Iron, arsenic, etc., to the value of about £150,000 [$729,000] are also produced. There are also flourishing potteries where well-known tobacco pipes are manufactured. With Schemnitz is conjoined the town of Bélabánya; their united population in 1884 was 15,265, chiefly Slovaks, of whom nearly 3000 were engaged in mining.

Schemnitz, which was already noted for its mines in the time of the Romans, has played considerable part in the history of Hungary. The archives of the town contain many interesting documents. After the Tartar invasion in the 12th century it was colonized by Germans, but had become quite Slavonized before the academy of mining was founded by Maria Theresa (1760). The school of forestry was added in 1809. The corporation is wealthy, having received special commercial privileges from the crown in consideration of pecuniary aid afforded in times of emergency.

SCHENECTADY, a city of the United States, county seat of Schenectady county, New York, in the valley of the Mohawk river, 17 miles by rail northwest of Albany, with which it is also connected by the Erie Canal. It is best known as the seat of Union College, an institution founded in 1795 by a union of several religious sects, and now possessed of large endowments, extensive buildings, and a valuable library, and along with the Albany medical and law schools, etc., forming the Union University. Besides manufacturing locomotives, iron bridges, and agricultural implements, Schenectady has shawl, hosiery, carriage, and varnish factories. The population was 9579 in 1860, 11,026 in 1870, and 13,655 in 1880.

Occupying the site of one of the council grounds of the Mohawks, Schenectady was chosen as a Dutch trading post in 1620, was chartered in 1684, and became a borough in 1765 and a city in 1798. In 1691 it was burned by the French and Indians, and sixty-three of its inhabitants massacred.

SCHETKY, JOHN ALEXANDER (1785–1824), a younger brother of J. C. Schetky (see below), studied medicine in Edinburgh university and drawing in the Trustees' Academy. As a military surgeon he served with distinction under Lord Beresford in Portugal. He contributed excellent works to the exhibitions of the Royal Academy and of the Water-Color Society, and executed some of the illustrations in Sir W. Scott's *Provincial Antiquities*. He died at Cape Coast Castle, 5th September, 1824, when preparing to follow Mungo Park's route of exploration.

SCHETKY, JOHN CHRISTIAN (1778–1874), marine painter, descended from an old Transylvanian family, was born in Edinburgh on the 11th of August 1778. He studied art under Alexander Nasmyth, and after having travelled on the Continent he settled in Oxford, and taught for six years as a drawing-master. In 1808 he obtained a post in the military college, Great Marlow, and three years later he received a congenial appointment as professor of drawing in the naval college, Portsmouth, where he had ample op-

portunities for the study of his favorite marine subjects. From 1836 to 1855 he held a similar professorship in the military college, Addiscombe. To the Royal Academy exhibitions he contributed at intervals from 1805 to 1872, and he was represented at the Westminster Hall competition of 1847 by a large oil-painting of the Battle of La Hogue. He was marine painter to George IV., William IV., and Queen Victoria. Among his published works are the illustrations to Lord John Manners's *Cruise in Scotch Waters*, and a volume of photographs from his pictures and drawings issued in 1867 under the title of *Veterans of the Sea*. He died in London, on the 28th of January, 1874.

One of his best works, the Loss of the Royal George, painted in 1840, is in the National Gallery, London, and the United Service Club possesses another important marine subject from his brush. His memoir by his daughter was published in 1877.

SCHEVENINGEN, a fishing village and watering-place in Holland, on the North Sea, about two miles from The Hague, with which it is connected by a shaded avenue with a tramway. There is a fine sandy beach below the line of dunes that separate the village from the sea. The terrace crowning the dunes serves as a promenade. Population in 1879, 7713. Scheveningen has a considerable herring fleet. In a naval engagement off the coast in 1673 De Ruyter defeated the combined forces of the French and English.

SCHIAVONETTI, Luigi (1765–1810), engraver, was born at Bassano in Venetia, on April 1, 1765. After having studied art for several years he was employed by Testolini, an engraver of very indifferent abilities, to execute imitations of Bartolozzi's works, which he passed off as his own. In 1790 Testolini was invited by Bartolozzi to join him in England, and, it having been discovered that Schiavonetti, who accompanied him, had executed the plates in question, he was taken by Bartolozzi into his employment, and, having greatly improved under his instruction, he became an eminent engraver in both the line and the dot manner, "developing an individual style which united grandeur with grace, boldness, draughtsman-like power, and intelligence with executive delicacy and finish." Among his early works are four plates of subjects from the French Revolution, after Benazech. He also produced a Mater Dolorosa after Vandyck, and Michelangelo's cartoon of the Surprise of the Soldiers on the Banks of the Arno. From 1805 to 1808 he was engaged in etching Blake's designs to Blair's *Grave*, which, with a portrait of the artist engraved by Schiavonetti after T. Phillips, R.A., were published in the last-named year. The etching of Stothard's Canterbury Pilgrims was one of his latest works, and on his death on the 7th of June, 1810, the plate was taken up by his brother Niccolo, and finally completed by James Heath.

SCHIEDAM, a town of the Netherlands, in the province of South Holland, not far from the confluence of the Schie with the Maas, 3 miles by rail from Rotterdam. It is best known as the seat of a great gin manufacture, which, carried on in more than two hundred distilleries, gives employment besides to malt-factories, cooperages, and cork-cutting establishments, and supplies grain refuse enough to feed about 30,000 pigs. Other industries are ship-building, glass-blowing, and candle-moulding. Schiedam, which has recently been growing rapidly towards the southwest in the Nieuw-Frankenland, is not behind the larger of the Netherlands cities in the magnificence of its private residences, but none of its public buildings are of much note. It is enough to mention the Groote or Jans-Kerk, with the tomb of Cornelis Haga, ambassador to Turkey, the old Roman Catholic church, the synagogue, the town-house, the exchange, the Musis Sacrum, the post office (Blaauwhuis), and a ruined castle (Huis te Riviere). The population of the commune increased from 9157 in 1811 to 12,360 in 1840, 21,103 in 1875, 23,035 in 1880, and 24,321 in 1884; the population of the town was 18,854 in 1870.

Schiedam, which first appears in a document of 1264, obtained privileges from Floris V. in 1275, and gradually acquired importance as a commercial town. In the 16th century it had a considerable share in the herring fishery and carried on salt-making, brick-making, and weaving, and began to turn its attention to distilling. The town was flooded in 1775.

SCHIEFNER, Franz Anton (1817–1879), linguist, was born at Reval, in Russia, on the 18th July, 1817. His father was a merchant who had emigrated from Bohemia at the end of last century. He received his education at the grammar school of his native place, where also his subsequent colleague, the celebrated naturalist Karl Ernst von Baer, had been brought up. He matriculated at St. Petersburg as a law student in 1836, but while qualifying for this profession he pursued with keen interest the study of the classics, and subsequently devoted himself at Berlin, from 1840 to 1842, exclusively to Eastern languages. On his return to St. Petersburg in 1843 he was employed in teaching the classics in the First Grammar School, and soon afterwards received a post in the Imperial Academy, where in 1852 the cultivation of the Tibetan language and literature was assigned to him as his special function. Simultaneously he held from 1860 to 1873 the professorship of classical languages in the Roman Catholic theological seminary. From 1854 till his death he was an extraordinary member of the Imperial Academy. He died after a fortnight's illness on the 16th November, 1879.

Schiefner made his mark in literary research in three directions. First, he contributed to the *Memoirs* and *Bulletin* of the St. Petersburg Academy, and brought out independently, a number of valuable articles and larger publications on the language and literature of Tibet. He possessed also a remarkable acquaintance with Mongolian, and when death overtook him had just finished a revision of the New Testament in that language with which the British and Foreign Bible Society had entrusted him. Further, he was one of the greatest authorities on the philology and ethnology of the Finnic tribes. He edited and translated the great Finnic epic *Kalevala;* he arranged, completed, and brought out in twelve volumes the literary remains of Alexander Castrén, bearing on the languages of the Samoyedic tribes, the Koibal, Karagass, Tungusian, Buryat, Ostiak, and Kottic tongues, and prepared several valuable papers on Finnic mythology for the Imperial Academy. In the third place, he made himself the expouent of recent investigations into the languages of the Caucasus, which, thanks to his lucid analyses, have now been placed within reach of European philologists. Thus he gave a full analysis of the Tush language, and in quick succession, from Baron P. Uslar's investigations, comprehensive papers on the Awar, Ude, Abkhasian, Tchetchenz, Kasi-Kumük, Hürkanian and Kürinian languages. He had also completely mastered the Ossetic, and brought out a number of translations from that language, several of them accompanied by the original text. For many of his linguistical investigations he had, with as much tact as patience, availed himself of the presence in St. Petersburg of natives (soldiers chiefly) of the districts on the languages of which he happened to be engaged. The importance, however, of the vast mass of linguistical material thus opened up by him, and of the results to which his investigations led, has not yet been fully realized, except so far, perhaps, as his numerous contributions to our knowledge of Eastern fables are concerned, for which branch of literature he evinced throughout his works a keen appreciation.

With a rare philological acumen, which with equal facility grasped the morphological and idiomatic parts of a language, Schiefner combined an indefatigable industry and a love of research which never flagged. He visited England three times for purposes of research,—in 1863, 1867, and 1878,—when he endeared himself to all who were brought in contact with him by his modesty and single-heartedness, his animated and spirited conversation, and his unswerving devotion to his various literary pursuits.

The following list of his works has been drawn up from biographical notices which appeared in the *Athenæum* for 24th Jan-

uary, 1880, and in the *Bulletin* of the St. Petersburg Academy, xxvi. pp. 30–44; *Bemerkungen zum Polej'schen Text des Devîmâhâtmya*, 1846; *Beiträge zur Kritik des Bhartrihari aus Çârngadhara's Paddhati*, 1847; (with A. Weber), *Variæ Lectiones ad Bohlenii editionem Bharlriharis sententiarum pertinentes*, 1850; *Ueber die logischen und grammatischen Werke des Tandjur*, 1847; *Ueber Indra's Donnerkeil*, 1848; *Nachträge zu den von O. Böhtlingk und J. Schmidt verfassten Verzeichnissen der auf Indien und Tibet bezüglichen Handschriften und Holzdrucke im asiatischen Museum der k. Akademie der Wissenschaften*, 1848; *Eine tibetische Lebensbeschreibung Çâkyamuni's*, 1848; *Ueber das Werk "Rgya tch'er rol pa,"* 1848–50; *Tibetische Studien*, 1851–64; *Ueber eine eigenthümliche Art der tibetischen Composita*, 1856; *Ueber Pluralbezeichnungen im Tibetischen*, 1877; *Ueber die Verschlechterungs-Perioden der Menschheit nach buddhistischer Anschauungsweise*, 1851; *Bericht über die neueste Büchersendung aus Peking*, 1851; *Das buddhistische Sûtra der 42 Sätze aus dem Tibetischen übersetzt*, 1851; *Ergänzungen und Berichtigungen zu J. Schmidt's Ausgabe des Dsangtun*, 1852; *Ueber das Werk "Histoire de la vie de Hiouen-thsang,"* 1853; *Bericht über die wissenschaftliche Thätigkeit des Herrn Prof. Wassiljew*, 1854; *Uber die nepalischen, assamischen, und ceylonischen Münzen des asiatischen Museums*, 1854; *Ein kleiner Beitrag zur mongolischen Paläographie*, 1856; *Sprachliche Bedenken gegen das Mongolenthum der Skythen*, 1856; *Bericht über Prof. Wassiljew's Werk über den Buddhismus*, 1856; *Ueber die unter dem Namen "Geschichte des Ardshi Bordshi Chan," bekannte mongolische Märchensammlung*, 1857; *Carminis indici Vimalapracnottara ratnamâlâ versio tibetica, mit deutscher Uebersetzung*, 1856; *Buddhistische Triglotte*, 1859; *Ueber ein indisches Krähenorakel*, 1859; *Ueber die hohen Zahlen der Buddhisten*, 1862; *Jäschke's Bemühungen um eine Handschrift des Gesar*, 1868; *Târanâthæ de doctrinæ buddhicæ in India propagatione narratio tibetica*, 1868 (German, 1869); *Ueber einige morgenländische Fassungen der Rhampsinitsage*, 1869; *Zur buddhistischen Apokalyptik*, 1874; *Bharatæ responsa, tib. et latine*, 1874; *Mahâkât jâjana und König Tchanda-pradjota*, 1875; *Indische Künstleranekdoten*, 1875; *Indische Erzählungen*, 1876–77 (an English translation of these by W. R. S. Ralston appeared in 1882); *Ueber Vasubandhu's Gâthâsangraha*, 1878; *Ueber eine tibitische Handschrift des India House*, 1879; *Ueber das Bonpo-Sûtra*, 1880; *Zur Sampomythe*, 1850; *Kleine Beiträge zur finnischen Mythologie*, 1852; *Zur ehstnischen Mythologie*, 1854; *Ueber den Mythengehalt der finnischen Märchen*, 1855; *Ueber die Heldensagen der minussinischen Tataren*, 1858; *Heldensagen, etc., rhythmisch bearbeitet*, 1859; *Zum Mythus vom Wettuntergange*, 1859; *Ueber die ehstnische Sage vom Kalewi-pocg*, 1860; *Zur russischen Heldensage*, 1861; *Ueber Kalewa und die Kalewingen*, 1862; *Kalevala, deutsch in rhythmischer Form*, 1852; *Ueber das Thier "tarvas" im finnischen Epos*, 1848–49; *Die Lieder der Woten, metrisch übertragen*, 1856; *Ueber das Wort "Sampo" im finnischen Epos*, 1861; *Versuch einer ostjakischen Sprachlehre*, 1849–1856; *Grammatik und Wörterverzeichnisse der samojedischen Sprachen*, 1854–1855; *Grundzüge einer tungusischen, Sprachlehre*, 1856; *Versuch einer burjätischen Sprachlehre*, 1857; *Versuch einer koibalischen und karagassischen Sprachlehre*, 1857; *Versuch einer jenisei-ostjakischen und kottischen Sprachlehre*, 1858; *Das 13-monatliche Jahr und die Monatsnamen der sibirischen Völker*, 1856; *Ueber die Sprache der Jukagiren*, 1859–71; *Beiträge zur Kenntniss der tungusischen Mundarten*, 1859; *Tungusische Miscellen*, 1874; *Ueber die von G. von Maydell gesammelten tungusischen Sprachproben*, 1874; *A. Czekanowski's tungusisches Wörterverzeichniss*, 1877; *Ueber sibirische Eigenthumszeichen*, 1855–1859; *Kurze Charakteristik der Thuschsprache*, 1854; *Versuch über die Thuschsprache*, 1856; *Versuch über das Awarische*, 1862; *Ueber Baron Uslar's neuere linguistische Forschungen*, 1863; *Versuch über die Sprache der Uden*, 1863; *Ausführlicher Bericht über Baron Uslar's abchasische Studien*, 1863; *Tschetschenzische Studien*, 1864; *Ausfuhrlicher Bericht über Baron Uslar's Kasikumükische Studien*, 1866; *Hürkanische Studien*, 1871; *Awarische Studien* 1872; *Kürinische Studien*, 1873; *Awarische Texte*, 1873; *Ossetische Sprüchwörter*, 1862: *Ossetische Texte*, 1863; *Zwei ossetische Thiermärchen*, 1864; *Ossetische Sagen und Märchen*, 1867.

SCHILLER, JOHANN CHRISTOPH FRIEDRICH (1759–1805), German dramatist and poet, was born at Marbach, in Würtemberg, on the 10th or 11th (probably 10th) November, 1759. His grandfather and great-grandfather had been bakers in Bittenfeld, a village at the point where the Rems flows into the Neckar; and the family was probably descended from Jacob Georg Schiller, who was born in Grossheppach, another Swabian village, in 1587. Schiller's father, Johann Kaspar Schiller, who was about thirty-six years of age when his son was born, was a man of remarkable intelligence and energy. In 1749, after the War of the Austrian Succession, in which he had served as a surgeon in a Bavarian regiment of hussars, he went to visit a married sister at Marbach, a little town on the Neckar; and here, a few months after his arrival, he married Elizabeth Dorothea Kodweiss, a girl of seventeen, the daughter of the landlord of the inn in which he had a lodging. She had great sweetness and dignity of character, and exercised a strong influence over her husband, who, although essentially kind and thoroughly honorable, was apt to give way to a somewhat harsh and imperious temper. They had six children, of whom the eldest, Christophine, was born eight years after their marriage. Next came Schiller, and after him were born four daughters, of whom only two, Louisa and Nanette, survived infancy.

Until Schiller was four years of age his mother lived with her parents at Marbach, while his father served in the Würtemberg army, in which he gradually rose to the rank of major. In 1764 the elder Schiller was joined by his family at Lorch, a village on the eastern border of Würtemberg, where he served for about three years as a recruiting officer. Afterwards he was transferred to Ludwigsburg, and in 1775 he was made overseer of the plantations and nursery gardens at the Solitude, a country residence of the duke of Würtemberg, near Stuttgart. The duties of this position were congenial to the tastes of Major Schiller, and he became widely known as a high authority on the subjects connected with his daily work.

At Lorch Schiller had been taught by the chief clergyman of the village, Pastor Moser, whose name he afterwards gave to one of the characters in *Die Räuber*. When the family settled in Ludwigsburg he was sent to the Latin school, which he attended for six years. He took a good place in the periodical examinations, and was much liked by his masters and fellow-pupils, for he was active, intelligent, and remarkable for the warmth and constancy of his affections. At a very early age he gave evidence of a talent for poetry, and it was carefully fostered by his mother, who was herself of a poetic temperament. His parents intended that he should become a clergyman, but this decision was abandoned at the request—practically by the order—of the duke of Würtemberg, who insisted on his being sent to the military academy, an institution which had been established at the Solitude for the training of youths for the military and civil services. Schiller entered this institution early in 1773, when he was between thirteen and fourteen years of age, and he remained in it until he was twenty-one. For some time he devoted himself to the study of jurisprudence, but the subject did not interest him, and in 1775, when a medical faculty was instituted at the academy, he was allowed to begin the study of medicine. In that year the academy was transferred from the Solitude to Stuttgart.

Schiller was often made wretched by the harsh and narrow discipline maintained at the academy, but it had no permanently injurious effect on his character. With several of his fellow-students he formed a lasting friendship, and in association with them, notwithstanding the vigilance of the inspectors, he was able to read many forbidden books, including some of the writings of Rousseau, Klopstock's *Messiah*, the early works of Goethe, translations of a few of Shakespeare's plays, and a German translation of Macpherson's rendering of the poems of Ossian. Under these influences he became an ardent adherent of the school which was then protesting vehemently against traditional restrictions on individual freedom; and he contrived to make opportunities for the expression, in more or less crude dramas and poems, of his secret thoughts and aspirations. For about two years work of this kind was interrupted by the pressure of professional studies; but in the last year of his residence at the academy he resumed it with increased fervor. In this year he wrote the greater part of *Die Räuber*, the most striking passages of which he read to groups of admiring comrades.

On the 14th December, 1780, Schiller was informed that he had been appointed medical officer to a grenadier regiment in Stuttgart, and he almost immediately began his new duties. He was not a very expert doctor, and he was too passionately devoted to literature to take much trouble to excel in a profession which he disliked. *Die Räuber* was soon finished, and in July, 1781, it was published at his own expense, some persons of his acquaintance having become security for the necessary amount. This famous play is ill-constructed, and contains much boyish extravagance, but it is also full of energy and revolutionary fervor, and it captivated the imagination of many of Schiller's contemporaries. Early in 1782 it was represented at the Mannheim theatre, and it was so warmly applauded that Schiller, who had stolen away from

Stuttgart to see his play, began to think it might be possible for him to devote his time wholly to the work of a dramatist. By and by he was persuaded to go again to Mannheim without leave; and for this offence, of which the duke of Würtemberg was informed, he was condemned to two weeks' arrest. Shortly afterwards he was peremptorily forbidden to write books, or to hold communication with persons who did not reside in Würtemberg. This tyrannical order filled him with so much indignation that he resolved at all costs to secure freedom, and on the 17th September, 1782, accompanied by his friend Streicher, a young musician, he fled from Stuttgart.

Schiller had now before him a time of much distress and anxiety. In the course of a few weeks he finished *Fiesco*, a play which he had begun at Stuttgart; but Dalberg, the director of the Mannheim theatre, declined to put it on the stage, and the unfortunate poet knew not how he was to obtain the means of living. At the same time it was thought probable that a request for his extradition might be addressed to the elector of the Palatinate. In this perplexity Schiller wrote to Frau von Wolzogen, a friend at Stuttgart, asking to be allowed to take refuge in her house at Bauerbach, a village in the Thuringian Forest, within two hours' walk of Meiningen. This request was granted, and at Bauerbach Schiller remained for nearly seven months, working chiefly at the play which he ultimately called *Cabale und Liebe* and at *Don Carlos*.

In July, 1783, Schiller returned to Mannheim, and this time he obtained from Dalberg a definite appointment as dramatic poet of the Mannheim theatre. *Fiesco*, which was soon represented, was received rather coldly, but for this disappointment Schiller was amply compensated by the admiration excited by *Cabale und Liebe*. These two plays express essentially the same mood as that which prevails in *Die Räuber*, but they indicate a striking advance in the mastery of dramatic methods. This is especially true of *Cabale und Liebe*, which still ranks as one of the most effective acting plays in German literature.

In addition to his dramas Schiller wrote a good many lyrical poems, both before and during his residence at Mannheim. Few of these pieces rise to the level of his early plays. For the most part they are excessively crude in sentiment and style, while in some his ideas are so vague as to be barely intelligible. Perhaps the best of them are the poems entitled *Die Freundschaft* and *Rousseau*, both of which have the merit of expressing thoughts and feelings that were within the range of the writer's personal experience.

Schiller's engagement with Dalberg was cancelled in August, 1784, and, as he had now a heavy burden of debt, he thought for some time of resuming the practice of his profession, but in the end he decided to try whether he could not improve his circumstances by issuing a periodical, *Thalia*, to be written wholly by himself. This plan he accomplished, the first number being published in the spring of 1785. It contained the first act of *Don Carlos* and a paper on "The Theatre as a Moral Institution," which he had read on the occasion of his being admitted a member of the German Society, a literary body in Mannheim, of which the elector palatine was the patron.

Meanwhile he had been corresponding with four admirers who had written from Leipsic to thank him for the pleasure they had derived from his writings. These friends were C. G. Körner, L. F. Huber, and Minna and Dora Stock. Weary of incessant struggle, Schiller proposed to visit them; and Körner, the leading member of the party, not only encouraged him in this design, but readily lent him money. Accordingly, in April, 1785, Schiller left Mannheim, and for some months he lived at Gohlis, a village in Rosenthal, near Leipsic. In the summer of the same year Körner and Minna Stock were married, and settled in Dresden, taking with them Dora, Minna's sister. Schiller and Huber also went to Dresden, and Schiller remained there nearly two years. Almost every day he spent the afternoons and evenings at Körner's house, and he derived permanent benefit from this intimate intercourse with the kindest and most thoughtful friends he had ever had. While in Dresden, he published in *Thalia* several prose writings, among others *Philosophische Briefe*, in which he set forth with enthusiasm some of his opinions about religion, and a part of the *Geisterseher*, a romance, which, although written in brilliant style, was so imperfectly planned that he was never able to finish it. He also issued *Don Carlos*, which he completed early in 1787. A considerable interval having passed between the writing of the earlier and that of the later parts of this play, *Don Carlos* represents two different stages of intellectual and moral growth. It lacks, therefore, unity of design and sentiment. But it has high imaginative qualities, and the Marquis Posa, through whom Schiller gave utterance to his ideas regarding social and political progress, is one of the most original and fascinating of his creations. Posa is not less revolutionary than Karl Moor, the hero of *Die Räuber*, but, while the latter is a purely destructive force, the former represents all the best reconstructive energies of the 18th century.

In July, 1787, Schiller went to Weimar, where he was cordially welcomed by Herder and Wieland. For several years after this time he devoted himself almost exclusively to the study of history, and in 1788 he published his *Geschichte des Abfalls der vereinigten Niederlande von der Spanischen Regierung*. This was followed by a number of minor historical essays (published in *Thalia*), and by his *Geschichte des dreissigjährigen Krieges*, which appeared in 1792. These writings secured for Schiller a high place among the historians of his own time. In every instance he derived his materials from original authorities, and they were presented with a freedom, boldness, and energy which made them attractive to all classes of readers. One result of the publication of his history of the revolt of the Netherlands was his appointment to a professorship at the university of Jena, where he delivered his introductory lecture in May, 1789. He lived in Jena for about ten years, and during that time frequently met Fichte, Schelling, the two Schlegels, Wilhelm von Humboldt, and many other writers eminent in science, philosophy, and literature.

On the 22d of February, 1790, Schiller married Charlotte von Lengefeld, whom he had met at Rudolstadt about two years before. She was of a tender and affectionate nature, bright, and intelligent, and Schiller found in her love and sympathy, a constant source of strength and happiness. They had four children, the eldest of whom was born in 1793.

About a year after his marriage he was attacked by a dangerous illness, and from this time he was always in delicate health, suffering frequently from paroxysms of almost intolerable pain. In the autumn of 1793 he went with his wife to Würtemberg in the hope that his native air might do him good; and he did not return to Jena until the spring of the following year. He was enabled to obtain this period of rest through the kindness of the hereditary prince of Augustenburg and the minister Count von Schimmelmann, who had jointly begged to be allowed to place 3000 thalers [$2181] at his disposal, to be paid in yearly instalments of 1000 thalers [$727]. Schiller heartily enjoyed his visit to his native state, where he had much pleasant intercourse with his father, mother, and sisters, and with some of his early friends. He did not again see his father and mother, the former of whom died in 1796, the latter in 1802.

The *Geschichte des dreissigjährigen Krieges* was the last important historical work written by Schiller. He abandoned history in order to study philosophy, which, under the impulse communicated by Kant, was then exciting keen interest among the educated classes of

Germany. Schiller's philosophical studies related chiefly to æsthetics, on which he wrote a series of essays, some of them being printed in *Neue Thalia* [issued from 1792 to 1794], others in the *Horen*, a periodical which he began in 1794 and continued until 1798. The most remarkable of these essays are a paper on "Die Anmuth und Würde," a series of letters addressed to the prince of Augustenburg on "Die ästhetische Erziehung des Menschen," and a treatise on "Die Naive und Sentimentalische Dichtung." In philosophical speculation Schiller derived inspiration mainly from Kant, but he worked his way to many independent judgments, and his theories have exercised considerable influence on those German writers who have dealt with the ultimate principles of art and literature. Goethe was of opinion that in "Die Naive und Sentimentalische Dichtung" Schiller had laid the foundation of modern criticism. In that powerful essay the vital distinction between classical and romantic methods was for the first time clearly brought out.

Schiller had been introduced to Goethe in 1788, but they did not begin to know one another well until 1794, when Goethe was attracted to Schiller by a conversation they had after a meeting of a scientific society at Jena. Afterwards their acquaintance quickly ripened into intimate friendship. To Schiller Goethe owed what he himself called "a second youth," and this debt was amply repaid, for by constant association with the greatest mind of the age Schiller was encouraged to do full justice to his genius. Moreover, his intellectual life was enriched by new ideas, and he was led by Goethe's indirect influence to balance his speculative judgments and idealistic conceptions by a keener and more accurate observation of the facts of ordinary life.

During the years which followed his departure from Mannheim Schiller had written *An die Freude*, *Die Götter Griechenlands*, *Die Künstler*, and other lyrical poems, all of which are of very much higher quality than the poems of his earlier period. But he had been so absorbed by labors of a different kind that he had had little time or inclination for his proper work as a poet. Now, stimulated by intercourse with Goethe, he began to long once more for the free exercise of his creative faculty; and from 1794 he allowed no year to pass without adding to the list of his lyrical writings. Among the lyrics produced in this the last and greatest period of his career the foremost place belongs to the *Lied von der Glocke*, but there is hardly less imaginative power in *Das Ideal und das Leben*, *Die Ideale*, *Der Spaziergang*, *Der Genius*, *Die Erwartung*, *Das Eleusische Fest*, and *Cassandra*. Few of Schiller's lyrics have the charm of simple and spontaneous feeling; but as poems giving expression to the results of philosophic contemplation the best of them are unsurpassed in modern literature. Schiller had a passionate faith in an eternal ideal world to which the human mind has access; and the contrast between ideals and what is called reality he presents in many different forms. In developing the poetic significance of this contrast his thoughts are always high and noble, and they are offered in a style which is almost uniformly grand and melodious.

In 1796 Schiller and Goethe together wrote for the *Musenalmanach* (an annual volume of poems, issued for several years by Schiller) a series of epigrams called *Xenien*, each consisting of a distich. Most of them were directed against contemporary writers whom the poets disliked, and much animosity was excited by their sharply satirical tone. A higher interest attaches to *Votivtafeln*, another series of epigrams, written at the same time as the *Xenien*. They are among the most suggestive of Schiller's writings, for, as he explains in the introductory epigram, they embody truths which he had found helpful in the experience of life. Soon after finishing these fine poems Schiller began, in rivalry with Goethe, to write his ballads, which surprised even his most ardent admirers by the boldness of their conceptions and by the graphic force of their diction. As a writer of ballads Goethe yielded the palm to Schiller, and this judgment has been confirmed by the majority of later critics.

Schiller never intended that *Don Carlos* should be his last drama, and from 1791 he worked occasionally at a play dealing with the fate of Wallenstein. He was unable, however, to satisfy himself as to the plan until 1798, when, after consulting with Goethe, he decided to divide it into three parts, *Wallensteins Lager*, *Die Piccolomini*, and *Wallensteins Tod*. *Wallensteins Lager* was acted for the first time at the Weimar theatre in October, 1798, and *Die Piccolomini* in January, 1799. In April, 1799, all three pieces were represented, a night being given to each. The work, as a whole, produced a profound impression, and it is certainly Schiller's masterpiece in dramatic literature. He brings out with extraordinary vividness the ascendency of Wallenstein over the wild troops whom he has gathered around him, and at the same time we are made to see how the mighty general's schemes must necessarily end in ruin, not merely because a plot against him is skilfully prepared by vigilant enemies, but because he himself is lulled into a sense of security by superstitious belief in his supposed destiny as revealed to him by the stars. Wallenstein is the most subtle and complex of Schiller's dramatic conceptions, and it taxes the powers of the greatest actors to present an adequate rendering of the motives which explain his strange and dark career. The love-story of Max Piccolomini and Thekla is in its own way not less impressive than the story of Wallenstein with which it is interwoven. Max and Thekla are purely ideal figures, and Schiller touches the deepest sources of tragic pity by his masterly picture of their hopeless passion and of their spiritual freedom and integrity.

Wallenstein was received with so much favor that Schiller resolved to devote himself in future mainly to the drama; and in order to be near a theatre—partly, too, that he might have more frequent opportunities of intercourse with Goethe—he transferred his residence, in December, 1799, from Jena to Weimar, where he spent the rest of his life. He took with him to Weimar three acts of *Maria Stuart*, and early in the summer of 1800 he finished it at Ettersburg, a country house of the duke of Weimar. The technical qualities of *Maria Stuart* are of the highest order, but the subject does not seem to have interested Schiller very deeply, and it cannot be said either that the characters are finely conceived or that the closing scenes of Queen Mary's life are presented in a truly poetic spirit. In his next play, *Die Jungfrau von Orleans*, completed about a year afterwards, Schiller had a more congenial theme, and the vigor with which he handled it commanded the warm admiration of Goethe. The scenes in which the maid is misled by her passion for Lionel are slightly perplexing, as they do not appear to accord with the essential qualities of her character; but in the earlier and later parts of the play Schiller displays splendid dramatic art in revealing the lofty courage and enthusiasm with which she fulfils her mission. In *Die Braut von Messina*, which was acted for the first time at the Weimar theatre in March, 1803, Schiller attempted to combine romantic and classical elements. The experiment is not perfectly successful, and even in its most striking passages the play is remarkable rather for brilliant rhetoric than for pure poetry. His last original drama, *Wilhelm Tell*, the first representation of which took place in March, 1804, is in some respects greater than any of those which preceded it, *Wallenstein* excepted. It has some obvious faults of construction, but these defects do not seriously mar the impression produced by its glowing picture of a romantic and truly popular struggle for freedom.

Besides his complete original plays, Schiller left

some dramatic sketches and fragments, the most important of which, *Demetrius*, has been finished in Schiller's manner by several later writers. He also produced German versions of *Macbeth*, of Gozzi's *Turandot*, of two comedies by Picard, and of *Phèdre*. His renderings of Picard's comedies are entitled *Der Parasit* and *Der Neffe als Onkel*.

In his last years Schiller received many tokens of growing fame. In 1802 he was raised to noble rank, and in 1804 he was informed that if he pleased he might be invited to settle in Berlin on advantageous terms. He went with his family to the Prussian capital, but the only result of the negotiations into which he entered was that the duke of Weimar, alarmed at the prospect of losing him, doubled his salary of 400 thalers [$290.80]. His health was at this time completely undermined, and from the summer of 1804 work was often rendered impossible by serious illness. On the evening of the 29th April, 1805, he returned from the Weimar theatre in a state of high fever, and from this attack he was unable to rally. He died on the 9th May, 1805, in his forty-sixth year.

Schiller was tall, slight, and pale, with reddish hair, and eyes of an uncertain color, between light-brown and blue. At the military academy he acquired a manner somewhat formal, like that of a soldier; but in carrying on conversation that interested him he became eager and animated. He had little appreciation of humor, and even in the treatment of subjects which he made his own he was apt to recur too frequently to the same ideas and the same types of character. But when he is at his best he is excelled among the poets and dramatists of Germany only by Goethe in the power with which he expresses sublime thoughts and depicts the working of ideal passions. As a man he was not less great than as a writer. He started in life with high aims, and no obstacle was ever formidable enough to turn him from paths by which he chose to advance to his goal. Terrible as his physical sufferings often were, he maintained to the last a genial and buoyant temper, and those who knew him intimately had a constantly increasing admiration for his patience, tenderness, and charity. With all that was deepest and most humane in the thought of the 18th century he had ardent sympathy, and to him were due some of the most potent of the influences which, at a time of disaster and humiliation, helped to kindle in the hearts of the German people a longing for a free and worthy national life.

There have been many editions of Schiller's collected works. The first was issued in twelve volumes at Stuttgart and Tübingen in 1812–15, the editor being his friend, C. G. Körner. There are also a good many volumes of Schiller's correspondence, the most interesting being his correspondence with Goethe. Of the biographies of Schiller, Carlyle's —published in 1825—was one of the earliest. See also *Schillers Leben*, by Frau von Wolzogen, Schiller's sister-in-law; *Schillers Leben*, by Hoffmeister (extended by Viehoff); *Schillers Leben*, by Boas; *Schillers Leben und Werke*, by Palleske; *Schillers Leben*, by H. Düntzer; and *Schiller*, by J. Sime (in "Foreign Classics for English Readers"). (J. SI.)

SCHINKEL, Karl Friedrich (1781–1841), architect and painter, and professor in the academy of fine arts at Berlin from 1820, was born at Neuruppin, in Brandenburg, on March 13, 1781, and died at Berlin, on October 9, 1841. He is esteemed one of the most original of modern German architects. His principal buildings are in Berlin (*q.v.*) and its neighborhood. They include the Bauakademie, which contains a museum of his designs. His *Sammlung architektonischer Entwürfe* (1820–1837; 3d ed. 1857–58) and *Werke der höheren Baukunst* (1845–6; new ed. 1874) exemplify his style.

SCHIRMER, Friedrich Wilhelm (1802–1866), landscape artist, was born in 1802 in Berlin. As a youth he painted flowers in the royal porcelain factory; afterwards he became a pupil of F. W. Schadow in the Berlin Academy, but his art owed most to Italy. His first journey across the Alps was taken in 1827; his sojourn extended over three years; he became a disciple of his countryman Joseph Koch, who built historic landscape on the Poussins, and is said to have caught inspiration from Turner. In 1831 Schirmer established himself in Berlin in a studio with scholars; in 1839 he was appointed professor of landscape in the academy; in 1845 he again visited Italy, but duties soon brought him back to Berlin. Illness compelled him in 1865 to seek a southern clime; he grew worse in Rome, and died on his way home in 1866.

Schirmer's place in the history of art is distinctive; his sketches in Italy were more than transcripts of the spots; he studied nature with the purpose of composing historic and poetic landscapes. On the completion of the Berlin Museum of Antiquities came his opportunity; upon the walls he painted classic sites and temples, and elucidated the collections by the landscape scenery with which they were historically associated. His supreme aim at all times was to make his art the poetic interpretation of nature. His pictures appeal to the mind by the ideas they embody, by beauty of form, harmony of line, significance of light and color. In this constructional landscape German critics discover "motive," "inner meaning," "the subjective," "the ideal." And Schirmer thus formed a school. Nevertheless at times he painted poor pictures, partly because he deemed technique secondary to conception.

SCHIRMER, Johann Wilhelm (1807–1863), landscape painter, was born in 1807, at Jülich in Rhenish Prussia. This artist, only a namesake of the preceding, had similar aim and career. He first was a student, and subsequently became a professor in the academy of Düsseldorf. In 1854 he was made director of the art school at Carlsruhe, where in 1863 he died. He travelled and sketched in Italy, and aimed at historic landscape after the manner of the Poussins. His Biblical landscapes with figures are held in good esteem.

SCHIZOMYCETES, a term proposed by Nägeli in 1857 to include all those minute organisms known as Bacteria, Microphytes, Microbes, etc., and allied forms. These terms have been used at various times by different authors with widely different meanings in detail, but it is now agreed that the Schizomycetes are minute vegetable organisms devoid of chlorophyll and multiplying by repeated bipartitions. They consist of single cells, which may be spherical, oblong, or cylindrical in shape, or of filamentous or other aggregates of such cells. True spores occur in several, but no trace whatever of sexual organs exists. From their mode of growth, division, and spore-formation (in part), as well as their habit of forming deliquescent, swollen cell-walls, and other peculiarities, there can be no doubt of the close alliance between the Schizomycetes and certain lower *Algæ;* whence both groups have been conjoined under the name *Schizophyta*. No one character except the want of chlorophyll—which of course entails physiological differences—separates the Schizomycetes from other *Schizophyta;* morphologically and phylogenetically the two groups are united. From this point of view we relegate all the so-called bacteria which contain chlorophyll (*e.g.*, Engelmann's *Bacterium chlorinum*, Van Tieghem's *B. viride* and *Bacillus virens*, Cohn's *Micrococcus chlorinus*, etc.) to the *Algæ*.

Schizomycetes, then, are saprophytic or parasitic *Schizophyta* devoid of chlorophyll, though they may secrete other coloring matters. In size their cells are commonly about 0.001 mm. (called 1 micro-millimetre = 1μ) in diameter, or from two to five times that length; but smaller ones and a few larger are known. The various shapes assumed by the cells are shown in Fig. 1; the filamentous and other aggregates will be described below.

General account.

Schizomycetes are ubiquitous as saprophytes in still ponds and ditches, in running streams and rivers, and in the sea, and especially in drains, bogs, refuse heaps, and in the soil, and wherever organic infusions are allowed to stand for a short time. Any liquid (blood, urine, milk,

beer, etc.) containing organic matter, or any solid food-stuff (meat, preserves, vegetables, etc.) allowed to stand exposed to the air soon swarms with bacteria, if moisture is present and the temperature not abnormal. Though they occur all the world over in the air

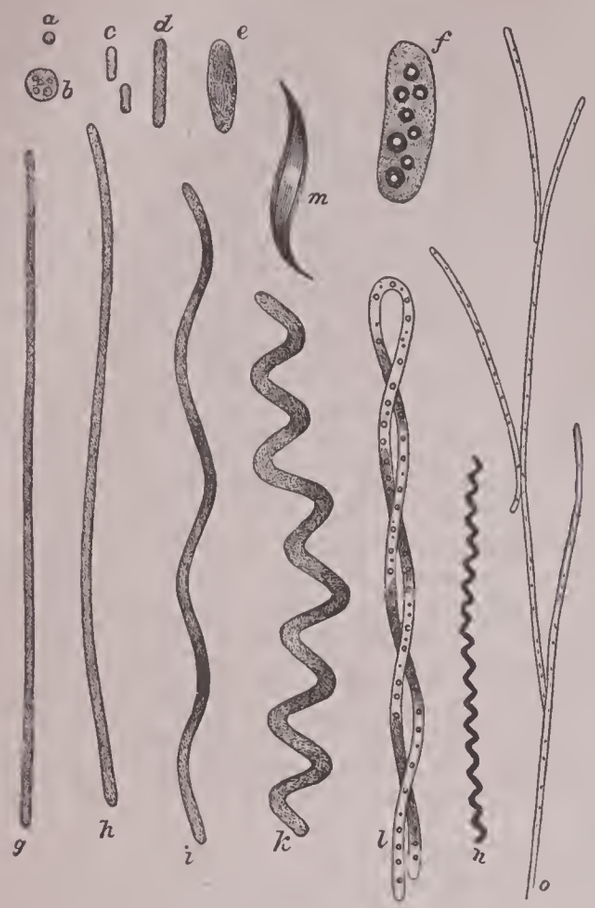


FIG. 1.—Typical forms of Schizomycetes. (After Zopf.) *a, Micrococcus; b, Macrococcus*, or "*Monas*"; *c, Bacterium; d, Bacillus; e, Clostridium; f, Monas okenii; g, Leptothrix; h, i, Vibrio; k, Spirillum; l, "Spirulina"* (a form of *Beggiatoa alba*); *m, "Spiromonas"* (Warming); *n, Spirochæte; o, Cladothrix*. The granules in *b, f*, and *l* are particles of sulphur.

and on the surface of exposed bodies, it is not to be supposed that they are by any means equally distributed, and it is questionable whether the bacteria suspended in the air ever exist in such enormous quantities as was once believed. The evidence to hand shows that on heights and in open country, especially in the north, there may be few or even no Schizomycetes detected in the air, and even in towns their distribution varies greatly; sometimes they appear to exist in minute clouds, as it were, with interspaces devoid of any, but in laboratories and closed spaces where their cultivation has been promoted the air may be considerably laden with them. Of course the distribution of bodies so light and small is easily influenced by movements, rain, wind, changes of temperature, etc. As parasites, certain Schizomycetes inhabit and prey upon the organs of men and animals in varying degrees, and the conditions for their growth and distribution are then very complex. Plants appear to be less subject to their attacks,—possibly, as has been suggested, because the acid fluids of the higher vegetable organisms are less suited for the development of Schizomycetes; nevertheless some are known to be parasitic on plants. Schizomycetes exist in every part of the alimentary canal of animals, except, perhaps, where acid secretions prevail. These are by no means necessarily harmful, though, by destroying the teeth for instance, certain forms may incidentally be the forerunners of damage which they do not directly cause.[1]

[1] See De Bary, *Morphologie und Biologie der Pilze*, 1884, and *Vorlesungen über Bacterien*, 1885; Zopf, *Die Spaltpilze*, 3d ed., 1885; Cohn, *Beitr. zur Biol. der Pfl.*, Hft. 2, 1872; Magnin, *Les Bactéries*, 1878; Burdon-Sanderson, *Quart. Jour. Micros. Sc.*, 1871; Tyndall, *Floating Matter of the Air*, 1881; Miflet, in *Cohn's Beitr. zur Biol.*, iii. Hft. i., 1879; Pasteur, *Jour. de Chim. et de Phys.*, ser. iii., 1862; Miquel, *Comptes Rendus*, 1878, and *Annuaire de l'observatoire de Montsouris*, 1877 *sq.*

History.

Little was known about these extremely minute organisms before 1860. Leeuwenhoek figured *Bacteria* as far back as the 17th century, and O. F. Müller knew several important forms in 1773, while Ehrenberg in 1830 had advanced to the commencement of a scientific separation and grouping of them, and in 1838 had proposed at least sixteen species, distributing them into four genera. Our modern more accurate though still fragmentary knowledge of the forms of Schizomycetes, however, dates from Cohn's brilliant researches, the chief results of which were published at various periods between 1853 and 1872; Cohn's classification of the *Bacteria*, published in 1872 and extended in 1875, has in fact dominated the study of these organisms almost ever since. He proceeded in the main on the assumption that the forms of *Bacteria* as met with and described by him are practically constant, at any rate within limits which are not wide: observing that a minute spherical *Micrococcus* or a rod-like *Bacillus* regularly produced similar micrococci and bacilli respectively, he based his classification on what may be considered the constancy of forms which he called species and genera. As to the constancy of form, however, Cohn maintained certain reservations which have been ignored by some of his followers. The fact that Schizomycetes produce spores appears to have been discovered by Cohn in 1857, though it was expressed dubiously in 1872; these spores had no doubt been observed previously. In 1876, however, Cohn had seen the spores germinate, and Koch, Brefeld, Pratzmowski, Van Tieghem, De Bary, and others confirmed the discovery in various species.

The supposed constancy of forms in Cohn's species and genera received a violent shock when Lankester in 1873 pointed out that his *Bacterium rubescens* (since named *Beggiatoa roseo-persicina*, Zopf) passes through conditions which would have been described by most observers influenced by the current doctrine as so many separate "species" or even "genera,"—that in fact forms known as *Bacterium*, *Micrococcus*, *Bacillus*, *Leptothrix*, etc., occur as phases in one life-history. Lister put forth similar ideas about the same time; and Billroth came forward in 1874 with the startling view that the various "form-species" and "form-genera" are only different states of one and the same organism. From that time to the present the discussion as to the limits of "species" among the Schizomycetes has been maintained; much extravagance has resulted, as well as valuable additions to our knowledge of the forms. Klebs (1875) and Nägeli (1877) upheld similar views to those suggested by Lankester; and the researches of Cienkowski, Zopf, Kurth, and De Bary have rendered it clear that forms employed by Cohn to define genera and species (it should be borne in mind that Cohn recognized their provisional nature) occur as phases in one and the same life-history. Zopf showed (1882) that minute spherical "cocci," short rodlets ("bacteria"), longer rodlets ("bacilli"), and filamentous ("leptothrix") forms as well as curved and spiral threads ("vibrio," "spirillum"), etc., occur as vegetative stages in one and the same Schizomycete (*c.f.* Fig. 16). In the meantime, while various observers were building up our knowledge of the morphology of the Schizomycetes, others were laying the foundations of what is known of the relations of these organisms to fermentation and disease, that ancient Will-o'-the-wisp "spontaneous generation" being revived by the way. When Pasteur in 1857 showed that the lactic fermentation depends on the presence of an organism, it was already known from the researches of Schwann (1837) and Helmholtz (1843) that fermentation and putrefaction are intimately connected with the presence of organisms derived from the air, and that the preservation of putrescible substances depends on this principle.

In 1862 Pasteur placed it beyond reasonable doubt that the ammoniacal fermentation of urea is due to the action of a minute Schizomycete; in 1864 this was confirmed by Van Tieghem, and in 1874 by Cohn, who named the organism *Micrococcus ureæ*. Pasteur and Cohn also pointed out that putrefaction is but a special case of fermentation, and before 1872 the doctrines of Pasteur were established with respect to Schizomycetes. Meanwhile two branches of inquiry had arisen, so to speak, from the above. In the first place, the ancient question of "spontaneous generation" received fresh impetus from the difficulty of keeping such minute organisms as bacteria from reaching and developing in organic infusions; and, secondly, the long-suspected analogies between the phenomena of fermentation and those of certain diseases again made themselves felt, as both became better understood. Needham in 1745 had declared that heated infusions of organic matter were not deprived of living beings; Spallanzani (1777) had replied that more careful heating and other precautions prevent the appearance of organisms in the fluids. Various experiments by Schwann, Helmholtz, Schultz, Schroeder, Dusch, and others led to the refutation, step by step, of the belief that the more minute organisms, and particularly bacteria, arose *de novo* in the special cases quoted. Nevertheless, instances were adduced where the most careful heating of yolk of egg, milk, hay-infusions, etc., had failed,—the boiled infusions, etc., turning putrid and swarming with Schizomycetes after a few hours.

In 1862 Pasteur repeated and extended such experiments, and paved the way for a complete explanation of the anomalies; Cohn in 1873 published confirmatory results; and it became clear that no putrefaction can take place without Schizomycetes. In the hands of Brefeld, Burdon-Sanderson, De Bary, Tyndall, Roberts, Lister, and others, the various links in the chain of evidence grew stronger and stronger, and every case adduced as one of "spontaneous generation" fell to the ground when examined. No case of so-called "spontaneous generation" has withstood rigid investigation; but the discussion contributed to more exact ideas as to the ubiquity, minuteness, and high powers of resistance to physical agents of the spores of Schizomycetes, and led to more exact ideas of antiseptic treatments. Methods were also improved, and the application of some of them to surgery at the hands of Lister, Koch, and others has yielded results of the highest importance.

Long before any clear ideas as to the relations of Schizomycetes to fermentation and disease were possible, various thinkers at different times had suggested that resemblances exist between the phenomena of certain diseases and those of fermentation, and the idea that a virus or contagium might be something of the nature of a minute organism capable of spreading and reproducing itself had been entertained. Such vague notions began to take more definite shape as the ferment theory of Cagniard-Latour (1828), Schwann (1837), and Pasteur made way, especially in the hands of the last-named savant. From about 1870 onwards the "germ theory of disease" has passed into acceptance. Rayer in 1850 and Davaine had observed the bacilli in the blood of animals dead of anthrax (splenic fever), and Pollender discovered them anew in 1855. In 1863, imbued with ideas derived from Pasteur's researches on fermentation, Davaine reinvestigated the matter, and put forth the opinion that the anthrax bacilli caused the splenic fever; this was proved to result from inoculation. Koch in 1876 published his observations on Davaine's bacilli, placed beyond doubt their causual relation to splenic fever, discovered the spores and the saprophytic phase in the life-history of the organism, and cleared up important points in the whole question (Figs. 10 and 11). In 1870 Pasteur had proved that a disease of silkworms was due to a ferment-organism of the nature of a Schizomycetes; and in 1871 Oertel showed that a *Micrococcus* already known to exist in diphtheria is intimately concerned in producing that disease. In 1872, therefore, Cohn was already justified in grouping together a number of "pathogenous" Schizomycetes. Thus arose the foundations of the modern "germ theory of disease"; and, in the midst of the wildest conjectures and the worst of logic, a nucleus of facts was won, which has since grown, and is growing daily. Septicæmia, tuberculosis, glanders, fowl-cholera, relapsing fever, and a few other diseases are now brought definitely within the range of biology, and several other contagious and infectious diseases are known to be also due to Schizomycetes.

Other questions of the highest importance have arisen from the foregoing. A few years ago Pasteur showed that *Bacillus anthracis* cultivated in chicken broth, with plenty of oxygen, and at a temperature of 42–43° C. lost its virulence after a few "generations," and ceased to kill even the mouse; Toussaint and Chaveau confirmed, and others have extended the observations. More remarkable still, animals inoculated with such "attenuated" bacilli proved to be curiously resistent to the deadly effects of subsequent inoculations of the non-attenuated form. In other words, animals vaccinated with the cultivated bacillus showed immunity from disease when reinoculated with the deadly wild form. The questions as to the causes and nature of the changes in the bacillus and in the host, as to the extent of immunity enjoyed by the latter, etc., are now burning,—Metschnikoff's recent observations (1884), showing that the white corpuscles eliminate the bacilli from the blood, being one of the most startling contributions to the answers.

Another burning question has already been in part touched upon. Experiments have shown that Schizomycetes are pleomorphic; they are also very sensitive, so to speak, to the influences of environment. The investigations of Cohn, Pasteur, Koch, Nägeli, Kurth, De Bary, and others leave no doubt that many Schizomycetes are sensibly affected by the media in which they are cultivated: not only are the forms modified, but also the physiological activity varies in degree, and even in kind. These and similar facts seem to be largely responsible for recent ideas as to the possibility of being able to cultivate or "educate" certain Schizomycetes. One case only need be referred to. *Bacillus anthracis* and *B. subtilis* are only distinguishable with great difficulty morphologically (*cf.* Figs. 10–12); the former is parasitic in its vegetative stages, the latter is always a saprophyte. Now *B. anthracis*, as said, can become harmless by cultivation, and so it has been thought that the two forms were convertible. Buchner even went so far as to declare that he had transformed *B. anthracis* into *B. subtilis*, *i.e.*, that the difference which botanists detect are only due to the influence of the environment at the time. These assertions cannot be regarded as proved; but the question whether harmless forms can become educated, as it were, to a parasitic mode of life within periods which we can control is of course of the highest importance. Such are a few of the questions now under discussion, together with others as to the mode of action of pathogenic Schizomycetes, as to the nature of immunity, and as to the limitation of "species" among such simple forms.[1]

MORPHOLOGY.—*Sizes, Forms, Structure, etc.*—The Schizomycetes consist of single cells, or of filamentous or other groups of cells, according as the divisions are completed at once or not. While some unicellular forms are less than 1μ (.001 mm.) in diameter,

[1] In addition to the foregoing, compare Nägeli, *Untersuchungen über niedere Pilze*, 1882; Buchner, *ibid.*, and in *Virch. Arch.*, xci., 1883; Nägeli, *Theorie der Gährung*, 1879; Chaveau in *Comptes Rendus*, 1879–84; Davaine, *ibid.*, 1863–64 and 1873; E. Ray Lankester, *Quart. Jour. of Micros. Sc.*, 1873 and 1876 (also valuable papers in *Q. J. M. S.* from 1870 to 1884); Pasteur, numerous papers in *Comptes Rendus*—especially 1862 and 1877—and in *Ann. de Chim. et Phys.*, 1858, 1862, etc.; Koch in *Cohn's Beitr.*, ii. Hft. 2, 1876; Kurth, *Bot. Zeitung*, 1883; Schützenberger, *Fermentation*, 1876; Metschnikoff, *Virch. Arch.*, 1884; *Nature*, various papers from 1871 to 1878.

others have cells measuring 4μ or 5μ or even 7μ or 8μ in thickness, while the length may vary from that of the diameter to many times that measurement. In the filamentous forms the individual cells are often difficult to observe until reagents are applied (*e.g.*, Fig. 14), and the length of the rows of cylindrical cells may be many hundred times greater than the breadth. Similarly, the diameters of flat or spheroidal colonies may vary from a few times to many hundred times that of the individual cells, the divisions of which have produced the colony.

Size.

The shape of the individual cell (Fig. 1) varies from that of a minute sphere to that of a straight, curved, or twisted filament or cylinder, which is not necessarily of the same diameter throughout, and may have flattened, rounded, or even pointed ends. The rule is that the cells divide in one direction only—*i.e.*, transverse to the long axis—and therefore produce aggregates of long cylindrical shape; but in rarer cases iso-diametric cells divide in two or three directions, producing flat, or spheroidal, or irregular colonies, the size of which is practically unlimited. As to the structure of the cell, little more can be said than that it consists of a mass of homogeneous or very slightly granular protoplasm, with a pearl-like lustre, and without vacuoles; this is enveloped by a membranous envelope, which is so delicate as to be scarcely perceptible. In the actively vegetating or mobile conditions this cell wall appears very thin and sharp, and is extremely flexible and elastic, but at other times it is swollen and diffluent, furnishing the intercellular gelatinous matrix of the zoogloea condition (Fig. 3). It is doubtful whether the thin envelope closely applied to the protoplasm is not always simply the innermost layer of a very diffluent covering, which is continuously thickening and throwing off its outermost swollen and disorganized lamellæ. The facts to hand seem to show that, while in some cases this envelope consists mainly of cellulose, in others (zoogloea of *Bacteria*, *e.g.*) it contains relatively large proportions of nitrogenous compounds. In some cases the cell-walls form a lamellated sheath. No cuticularization occurs, nor are deposits of lime or silex known in the cell walls. Coloring pigments, however (red, yellow, and even green and blue), are sometimes met with, and a rusty or brown tinge is in some cases produced by the precipitation of iron oxides in the walls. In the typical Schizomycetes the protoplasmic contents (which are said to consist largely of a peculiar substance named mycoprotein) are colorless, or more rarely tinged with coloring matters—bright red, yellow, etc.—which cannot be mistaken for chlorophyll. The few forms described as containing a green pigment, allied to or identical with chlorophyll, will not be considered here, but relegated to the *Algæ*. The occurrence of starch or a granulose-like substance in some *Bacteria* is undoubted; it yields a deep blue color with iodine solutions, is diffused in bands or patches, and arises in cases where the Schizomycete is nourished by a matrix which does not contain starch. Trécul noticed this formation of amyloid substance in *Clostridium*, Van Tieghem in a *Spirillum*, and several other cases are known; Ward detected starch in a *Bacillus* found in decaying coffee seeds, and in other media devoid of starch. In the filamentous Schizomycetes (*Beggiatoa*, *e.g.*) are found extremely minute dark granules; Cramer and Cohn have shown that these consist of sulphur in fine crystals (Fig. 14). Oily or fatty substances and minute granules of undetermined nature occur in the protoplasm, but no nucleus has as yet been discovered in any Schizomycete.

Form and structure.

Vegetative States.—While many forms are fixed to a substratum, others are free; and in certain conditions single cells or groups may be motile. In some cases the movements are mere oscillations, in others there are rapid movements of translation, sometimes ascribed to the action of flagella or cilia; these movements are of course not to be confounded with the dancing "Brownian motion" observed in the case of all such minute bodies suspended in fluids. Cilia have now been described in some of the smallest *Bacteria* by several good observers (Dallinger and Drysdale,[1] Cohn, Koch, Zopf), though, on account of their extreme fineness, and the difficulty of

Vegetative states.

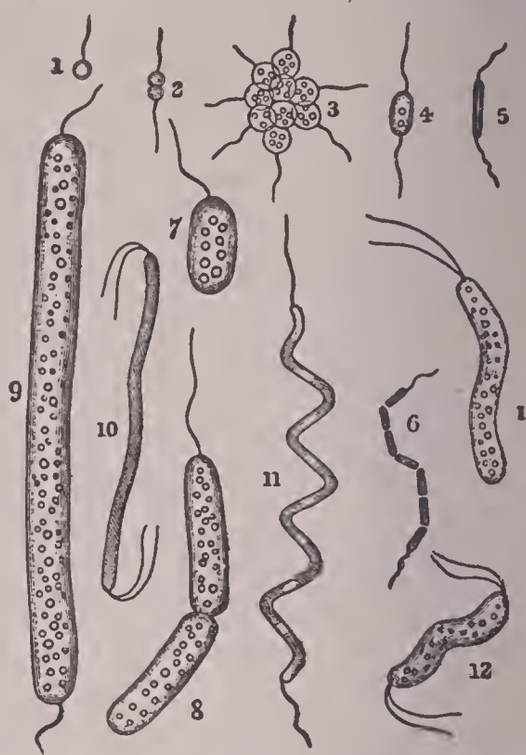


FIG. 2.—Types of motile and ciliated forms of Schizomycetes. (After Zopf.) 1, *Micrococcus* with one cilium; 2, the same dividing; 3, group of swarming *micrococci* of *Beggiatoa roseo-persicina* (*Bacterium rubescens* of Lankester); 4, bacterium-like motile form of the same; 7, 8, 9, and 10, other forms of the same (8 is dividing); 5, bacillus-like motile form (Koch); 6, motile chain of hay bacilli (Brefeld)—each terminal rodlet has one cilium; 11, *spirillum* form with one cilium at each end; 12, stouter spirillum-like form with two cilia at each end; 13, "*ophidomonas*" form (Warming). The granules in 3, 4, 7, 8, 9, 12, and 13 are particles of sulphur.

fixing them, much discussion has taken place as to their nature, functions, origin, numbers, and even existence; that they occur is proved by the photographs, but whether they are not sometimes mere filaments drawn out from the cell-walls is very doubtful (Figs. 2 and 12). While some Schizomycetes appear to have no active stage, and many are only motile under certain conditions when swarming, others are described as possessing two or even three distinct active forms. When vigorously growing and dividing, the Schizomycetes as a rule present certain definite forms, which are at any rate so constant under certain conditions that they can be figured and described with such accuracy and certainty that good observers have regarded them as fixed species, or at least as "form-species" or "form-genera." We now know, however, that many Schizomycetes pass through several such phases, and we may therefore regard them in these cases as "vegetative forms," which pass into one another too gradually to admit of their being employed as sharply distinctive of genera.

As the chief of these forms may be mentioned the following (see Fig. 1):

Cocci: spherical or spheroidal cells, which, according to their relative (not very well defined) sizes are spoken of as *Micrococci*, *Macrococci*, and perhaps *Monas* forms.

Rods or *rodlets:* slightly or more considerably elongated cells which are cylindrical, biscuit-shaped, or somewhat fusiform. The cylindrical forms are short, *i.e.*, only three or four times as long as broad (*Bacterium*), or longer (*Bacillus*); the biscuit-shaped ones are *Bacteria* in the early stages of division. *Clostridia*, etc., are spindle-shaped.

Filaments (*Leptothrix forms*) really consist of elongated cylindrical cells which remain united end to end

[1] Dallinger and Drysdale, *Monthly Micros. Jour.*, 1875.

after division, and they may break up later into elements such as those described above. Such filaments are not always of the same diameter throughout, and their segmentation varies considerably. They must be free, or attached at one (the "basal") end. A distinction is made between *simple* filaments (*e.g.*, *Leptothrix*) and such as exhibit a false branching (*e.g.*, *Cladothrix*).

Curved and *spiral* forms. Any of the elongated forms described above may be curved, or sinuous, or twisted into a corkscrew-like spiral instead of straight. If the sinuosity is slight we have the *Vibrio* form; if pronounced, and the spiral winding well marked, the forms are known as *Spirillum*, *Spirochæte*, etc. These and similar terms have been applied partly to individual cells, but more often to filaments consisting of several cells; and much confusion has arisen from the difficulty of defining the terms themselves. Various observers have, moreover, described particular cases where the cells or cell-filaments exhibit irregularities of form; such "involution forms," "torula forms," etc., appear to be fairly constant in some cases.

In addition to the above, however, certain Schizomycetes present aggregates in the form of plates, or solid or hollow

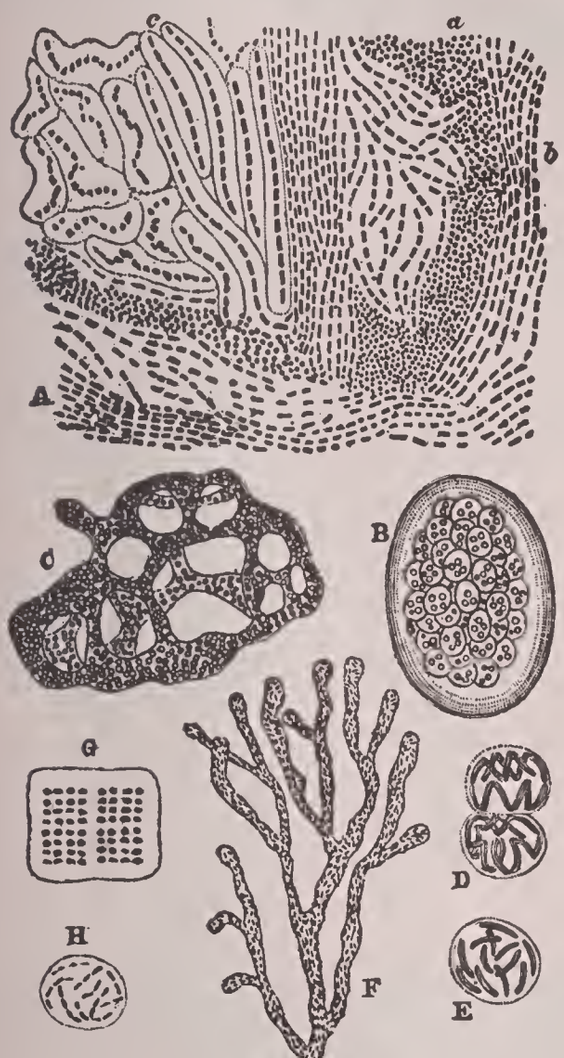


FIG. 3.—Types of Zooglœa. (After Zopf.) A, mixed zooglœa found as a pellicle on the surface of vegetable infusions, etc.; it consists of various forms, and contains cocci (*a*) and rodlets, in series (*b* and *c*), etc. (× 540). B, egg-shaped mass of zooglœa of *Beggiatoa roseo-persicina* (*Bacterium rubescens* of Lankester); the gelatinous swollen walls of the large crowded cocci are fused into a common gelatinous envelope. C, reticulate zooglœa of the same (× 250). D, E, H, colonies of *Myconostoc* enveloped in diffluent matrix (× 540). F, branched fruticose zooglœa of *Cladothrix* (slightly magnified). G, zooglœa of *Bacterium merismopedioides*, Zopf, containing cocci arranged in tablets.

and irregular branched colonies. This may be due to the successive divisions occurring in two or three planes instead of only across the long axis (*Sarcina*), or to displacements of the cells after division (as in the zooglœa conditions, etc., see Fig. 3).

Growth and Division.—Whatever the shape and size of the individual cell, cell-filament, or cell-colony, the immediate visible results of active nutrition are elongation of the cell and its division into two equal halves, across the long axis, by the formation of a septum, which either splits at once or remains intact for a shorter or longer time. This process is then repeated, and so on. In

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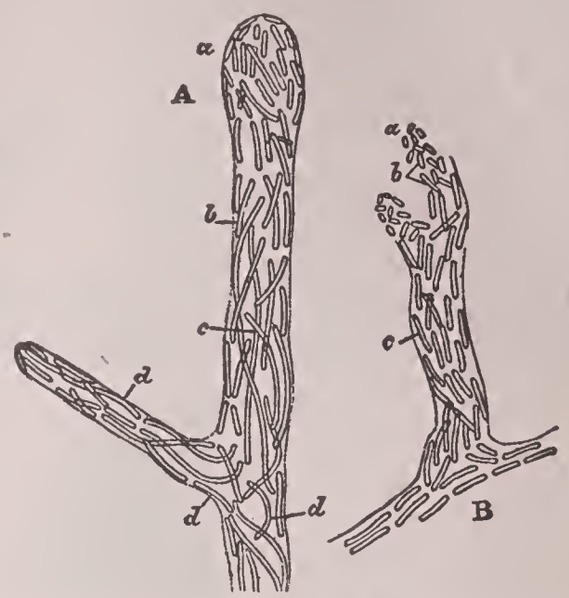

FIG. 4.—A, branch of a zooglœa of *Cladothrix dichotoma* (*cf.* Fig. 3, F), × 540. (After Zopf.) It contains short and longer *bacillar* forms (*a* and *b*), *leptothrix* forms (*c*), some of which are curved like *Vibrio* (*d*) and *Spirillum*. B, the same, but the rodlets breaking up into cocci. (After Zopf.)

the first case the separated cells assume the characters of the parent-cell whose division gave rise to them; in

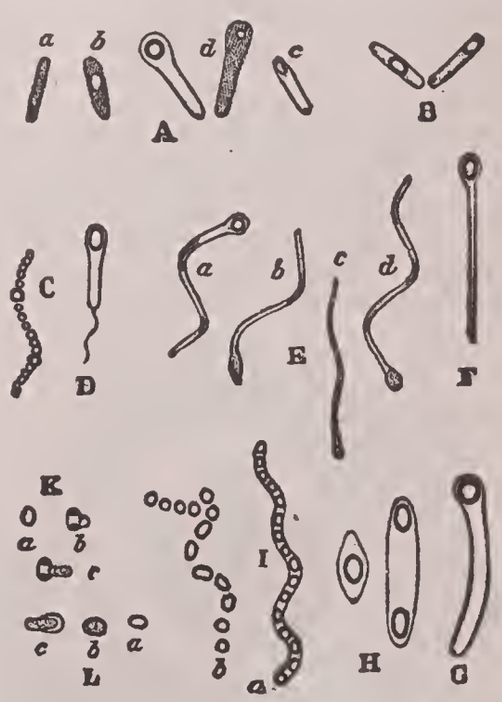

FIG. 5.—Types of Spore-formation in Schizomycetes. (After Zopf.) A, various stages in the development of the endogenous spores in a *Clostridium* (*Bacillus*)—the small letters indicate the order. B, endogenous spores of the hay bacillus. C, a chain of *cocci* of *Leuconostoc mesenterioides*, with two "resting spores," *i.e.*, arthrospores. (After Van Tieghem.) D, a motile rodlet with one cilium and with a spore formed inside. E, spore-formation in *Vibrio*-like (*c*) and *Spirillum*-like (*a*, *b*, *d*) Schizomycetes. F, long rod-like form containing a spore (these are the so-called "*Köpfchenbacterien*" of German authors). G, *Vibrio* form with spore. (After Prazmowski.) H, *Clostridium*—one cell contains two spores (Prazmowski). I, *Spirillum* containing many spores (*a*), which are liberated at *b* by the breaking up of the parent cells. K, germination of the spore of the hay bacillus (*B. subtilis*)—the axis of growth of the germinal rodlet is at right angles to the long axis of the spore. L, germination of spore of *Clostridium butyricum*—the axis of growth coincides with the long axis of the spore.

the second case they form filaments, or, if the further elongation and divisions of the cells proceed in different directions, plates or spheroidal or other-shaped

colonies. It not unfrequently happens, however, that groups of cells break away from their former connection as longer or shorter straight or curved filaments, or as solid masses. In some filamentous forms this "fragmentation" into multicellular pieces of equal length or nearly so is a normal phenomenon, each partial filament repeating the growth, division, and fragmentation as before (*cf.* Figs. 15 and 16). Finally, such filaments may break up into their individual cells, forming "bacilli," "bacteria," or "cocci" as the case may be. By these means hundreds of thousands of cells may be produced in a few hours,[1] and, according to the species and the conditions (the medium, temperature, etc.), enormous collections of isolated cells may cloud the fluid in which they are cultivated, or form deposits below or films on its surface; valuable

FIG. 6.—Characteristic groups of *Micrococci*. (After Cohn.) A, *Micrococcus prodigiosus*. B, *M. vaccinæ*. C, zooglœa stage of a *Micrococcus*, forming a close membrane on infusion—Pasteur's *Mycoderma*. (Very highly magnified.)

characters are sometimes obtained from these appearances. When these dense "swarms" of vegetative cells become fixed in a matrix of their own swollen contiguous cell-walls, they pass over into a sort of resting state as a so-called zooglœa (Fig. 3).

Zooglœa.

One of the most remarkable phenomena in the life history of the Schizomycetes is the formation of this zooglœa stage, which corresponds to the "palmella" condition of the lower *Algæ*. This occurs as a membrane on the surface of the medium, or as irregular clumps or branched masses (sometimes several inches across)

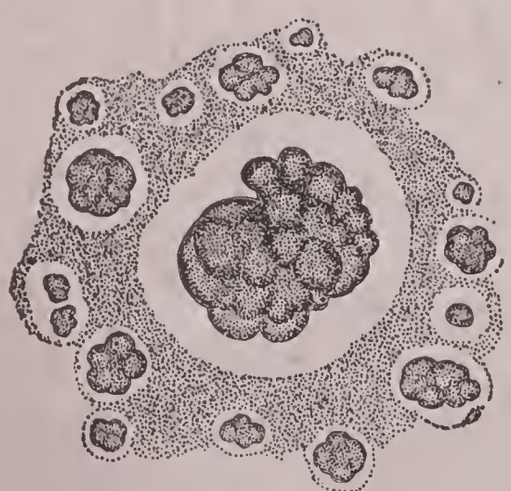

FIG. 7.—*Ascococcus billrothii*. (After Cohn.) It forms irregular colonies of zooglœa containing innumerable micrococci. (× 65.)

submerged in it, and consists of more or less gelatinous matrix enclosing innumerable "cocci," "bacteria," or other elements of the Schizomycete concerned. Formerly regarded as a distinct genus—the natural fate of all the various forms—the zooglœa is now known to be a sort of resting condition of the Schizomycetes, the various elements being glued together, as it were, by their enormously swollen and diffluent cell-walls becoming contiguous. The zooglœa is formed by active division of single or of several mother-cells, and the progeny appear to go on secreting the cell-wall substance, which then absorbs many

FIG. 8.—*Bacterium zopfii*. (After Kurth.) A, coils of the filamentous (*leptothrix*) stage still actively growing. B, the same coils observed a few hours later; the filaments have become cut up into segments by septa, the segments separating as rodlets (*bacteria*). C, the same coils a few hours later still; the rodlets broken up into yet shorter segments or *cocci*. (× 740.)

times its volume of water, and remains as a consistent matrix, in which the cells come to rest. The matrix—*i.e.*, the swollen cell-walls—in some cases consists

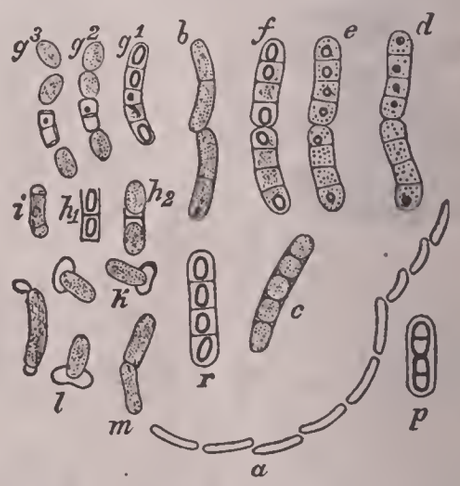

FIG. 9.—*Bacillus megaterium*. (After DeBary). *a*, a chain of motile rodlets still growing and dividing (*bacilli*); *b*, a pair of bacilli actively growing and dividing; *p*, a rodlet in this condition (but divided into four segments) after treatment with alcoholic iodine solution; *c*, *d*, *e*, *f*, successive stages in the development of the spores; *r*, a rodlet segmented in four, each segment containing one ripe spore; g^1, g^2, g^3, early stages in the germination of the spores (after being dried several days); h^1, h^2, *i*, *k*, *l*, and *m*, successive stages in the germination of the spore. (*a*, × 250; all the rest × 600.)

mainly of cellulose, in others chiefly of "mycoprotein," the substance said to be met with in the protoplasm; the matrix in some cases is horny and resistant, in others more like a thick solution of gum. It is intelligible from the mode of formation that foreign bodies may become entangled in the gelatinous matrix, and compound zooglœæ may arise by the apposition of several distinct forms, a common event in macerating troughs (Fig. 3, A). Characteristic forms may be assumed by the young zooglœa of different species,—spherical, ovoid, reticular, filamentous, fruticose, lamellar, etc.,—but these vary considerably as the mass increases or comes in contact with others. Older

[1] Brefeld has observed that a bacterium may divide once every half hour, and its progeny repeat the process in the same time. One bacterium might thus produce in twenty-four hours a number of segments amounting to many millions of millions.

zoogloeæ may precipitate oxide of iron in the matrix, if that metal exists in small quantities in the medium. Under favorable conditions the elements in the

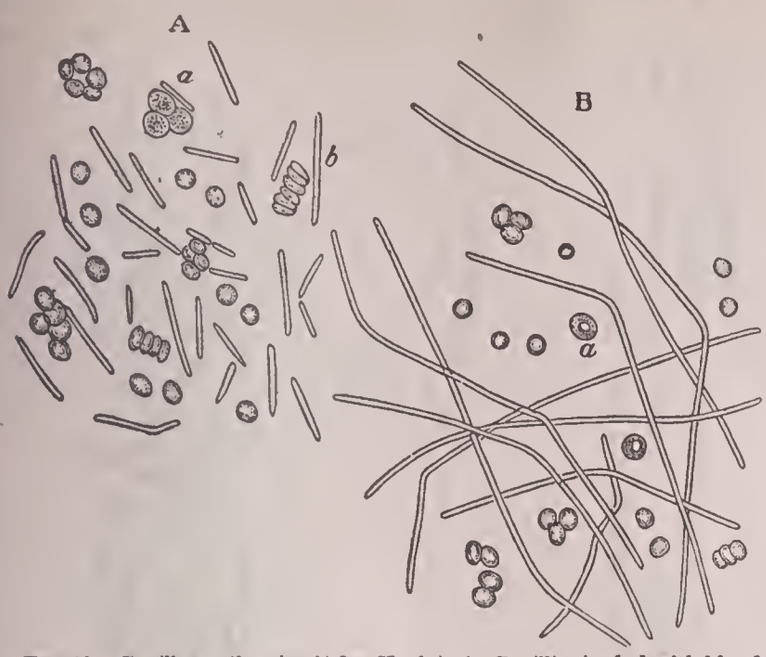

FIG. 10.—*Bacillus anthracis.* (After Koch.) A. *Bacilli* mingled with blood-corpuscles from the blood of a Guinea pig; some of the *bacilli* dividing. B, the rodlets after three hours' culture in a drop of aqueous humor. They grow out into long *leptothrix*-like filaments, which become separate later, and spores are developed in the segments. (× 650.)

zoogloea again become active, and move out of the matrix, distribute themselves in the surrounding medium, to grow and multiply as before (Fig. 4). If the zoogloea is formed on a solid substratum it may become firm and horny; immersion in water softens it as described above.

Spores. *Spores.*—Spores or resting-cells are now known in many Schizomycetes (Fig. 5). They may be formed in two ways. In *Leuconostoc*, *Bacterium zopfii*, *Crenothrix*, *Beggiatoa*, and *Cladothrix* the spore is simply one of the smallest segments ("cocci") into which the filament at length breaks up. De Bary terms such forms "arthrosporous" (*cf.* Figs. 8, 13, 14 and 16). In others the formation of the spore is "endosporous" (De Bary). It begins with the appearance of a minute granule in the protoplasm of a vegetative cell; this granule enlarges, and in a few hours has taken to itself all the protoplasm, secreted a dense envelope and is a ripe ovoid spore, smaller than the mother-cell, and lying loosely in it (*cf.* Figs. 9, 11, and 12). In the case of the simplest and most minute Schizomycetes (*Micrococcus*, etc.) no definite spores have been discovered; any one of the vegetative micrococci may commence a new series of cells by growth and division. We may call these forms "asporous," at any rate provisionally.

FIG. 11.—A, *Bacillus anthracis.* (After De Bary). Two of the long filaments (B, Fig. 10), in which spores are being developed. The specimen was cultivated in broth, and the spores are drawn a little too small—they should be of the same diameter transversely as the segments. (× 600.) B, *Bacillus subtilis.* (After De Bary.) 1, fragments of filaments with ripe spores; 2–5, successive stages in the germination of the spores, the remains of the spore attached to the germinal rodlets. (× 600.)

The spore may be formed in short or long segments, the cell-wall of which may undergo change of form to accommodate itself to the contents. As a rule only one spore is formed in a cell, and the process usually takes place in a bacillar segment. In some cases the spore-forming protoplasm gives a blue reaction with iodine solutions. The spores may be developed in cells which are actively swarming, the movements not being interfered with by the process (Fig. 5, D). The so-called "Köpfchenbacterien" of older writers are simply bacterioid segments with a spore at one end, the mother cell-wall having adapted itself to the outline of the spore (Fig. 5, F). The ripe spores of Schizomycetes are spherical, ovoid, or long-ovoid in shape, and extremely minute (*e.g.*, those of *Bacillus subtilis* measure 0.0012 mm. long by 0.0006 mm. broad according to Zopf), highly refractive and colorless (or very dark, probably owing to the high index of refraction and minute size). The membrane may be relatively thick, and even exhibit shells or strata.

The germination of the spores has now been observed in several forms with care. The spores are capable of germination at once, or they may be kept for months and even years, and are very resistant against desiccation, heat and cold, etc. In a suitable medium and at a proper temperature the germination is completed in a few hours. The spore swells and elongates, and the contents grow forth to a cell like that which produced it, in some cases clearly breaking through the membrane, the remains of which may be seen attached to the young germinal rodlet (Figs. 5, 9, and 11); in other cases the surrounding membrane of the spore swells and dissolves. The germinal cell then grows forth into the forms typical for the particular Schizomycete concerned.[1]

Pleomorphism. *Pleomorphism.*—As already stated, some Schizomycetes have been shown to present as vegetative forms, or phases in one and the same life-history, "cocci," "bacteria," "leptothrix-filaments," and even spiral and curved forms known as "spirillum," "vibrio," etc. On the other hand, several Schizomycetes which have been long and diligently investigated by the best observers show no such pleomorphism. As examples of the latter we may select *Bacillus megaterium* (Fig. 9) and numerous *Micrococci* which produce similar cells generation after generation. A remarkable example of a pleomorphic

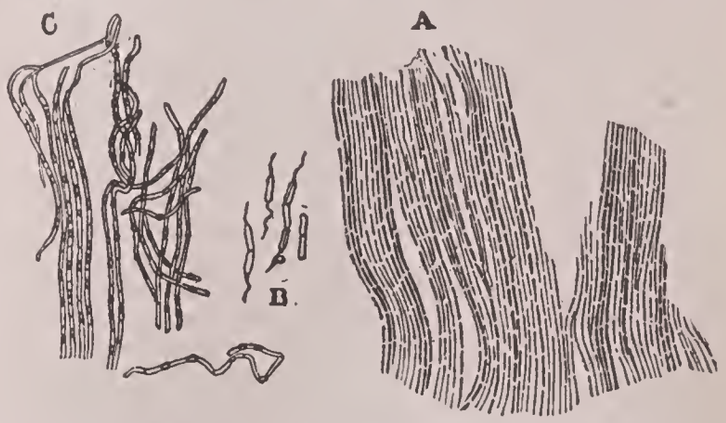

FIG. 12.—*Bacillus subtilis.* (After Strasburger). A, zoogloea pellicle (× 500). B, motile rodlets (× 1000). C, development of spores (× 800).

form is *Cladothrix dichotoma* (Fig. 16). According to Zopf this species passes successively through the stages known as "coccus," "bacterioid," "bacillar," and "leptothrix," by mere elongation and division by

[1] Cohn, *Beiträge zur Biologie*, passim; Zopf, *Die Spaltpilze*, 3d ed., 1885; De Bary, *Morph. und Biol. der Pilze*, etc., 1884, and *Vorlesungen über Bacterien*, 1885. The enormous and scattered literature on the morphology of Schizomycetes is collected to a great extent in the works cited.

transverse septa; the observer named declares that these simple filaments have formerly received generic and specific names (*Leptothrix parasitica* and *L.*

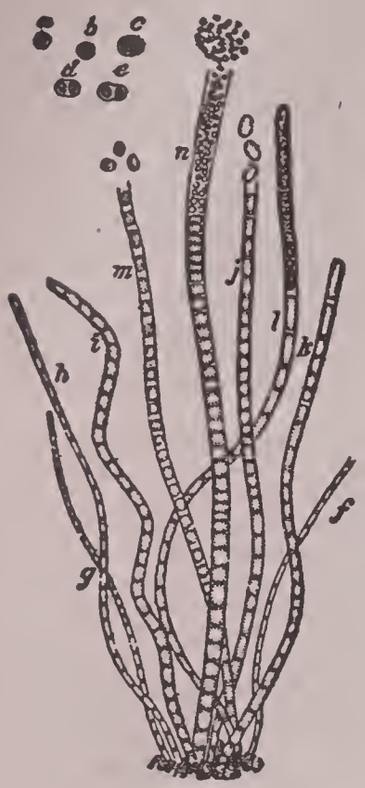

FIG. 13.

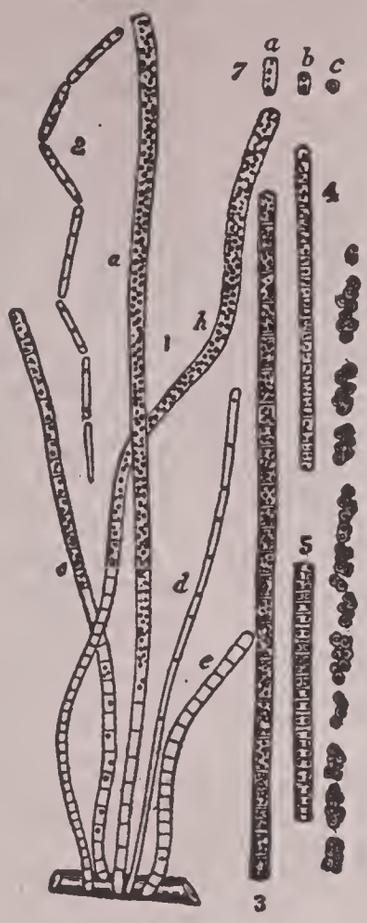

FIG. 14.

FIG. 13.—*Crenothrix kühniana.* *a* to *c*, cocci or spores,—*c*, *d*, and *e*, dividing; *f* to *n*, filamentous stage. The filaments vary in shape, diameter, etc., and are fixed below; at *i* to *n* is seen the common investing sheath; *m* and *j*, the segments separating and escaping; in *n* the segments divide up still further before escaping as minute *cocci* or spores—all stages of division are seen. (× 600.)

FIG. 14.—*Beggiatoa alba.* (After Zopf.) 1, a group of attached filaments (× 540); 2, a filament breaking up; 3, 4, 5, portions of filaments treated with methyl-violet so as to show the septa, which are usually obscured by the sulphur granules in the filaments; in 5 some of the segments are undergoing longitudinal as well as transverse divisions prior to forming cocci (spores); 6, cocci becoming isolated. (× 900).

ochracea, Kütz). Certain of the threads then partially break up, and the portions become slightly displaced from the linear series; these portions go on growing in a direction at an angle with the previous one, but still in contact, and thus produce the "false-branching" to which *Cladothrix* owes its name. Finally the filaments break up into segments corresponding with the septa which have been formed across them. This fragmentation is peculiar in that the filaments separate first into shorter filaments, then into rodlets, and finally into "cocci." Portions of the filaments or branches may become separated and travel with a gliding movement, or even become more active and swarm by means of cilia. Such portions may break up into shorter filaments or rods which also swarm. But, in addition to these straight and more or less rigid forms (which, it will be noticed, simulate Ehrenberg and Cohn's "genera" *Micrococcus*, *Bacterium*, *Bacillus*, and *Leptothrix* so closely that any of them observed alone would undoubtedly have been formerly placed apart in one of those "genera"), it is interesting to find that some of the filaments become spirally twisted and simulate *Spirillum*, *Spirochæte*, and *Vibrio*, the distinctions depending on the relative length and thickness of the filament, and the closeness or steepness of the coils. Moreover these twisted filaments also break up into shorter gliding or ciliated portions, which at length fall into rodlets and "cocci" as before.

A branched zoogloea form also occurs, and this contains cocci, bacterium-like or bacillar rods, or filaments resembling *Leptothrix* or *Vibrio* according to circumstances. In Lankester's *Bacterium rubescens* we have another species which is variable in a high degree. Many other Schizomycetes have now

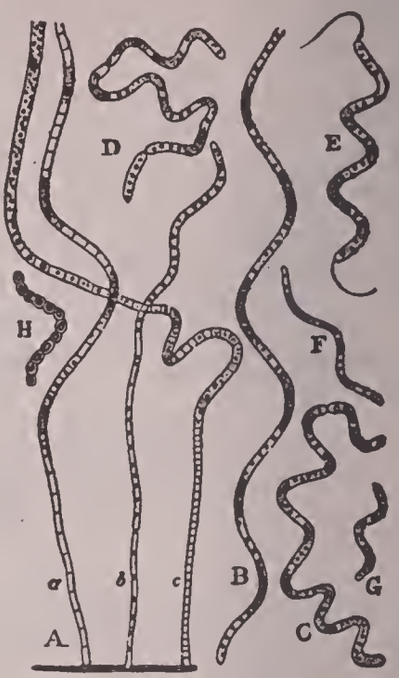

FIG. 15.—*Beggiatoa alba.* (After Zopf.) Curved and spiral forms. C, D, separated spirally-wound pieces, which are breaking up still further in H. E, motile *spirillum* form with a cilium at each end. (× 540).

been shown to be more or less pleomorphic, and the researches of Lankester, Nägeli, Zopf,

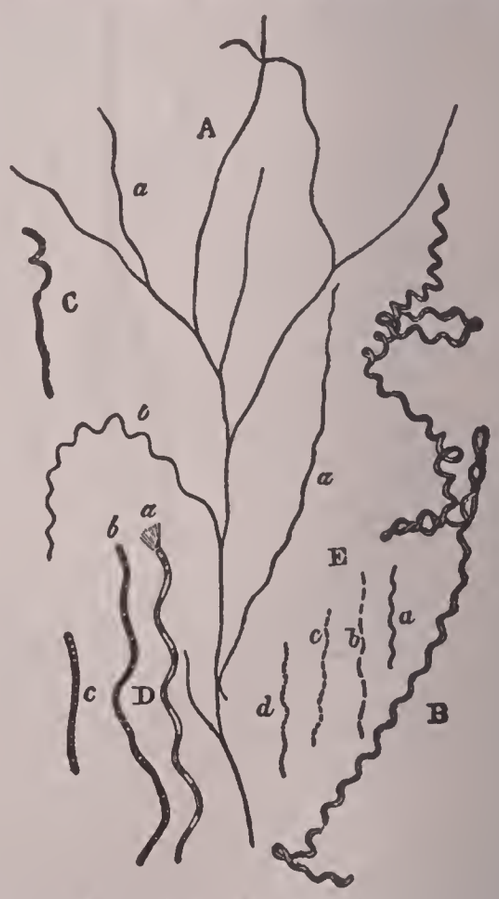

FIG. 16.—*Cladothrix dichotoma.* A, branched plant, the branches in part spiral and of the form known as *Vibrio* (*a*) or *Spirillum* (*b*) (slightly magnified). B, a long coiled branch more highly magnified. C, portion of branch resembling *Spirillum* at one end and *Vibrio* at the other. D, coiled branches,—*a*, not segmented; *b*, *c*, segmented into rodlets and cocci. E, *Spirochæte*-like portions breaking up into rodlets and cocci.

Miller, Kurth, De Bary, and others have laid the foundation for a knowledge of the circumstances which induce the changes in form referred to; it is at least

certain that alterations in the nutritive medium, in the quantity of oxygen at the disposal of the organism, and in the temperature, etc., play their part in the matter.

It by no means follows, however, that because some species are pleomorphic all must be so, and still less that no species of Schizomycetes—or only one—exist at all; those who deny the existence of species among the Schizomycetes on the evidence to hand must, to be logically consistent, deny the existence of species altogether. But even if that be allowed, some name of similar intention must be employed to denote any group of organisms which, within our experience, exhibit periodical repetitions of a process of development, *i.e.*, all the individuals of successive generations go through the same phases periodically. It matters not that variations—ill-defined deviations from an average or "type"—occur on the part of individuals or generations; the periodically repeated life-history or development marks what we term a species.

The difficulties presented by such minute and simple organisms as the Schizomycetes are due partly to the few "characters" which they possess, and partly to the dangers of error in manipulating them; it is anything but an easy matter either to trace the whole development of a single form or to recognize with certainty any one stage in the development unless the others are known. This being the case, and having regard to the minuteness and ubiquity of these organisms, we should be very careful in accepting evidence as to the continuity or otherwise of any two forms which fall short of direct and uninterrupted observation. The outcome of all these considerations is that, while recognizing that the "genera" and "species" as defined by Cohn must be recast, we are not warranted in uniting any forms the continuity of which has not been directly observed; or, at any rate, the strictest rules should be followed in accepting the evidence adduced to render the union of any forms probable.[1]

Classification. Classification.—The limits of this article prevent our examining in detail the system of classification proposed by Cohn, or the modifications of it followed by other authorities. Zopf, in the third edition of his work (1885), proposes a scheme based on the modern views as to the pleomorphism: we must refer to the original for the details, simply remarking that, apart from the extreme views accepted by the author, his system is impracticable to a degree and recognized by him as provisional only. Indeed any such classification must be provisional, for we are at the threshold only of a knowledge of the Schizomycetes.

The best starting-point for a modern classification of these organisms is that suggested by De Bary—the two modes of formation of the spores,—and as a provisional scheme, and simply to facilitate comparison of the groups, we might perhaps employ De Bary's two groups, and a third one to include those simple forms which show no trace of spore-formation. Many gaps exist, and many changes will probably have to be made. Meanwhile it might be advisable to classify the Schizomycetes provisionally as follows:

Group A. **Asporeæ**.

There are no spores distinct from the vegetative cells.

I. Coccaceæ (Figs. 6 and 7).
Genera: 1, *Micrococcus* (and *Streptococcus*); 2, *Sarcina* (and Zopf's *Merismopedia*); 3, *Ascococcus*.

Group B. **Arthrosporeæ** (De Bary).

The vegetative cells differ in shape, size, growth, or other characters from the spores: the latter are produced by segmentation.

II. Arthrobacteriaceæ.
Genera: 4, *Bacterium* (Fig. 8); 5, *Leuconostoc*; 6, *Spirochæte* (?).

III. Leptotricheæ.
Genera: 7, *Crenothrix* (Fig. 13); 8, *Beggiatoa* (Figs. 14 and 15); 9, *Phragmidothrix* (?); 10; *Leptothrix*.

IV. Cladotricheæ.
Genus: 11, *Cladothrix* (Fig. 16).

Group C. **Endosporeæ** (De Bary).

Genera: 12 (Figs. 9–12), *Bacillus* (and *Clostridium*); 13, *Vibrio* (?); 14, *Spirillum* (at least in part).[2]

Physiology.—As in the case of other plants, we are here concerned with the functions of the Schizomycetes and their relations to the environment; for convenience, the subject may be treated under various headings. Limitation of space prevents our doing more than touch lightly upon such matters as the action of the Schizomycetes as ferments, and their relations to disease, though both subjects belong strictly to the physiology of their nutrition and actions on the environment.

Nutrition. *Nutrition.*—Having no chlorophyll, the Schizomycetes of course depend on other organisms for their carbonaceous food, and are either saprophytes —*i.e.*, live on the remains of dead organisms— or parasites—*i.e.*, obtain their food direct from living organisms. Pasteur, Nägeli, and others have shown that these organisms can derive their carbon from very numerous and widely different organic substances, *e.g.*, sugars of all kinds, mannite, glycerine, tartaric and other vegetable acids, etc., and even from ethyl-alcohol, benzoic, salicylic, and carbolic acids to some extent. Carbonic, formic, and oxalic acids, cyanogen, urea, and oxamide are, however, useless for this purpose. The nitrogen and carbon together may be obtained from leucin, asparagin, methylamine, etc., or the nitrogen alone from these or urea, and compounds of ammonia with vegetable acids or phosphorus. The best nutritive substances are proteids (peptones) and sugars (glucoses); others must be passed over here. The nature of the particular Schizomycete has to be studied as well as the solution, and external agents affect the matter also. Certain minerals are of course necessary,—sulphur, phosphorus, potassium (or rubidium or cæsium), and calcium (or magnesium, barium, or strontium) being indispensable. As one of many suitable nutritive solutions we may select the following:

Di-potassium phosphate	0.20	gramm.
Magnesium sulphate	0.04	"
Calcium chloride	0.02	"
Peptone	1.00	"
Water	100.00	"

For other solutions, particulars as to changes of concentration, etc., and the peculiarities of different Schizomycetes in this connection, special works must be consulted.

The chief sources of error in cultures of these very minute forms are the introduction of spores, etc., from without into the vessels, and on the instruments, etc., and the difficulty of continuously observing a developing individual with the necessary high powers. Numerous errors have arisen from inferences being employed to fill up gaps in life-histories which have only been partly observed. The first object of the cultivator, then, is to guarantee the purity of his materials, instruments, etc., and then to keep one form (or even a single specimen) under observation for a sufficiently long period and under suitable conditions. The practical difficulties are enormous, of course, and are very rarely entirely overcome for periods at all long. Here again we must refer to the special works for details as to the beautiful and refined methods now devised or employed by De Bary, Cohn, Koch, Brefeld, Lister, Nägeli, and others, calling special attention to the gelatine method devised by Vittadini and Brefeld and so successfully used and improved by Koch. Thoroughly conducted cultivations should decide in what medium the Schizomycete flourishes best, and how it behaves in others,—what vegetative forms it presents normally, and how changes in the environment affect these. They should also decide the characters of the aggregates or colonies; at what temperatures germination, growth, division, spore-formation, etc., take place or cease, and so on; the necessity or otherwise of free oxygen; the effects of the organism on its substratum or medium—whether it cause fermentation, or putrefaction, or excrete soluble ferments, and so on. Moreover, the products of these actions should be examined in detail. Where the particular Schizomycete is a parasite

[1] Ray Lankester, *Quart. Jour. Micr. Sc.*, 1873 and 1876; Nägeli and Buchner, *Niedere Pilze*, 1882; Billroth, *Untersuchungen über die Vegetationsformen der Coccobacteria septica*, Berlin, 1874; Klebs, numerous papers in *Archiv f. exp. Pathol. und Pharmacol.*; Kurth, *Bot. Zeitung*, 1883; Prazmowski, *Biol. Centralblatt*, 1884; Zopf, *Zur Morph. der Spaltpflanzen*, Leipsic, 1882; Cienkowski. *Zur Morphologie d. Bacterien*, 1876.

[2] For the definitions of the genera (and species) the reader is referred to the special works, especially those of Zopf and De Bary; also Winter-Rabenhorst, *Kryptogamen Flora—Pilze*, i., 1881; and Grove, *Synopsis of the Bacteria and Yeast Fungi*, 1884.

(wholly or partially) the methods of culture are even more refined. Here the fluids or tissues of the host must be regarded as a soil in which (by means of "infection," "inoculation," etc.) the observer sows the spores or vegetative cells of the parasitic organism. It is impossible to go more into details in the limits of this article, however, and we must dismiss the subject with the remark that, having regard to the complexity of the medium (*e.g.*, blood) and the organization of the host, the difficulties of manipulation become greater than ever.

Physical conditions.

Temperature.—As with other plants, so with the Schizomycetes, their various functions, *e.g.*, germination, growth, division, formation of spores, etc., can only be carried on at certain temperatures: the best average temperature is about 35° C., but the optimum may differ for each species and for each function. The same is generally true for the minimum and maximum temperatures, which have to be determined separately also. Remarkable phenomena are connected with the death-points of certain *Bacilli*, etc. The spores of some of these forms have been frozen for days or weeks without injury, and some are said to have resisted temperatures as low as —100° C., or even lower: it appears to be all but impossible to kill such spores by cold. High temperatures are more fatal; but the spores of *Bacilli* have germinated after the fluid containing them was boiled for an hour, and even a temperature of 110° C. and higher has been withstood. The vegetative states are less resistant; nevertheless the bacilli of anthrax were not killed by heating the fluid to 75–80° for an hour or more. Speaking generally, ripe spores are most resistant and germinating ones least so; dry cells or spores resist extreme temperatures better than normally saturated ones. Of course time is an important factor; and other conditions also affect the matter, *e.g.*, slightly acid media are more fatal than neutral or feebly alkaline ones, denser less so than thin ones (*cæteris paribus*), and so on.

To illustrate the importance of these facts we may note Tyndall's method of "discontinuous heating": by boiling the solutions containing the spores for 5–10 minutes daily all the life was destroyed in two or three days, though an exposure of an hour or more to a temperature of 100° C. did not kill the spores if not repeated. The explanation is that the spores which resist the first or second short boiling have time to begin germinating in the interval, and they then succumb at once when the liquid is again boiled.[1]

Light, Electricity, Gravitation, etc.—The relations between these and the functions of Schizomycetes have been partly investigated, but the results must be passed over here. A few of the higher genera show polarity—or at any rate difference between base and apex.[2]

Chemistry.

Effects of Chemical Agents.—Oxygen.—Pasteur showed that, while some Schizomycetes require free oxygen like other plants, there are some which need none, or at most very little—the extreme case is perhaps still doubtful; but "anaerobiotic" forms like *Bacillus butyricus* stand in sharp contrast to such exquisitely "aerobiotic" ones as *Bacterium aceti*, *Bacillus subtilis*, etc. A few are known to flourish best—or at any rate they are more active—when supplied with oxygen in proportion less than that in the atmosphere. Engelmann showed that, while some species congregated close to a bubble of air, others collected at a certain distance from it, and came nearer when the bubble contained less oxygen. The same is true for the same species when brought near an *Alga* which is evolving oxygen—the aerobiotic forms collect where the oxygen is being evolved (in the yellow-red, etc., of the spectrum). Some Schizomycetes are powerful deoxidizing and reducing agents: it has already been stated that *Beggiatoa* deposits pure sulphur in its filaments. *Bacterium aceti* and others, on the contrary, transfer oxygen in large quantities to the medium in which they live, and the carbon in that may be entirely consumed. Fermentation once started may go on without free oxygen or not (according to the particular Schizomycete, etc.), but it is necessary at the commencement. Oxygen is of course necessary for the respiration of the growing Schizomycete.[3]

Water is absolutely necessary for the life and growth of the Schizomycetes, but the spores (and to a less extent the vegetative cells) of some can resist desiccation for long periods; others (*e.g.*, *Bacterium zopfii*) soon die. Those of *Bacillus subtilis* have been kept air-dry for years; and those of *B. anthracis* were not killed after several weeks in absolute alcohol. A year in water failed to kill the spores of *B. subtilis*. Zooglœa and vegetative cells of some resist drying for some time—how long is uncertain. In the dry state spores and cells are disseminated by currents of air: how far spores may be buried and still retain life (carried down by rain, etc.) is uncertain. The importance of these facts, however, is obvious.[4]

Acids, Poisons, etc.—The reader must be referred to the literature for details as to the quantities of acids and other products of their own decomposition which can be endured by given Schizomycetes (see especially the literature on fermentation and cultivation, and also respecting the action of poisons, antiseptics, etc.).[5]

Attraction to food materials.

Attraction towards Proteid Food-Substances.—Bacteria have long been known to swarm around pieces of organic food-materials, but although Ehrenberg and Cohn noticed the fact it was not investigated in detail until quite recently. Pfeffer finds that *Bacteria* and *Spirilla* are attracted in a definite manner towards minute tubes containing extract of meat or solution of asparagin, just as he finds antherozoids and zoospores of various kinds attracted by definite substances into tubes designed to imitate archegonia. For Pfeffer's proofs that the substances mentioned exert a specific attraction on the organism the reader is referred to his treatise, "Locomotorische Richtungsbewegungen durch chemische Reize," in *Unters. aus dem bot. Inst. zu Tübingen*, i. Hft. 3, 1884.

Fermentation.

Fermentation and Putrefaction.—The growth and development of a Schizomycete in any organic medium results in a breaking down of the complex food-materials into simpler bodies, which may then become oxidized and still further decomposed. Such processes are known as fermentation in the wider sense. The particular kind of fermentation depends on the medium and on the species of Schizomycete, and may be affected by other circumstances; as the process goes on volatile substances may escape and others remain behind. Where proteid substances are being decomposed by Schizomycetes and evil-smelling gases escape, the fermentation is spoken of as putrefaction; in certain cases, where intense oxidation follows and still further consumes the products of decomposition, the process has been termed eremocausis. In a few instances a process of reduction sets in, as when sulphur salts are decomposed by *Beggiatoa*. The theory of FERMENTATION (*q.v.*) cannot be treated in detail here, but it is important to note that side by side with the actions referred to another kind of action may go on. Many Schizomycetes excrete what are called "soluble ferments," which are capable of changing proteids into peptones, sugar into glucose, and so on. These processes of inversion, etc., result simply in an alteration of the proteid, etc., from the non-diffusible and non-assimilable condition to the diffusible and assimilable one, and are in no way destructive as are the fermentations described above. Nevertheless it is the custom to speak of both as cases of fermentation; the one series of changes renders the medium less and less capable of supporting life at every stage, the other series does not do so, yet the same name is frequently given to both kinds of action. It is a curious fact that the same Schizomycete may produce a different fermentation in each of two different media. The various fermentations are distinguished and valued according to the products which result; these bye-products are usually injurious to the ferment organism as they accumulate, and often complicate the investigation.

Of important fermentations due to Schizomycetes may be mentioned those concerned in the making of vinegar and cheese, in the preparation of flax, hemp, etc., in the souring and diseases of beer, wines, etc., the destruction of sugars, preserved food, etc. Others are of importance in the soil, and in the destruction of organic matter in ponds, rivers, drains, etc. In fact, much of the *raison d'être* of sanitary science may be referred here; and it may turn out to be still more true than we now know that Schizomycetes are important in agriculture.

In pathology the changes due to these organisms are at length being duly recognized. Apart from the comparatively harmless actions of those forms normally existing in the alimentary canal—*Leptothrix* aids in the decay of teeth, etc.—it is now certain that some invasions are dangerous. The injurious effects of some Schizomycetes when intro-

[1] See Cohn, *Beitr. zur Biol. d. Pfl.*, i. Hft. 2, 1872, ii. Hft. 2, 1876; Eidam, *Beitr. zur Biol.*, i. Hft. 3, 1875; Brefeld, *Unters. über Schimmelpilze*, iv.; Tyndall, *Floating Matter of the Air*, 1881; Roberts, *Phil. Trans.*, 1874; Pasteur, *Ann. de Chimie*, 1862.

[2] See Engelmann, *Unters. aus. d. Physiol. Lab. zu Utrecht*, 1882; Cohn and Mendelssohn in *Beitr. zur Biol. d. Pfl.*, iii. Hft. 1, 1879; Pfeffer, *Pflanzenphysiologie*, ii. p. 156, 1881.

[3] See Pasteur, *Comptes Rendus*, 1861–62; Nägeli, *Theorie der Gährung*, 1879; Schützenberger, *Fermentation*, 1876; Engelmann, *Bot. Zeitung*, 1881 and 1882; Pfeffer, *Pflanzenphysiologie*, 1881.

[4] See Pasteur, *Comptes Rendus*, 1883; Kurth, "Bacterium zopfii," in *Bot. Zeitung*, 1883; Brefeld, *Schimmelpilze*, iv.; see also the literature on distribution and occurrence of Schizomycetes.

[5] See Woodhead and Hare, *Pathological Mycology*, i., 1885. Further literature is there quoted.

duced into open wounds, etc., against which the brilliant labors of Lister have been so successfully directed, are acknowledged everywhere; but it is important to recognize that on the whole the diseases due to organisms in the blood depend fundamentally upon changes of the same category as those referred to. Of course the fluids of a living body present complicated conditions, and the action of a pathogenous Schizomycete cannot be treated and studied simply as a typical fermentation; but, although the conditions presented are involved and special, it cannot be doubted that common principles lie at the base of all the phenomena, and that the fluids of the diseased organism must be treated, so to speak, as fermentable media.

Numerous other fermentations of scientific interest are due to Schizomycetes; *e.g.*, those in which colors are formed, certain cases of phosphorescence, the ammoniacal fermentation of urine, etc.[1]

Schizomycetes and Disease.—The presence of Schizomycetes in the blood, tissues, or organs of animals and man suffering from certain specific diseases is admitted, and has naturally suggested the question—Are they accompaniments only or have they any causal relations to the diseased conditions? Their constancy in given cases excluded the former view. Next arose the discussion as to how the causal connection comes about and in what it consists, a discussion which is still going on as to the details. The chief points now established may be expressed generally somewhat as follows:

Relations to disease.

In a given specific disease, due to the action of a definite Schizomycete, the latter may be conceived to be injurious in several ways. If it robs the blood or tissues of oxygen or of any other valuable constituent, or if its activity results in the excretion of poisonous substances or in their formation as products of degradation of the matrix, or if it simply acts more or less as a mechanical obstruction or irritant,—in any of these cases harm may result to the delicately adjusted organism of the host. It being known that Schizomycetes act thus in nutrient pabula outside the body, their rapid growth and multiplication inside can of course only be explained as due to their success in the pabula there met with, and are indications that they produce changes there which must result in abnormality so far as the host is concerned. This does not end the matter, however. The living tissues of a healthy animal exert actions which are antagonistic to those of the parasitic invader; and it is now generally admitted that the mere admission of a Schizomycete into an animal does not necessarily cause disease. Were it otherwise it is difficult to see how the higher organisms could escape at all. Schizomycetes abound all over, about, and around us; many, of course, are unable to live in the fluids of the body, but many are able to do so. Something must therefore be placed to the action of the tissues of the host, which when healthy can "resist" the attempts of a Schizomycete to settle, grow, and multiply with fatal effect. Much can undoubtedly be explained by this struggle for existence between the cells of the parasite and those of the healthy tissues invaded. But the higher organisms, again, present obstacles of other kinds to the lodgment of Schizomycetes; ciliary actions, active excretions, isolating processes of tissue-formation, etc., may be mentioned. Thus not every Schizomycete met with in the body can do harm.

But even when a Schizomycete has gained access to the bloodvessels, lymph-passages, etc., and has succeeded in establishing itself and multiplying, there are other facts to be taken into account before we dismiss the question as to its relations to disease. The rapidity of its growth may vary according to many circumstances,—temperature, oxidation, etc.,—as well as the still partially obstructive action of the invaded organism; whether the parasite excretes a poison, or simply robs the host, or distributes injurious agents of any kind, it is clear that everything which favors it aids in intensifying its action. And this may be local or general also according to complex circumstances. Of course sores, open wounds, etc., may render the access of a given Schizomycete very easy, and pave the way for its success in the tissues, etc., different strata of which may be exerting less and less resistance to its attacks. The study of this subject has led to the methods of modern surgery devised by Lister. It may be mentioned that Schizomycetes which produce bad effects on injured or dead tissues of wounds are not necessarily able to live in the healthy organism, however deadly the poisonous products of their action may be when they succeed in establishing themselves.

All these and many other facts, then, point to the conclusion that the mere presence of a Schizomycete in an organ or tissue is not sufficient proof of its causal relation to disease, and lead us to the following requirements to be satisfied before any such relation can be admitted (Koch): (1) given a specific disease in which a definite Schizomycete is constantly detected, and with a constant disposition with respect to the tissues, organs, etc.,—this organism should be absent from animals free from the disease; (2) the Schizomycete should be cultivated in nutrient media outside the body, kept pure for several "generations," and obtained in some quantity by these means; (3) inoculation of a small amount of this pure cultivation should reproduce the specific disease in a healthy animal; (4) the same foreign elements as before should be clearly detected in the tissues of the now diseased subject, and in the same relations as before.

The satisfying of all these requirements is difficult, and the necessity of overcoming the difficulties has led to what may almost be termed a special branch of medical art. At the same time the majority of the principles which are here becoming recognized have long been known to biologists, and especially to botanists, and there are still numerous indications of a want of botanical training on the part of writers on these subjects. It is impossible here to even mention all the methods devised for staining, preparing, and examining tissues, etc., and the Schizomycetes they contain, or for cultivating these minute organisms under constant conditions on sterilized potatoes, bread-paste, jelly, blood-serum, etc., or in animal infusions or fluids, etc. Some of the more important points in cultivation have already been referred to; the literature must be consulted for further details.[2] (H. M. W.)

SCHLAGINTWEIT-SAKÜNLÜNSKI, Hermann von (1826–1882), the eldest of a band of brothers, all more or less noted as scientific explorers or students of foreign countries, sons of an oculist of Munich. Hermann was born on the 13th of May, 1826. His first scientific labors were studies in the Alps, carried on between 1846 and 1848 in association with his brother Adolf (born January 9, 1829). The publication of the *Studien über die physikalische Geographie der Alpen* in 1850 founded the scientific reputation of the two brothers, and their reputation was increased by their subsequent investigations in the same field, in which the third brother Robert (born October 27, 1833) also took part. Soon after the publication of the *Neue Untersuchungen über die phys. Geog. u. Geol. der Alpen* (1854, 4to), the three brothers received, on the recommendation of Alex. von Humboldt, a commission from the East India Company to travel for scientific purposes in their territory, and more particularly to make observations on terrestrial magnetism. Their explorations extended over the period 1854–57, during which they travelled, sometimes in company, sometimes separately, in the Deccan and in the region of the Himalayas, even prosecuting their investigations beyond the frontiers of the Company's territory into the region of the Karakorum and Kuenlun Mountains. Hermann and Robert were the first Europeans who crossed the latter mountains, and it was in honor of that achievement that the former had the title or surname of Sakünlünski bestowed upon him (in 1864). The two returned to Europe in the summer of 1857, but Adolf, who remained to prosecute his explorations in Central Asia, was put to death by the emir of Kash-

[1] Watson Cheyne, *Antiseptic Surgery*, 1882; Duclaux, *Chimie Biologique*, 1883; Fitz, "Ueber Schizomyceten-Gährungen," various papers in *Ber. d. deutsch. chem. Gesellschaft*, 1876-1884; Lister, *Pharm. Jour.*, 1877; Nägeli, *Theorie der Gährung*, 1879; Wortmann, *Zeitschr. f. physiol. Chemie*, vi.; Schützenberger, *Fermentation*, 1876; Musculus, "Ueber die Gährung des Harnstoffs," in *Pflüger's Archiv*, xii.; Pasteur, *Ann. de Chim. et Phys.*, 1858, and various papers in *Comptes Rendus*, also *Études sur la Bière*, 1876, and *Études sur le Vin*, 1866; Schlössing and Müntz, *Comptes Rendus*, lxxxiv., lxxxix.; *Pasteur: his Life and Labors*, London, 1885; Schroeter in Cohn's *Beitr. zur Biol.*, Hft. 2, 1872; Van Tieghem, "Bacillus Amylobacter," in *Comptes Rendus*, 1879.

[2] Only a few authorities can be mentioned here, for the literature on pathogenous Schizomycetes and methods is simply enormous; further references may be made to the works of Babes, Koch, Davaine, Pasteur, Chauveau, Bollinger, Fehleisen, Klein, Gaffky, Miller, Rosenbach, Oertel, Obermeyer, Burdon-Sanderson, Toussaint, Waldeyer, Watson Cheyne, Dreschfeld, and many others. Flügge, "Ferment und Mikroparasiten," in Ziemssen's *Handbuch der Hygiene*, Leipsic, 1883; Magnin, *Les Bacteries*, Paris, 1878; Klein, *Micro-organisms and Disease*, 1884; Woodhead and Hare, *Pathological Mycology*, 1885. Valuable papers are also to be found in the following periodicals: *Brit. Med. Jour.*, *Trans. of the Pathol. Soc.*, *Virchow's Archiv*, *Archiv f. exp. Pathol.*, *Centralbl. f. d. med Wiss.*, *Bull. de l'Acad. de Méd.*, *Deutsche med. Wochenschrift*, *The Lancet*, *Quart. Jour. of Micr. Sc.*, and others.

gar on the 26th of August. Between 1860 and 1866 Hermann and Robert published in four volumes the "Results of a Scientific Mission to India and High Asia." The extensive collections of ethnography and natural history made by them were ultimately deposited in the Burg at Nuremberg through the intervention of the king of Bavaria (May, 1877). Hermann spent the last years of his life chiefly in literary and scientific activity, partly at Munich partly at the castle of Jägersburg near Forchheim. He died at Munich on the 19th of January, 1882.

His brother Robert was appointed professor of geography at Giessen in 1864, but his academical labors were sometimes interrupted by travels, especially in the United States, which furnished him with material for more or less important works. He died at Giessen, June 6, 1885. Of two other brothers, one, Edward (born March 23, 1831), killed in battle at Kissingen in 1866, made himself known by an account of the Spanish expedition to Morocco in 1859–60. Emil (born July 7, 1835) is the author of several learned works relating to India and Tibet.

SCHLANGENBAD. See SCHWALBACH.

SCHLEGEL, AUGUST WILHELM VON (1767–1845), German poet, translator, and critic, was born on the 8th September, 1767, at Hanover, where his father, J. Adolf Schlegel, was a pastor. He was educated at the Hanover gymnasium and at the university of Göttingen. Having spent some years as a tutor in the house of a banker at Amsterdam, he went to Jena, where he was made a professor and received from the duke of Weimar the title of "Rath." Here he began his translation of Shakespeare, which was ultimately completed, under the superintendence of Tieck, by Tieck's daughter Dorothea and Count Baudissin. A revised edition of this rendering, which is considered one of the best poetical translations in the German language, has been issued by the German Shakespeare society. At Jena Schlegel contributed to Schiller's periodicals the *Horen* and the *Musenalmanach;* and with his brother Friedrich he conducted the *Athenæum*, which ranked among the most powerful organs of critical opinion in Germany. He also published a volume of poems, and carried on a rather bitter controversy with Kotzebue. At this time the two brothers were remarkable for the vigor and freshness of their ideas, and commanded respect as the leaders of the rising Romantic school. In 1802 Schlegel went to Berlin, where he delivered lectures on art and literature; and in the following year he issued *Ion*, a tragedy in the antique style, which gave rise to a suggestive discussion on the principles of dramatic poetry. About the same time appeared his *Spanish Theatre*, in which he presented admirable translations of five of Calderon's plays; and in another volume he gave translations of Spanish, Portuguese, and Italian lyrics. In 1807 he attracted much attention in France by an essay in the French language, in which he compared Racine with Euripides. His lectures on dramatic art and literature, which have been translated into most European languages, were delivered at Vienna in 1808. Meanwhile he had been travelling in France, Germany, Italy, and other countries with Madame de Staël, who owed to him many of the ideas which she embodied in her work, *De l'Allemagne.* In 1813 he acted as the secretary of the crown prince of Sweden, through whose influence the right of his family to noble rank was revived. Schlegel was made a professor at the university of Bonn in 1818, and during the remainder of his life he occupied himself chiefly with Oriental studies, although he continued to lecture on art and literature, and in 1828 he issued two volumes of critical writings. In 1823–30 he published the *Indische Bibliothek;* and as separate works appeared (1823) the *Bhagavad-Gîta* with a Latin translation, and (1829) the *Râmâjana.* Schlegel was twice married—first to a daughter of Prof. Michaelis of Göttingen, then to a daughter of Prof. Paulus of Heidelberg. Both wives separated from him soon after their marriage. He died at Bonn on the 12th May, 1845. As an original poet Schlegel is unimportant, but as a poetical translator he has rarely been excelled, and in criticism he exercised a strong influence by the emphasis with which he marked the distinction between classical and romantic literature. By his study of Sanskrit he helped to prepare the way for the development of the science of language.

In 1846–47 Schlegel's German works were issued in twelve volumes by Böcking. There is also an edition of his *Œuvres, écrites en français* and of his *Opuscula Latina.*

SCHLEGEL JOHANN ELIAS (1718–1749), a German dramatic writer, was born at Meissen on the 28th January, 1718. He was educated at Schulpforta and at the university of Leipsic. In 1743, having finished his studies, he became private secretary to his relative, Von Spener, the Saxon ambassador at the Danish court. Afterwards he was made professor extraordinary at the academy of Soröe, where he died on the 13th August, 1749. Schlegel was a contributor to the *Bremischen Beiträge*, and for some time, while he was living in Denmark, he edited a weekly periodical, *Der Fremde.* He was also known as a writer of clever poetical epistles. Incomparably his best works, however, are his dramas, which did much to prepare the way for the dramatic achievements of Lessing, by whom his genius was warmly appreciated. He wrote two lively and well-constructed comedies, the *Triumph der guten Frauen* and the *Stumme Schönheit*, the latter in alexandrines, the former in prose. *Hermann* and *Kanut* (in alexandrines) are generally considered his best tragedies.

His works were edited after his death by his brother J. H. Schlegel, who had a considerable reputation as a writer on Danish history. Another brother, J. Adolf Schlegel, an eminent preacher, and author of some volumes of verse, was the father of August Wilhelm and Friedrich von Schlegel.

SCHLEGEL, KARL WILHELM FRIEDRICH VON (1772–1829), known chiefly as an historian of literature, was the brother of August Wilhelm von Schlegel. He was born at Hanover on the 10th March, 1772. Having studied at Göttingen and Leipsic, he attracted some attention by a book on the *Griechen und Römer* (1797), which was praised by Heyne. This work was soon followed by his *Geschichte der Poesie der Griechen und Römer.* At Jena, where he lectured as a privatdocent at the university, he contributed to the *Athenæum* many striking critical articles, and a number of lyrical poems which were afterwards included in a volume entitled *Gedichte.* Here also he wrote *Lucinde*, an unfinished romance, which was held by some of the best of his contemporaries to be of a deeply immoral tendency, and *Alarcos*, a tragedy, in which he attempted without much success to combine romantic and classical elements. In 1802 he went to Paris, where he edited *Europa*, lectured on philosophy, and carried on Oriental studies, some results of which he embodied in a well-known book, *Ueber die Sprache und Weisheit der Indier.* In 1803 he and his wife joined the Roman Church, and from this time he became more and more opposed to the principles of political and religious freedom. He went to Vienna in 1808, and in the following year was engaged as imperial court secretary at the headquarters of the archduke Charles. At a later period he was for some time councillor of legation in the Austrian embassy at the Frankfort diet, but in 1818 he returned to Vienna. Meanwhile he had published two series of lectures, *Ueber die neuere Geschichte* (1811) and *Geschichte der alten und neuen Literatur* (1815). After his return to Vienna from Frankfort he edited *Concordia*, and began the issue of his *Sämmtliche Werke.* He also delivered lectures, which were republished in his *Philosophie des Lebens* (1828) and in his *Philosophie der Geschichte* (1829). He died on the 11th January, 1829, at Dresden, where he was delivering the course of lectures which appeared in 1830 under the title

Philosophische Vorlesungen, insbesondere über die Philosophie der Sprache und des Wortes. His own collection of his works included ten volumes, and to this number five volumes were added after his death. A permanent place in the history of German literature belongs to Freidrich Schlegel and his brother August Wilhelm as the critical leaders of the Romantic school, which derived from them most of its governing ideas as to the characteristics of the Middle Ages, and as to the methods of literary expression. In their writings, too, there is the fullest and most impressive statement of the mystical spiritual doctrines of the Romantic school. Of the two brothers, August Wilhelm did the highest permanent service to his countrymen by his translations from Shakespeare and Calderon. The best of Friedrich's works is his *Geschichte der alten und neuen Literatur*, in which was presented for the first time a systematic account of the development of European literature as a whole.

Friedrich Schlegel's wife, Dorothea, a daughter of Moses Mendelssohn, was born at Berlin about the year 1770, and died at Frankfort in 1839. She was an eccentric but remarkably clever woman, and wrote or edited several works, issued by her husband,—the unfinished romance *Florentin* (1801), the first volume of the *Sammlung romantischer Dichtungen des Mittelalters* (2 vols., 1804), and *Lother und Maller* (1805). By her first marriage she had a son, Philip Veit, who became one of the most eminent painters of his day in Germany.

SCHLEICHER, August (1821–1868), born at Meiningen on February 19, 1821, studied at the universities of Leipsic and Tübingen, became extraordinary professor of philology in Prague in 1850, removed to Jena as ordinary professor in 1857, and died there on December 6, 1868. His work is characterized in the article Philology, vol xviii. p. 795–6.

SCHLEIDEN, Matthias (1804–1881), was born at Hamburg in 1804. He studied law at Heidelberg and practiced as advocate in Hamburg till 1831, but not succeeding he studied botany and medicine at Göttingen and Berlin, and graduated in Jena in 1839, where he afterwards became professor of botany (1846–50). In 1863 he was called to Dorpat, but resigned the following year and returned to Germany, where he lived as a private teacher. He died at Frankfurt in 1881. His title to remembrance is twofold. Uniting the labors of two centuries of workers in vegetable histology, from Malpighi and Grew to Mirbel and Robert Brown, he proved that a nucleated cell is the only original constituent of the plant embryo, and that the development of all vegetable tissues must be referred to such cells, thus preparing the way for the epoch-making cell theory of Schwann; and his *Principles of Scientific Botany*, which went through several editions (1842–50), did much to shake the tyranny of the purely systematic Linnean school, whose accumulations he was accustomed irreverently to describe as "hay." Despite a certain inability to criticise and verify his own hypotheses, he gave, both by his speculative activity and by the introduction of improved technical methods, so vivid an impulse to the younger botanists of his time as to have earned from De Bary the title of reformer of scientific botany. His botanical labors practically ceased after 1850, when he entered on various philosophical and historical studies. See Schwann.

SCHLEIERMACHER, Friedrich Daniel Ernst (1768–1834), theologian and philosopher, was the son of a Prussian army-chaplain of the Reformed confession, and was born November 21, 1768, at Breslau. In his fifteenth year the boy, who was of a weak constitution, was placed by his parents in a Moravian school at Niesky in Upper Lusatia, and two years later in the seminary of the same sect at Barby near Halle. Here Moravian theology proved inadequate to satisfy the deep religious needs and awakening intellect of the youth. It was particularly the doctrines of eternal punishment, of the deity and the substitutionary sufferings of Christ, and of the total corruption of human nature that were stumbling-blocks to him. He was also unable to make his own the peculiar religious experiences of his Moravian and pietistic teachers. The efforts of his strictly orthodox father and of the heads of the seminary to lead him to crush his doubts as sinful, and to shun modern theology and literature, tended only to strengthen his desire to explore the great world of knowledge. Reluctantly his father gave him permission to leave Barby for the university of Halle, and the correspondence between the father and the son on this painful crisis in Friedrich's life supplies a striking illustration of a typical phase of distressing modern mental history. When Schleiermacher entered the university of Halle (1787) the reign of pietism there had ceased, having given way to the rationalistic philosophy of Wolf with the critical theology of Semler, though the new philosophy of Kant was rapidly displacing Wolf's. As a student he pursued an independent course of reading and neglected to his permanent loss the study of the Old Testament and the Oriental languages. But he frequented the lectures of Semler and of J. A. Eberhard, acquiring from the former the principles of an independent criticism of the New Testament and from the latter his love of Plato and Aristotle. At the same time he studied with great earnestness the writings of Kant and Jacobi. He commenced thus early his characteristic habit of forming his opinions by the process of patiently examining and weighing the positions of all thinkers and parties. But with the receptivity of a great eclectic he combined the reconstructive power of a profoundly original thinker. While yet a student he began to apply ideas gathered from the Greek philosophers in a reconstruction of Kant's system. At the completion of his three years' course at Halle he obtained through the influence of the court-chaplain Sack an appointment as private tutor in the family of Count Dohna-Schlobitten, which he held upwards of two years, developing in a cultivated and aristocratic household his deep love of family and social life. After short engagements in tuition and as *locum tenens* to a clergyman of the small town of Landsberg, he received (1796) the appointment of chaplain to the Charité Hospital in Berlin, a position which he held nearly six years, and which offered no scope for the development of his powers as a preacher. He was the more induced to seek the satisfaction of his mental and spiritual necessities in the cultivated society of Berlin, and in profound philosophical studies. This was the period in which he was constructing the framework of his philosophical and religious system. It was the period too when he made himself widely acquainted with art, literature, science, and modern culture generally. He was at that time profoundly affected by German Romanticism, as represented by his friend Friedrich Schlegel, and it required all the energy of his moral nature and the force of his intellect to preserve himself from its moral and mental extravagances. Of this his *Confidential Letters* on Schlegel's *Lucinde* (1801), as well as his perilous relation to Eleonore Grunow, the wife of a Berlin clergyman, are proof and illustration. Gradually his sound moral nature, his deep religiousness, and his powerful intellect enabled him to emancipate himself entirely from the errors and weaknesses of a transient phase of mental and social history, and to appropriate at the same time the elements of truth and goodness which it possessed in rich measure. Romanticism unlocked for him the divine treasures of life and truth which are stored in the feelings and intuitions of the human soul, and thus enabled him to lay the foundations of his philosophy of religion and his ethical system. It enriched his imagination and life too with ideals ancient and modern, which gave elevation, depth, and color to all his thought. Meantime he studied Spinoza and Plato, and was profoundly influenced by both, though he was never a Spinozist; he made Kant more and more his master,

though he departed on fundamental points from him, and finally remodelled his philosophy; with some of Jacobi's positions he was in sympathy, and from Fichte and Schelling he accepted ideas, which in their place in his system, however, received another value and import. The literary fruit of this period of intense fermentation and of rapid development was his "epoch-making" book, *Reden über die Religion* (1799), and his "new year's gift" to the new century, the *Monologen* (1800). In the first book he vindicated for religion an eternal place amongst the divine mysteries of human nature, distinguished it from all current caricatures of it and allied phenomena, and described the perennial forms of its manifestation and life in men and society, giving thereby the programme of his subsequent theological system. In the *Monologen* he threw out his ethical manifesto, in which he proclaimed his ideas as to the freedom and independence of the spirit, and as to the relation of the mind to the world of sense and imperfect social organizations, and sketched his ideal of the future of the individual and society. In 1802, to his great advantage morally and intellectually, Schleiermacher exchanged the brilliant circle of Berlin Romanticists for the retired life of a pastor in the little Pomeranian town of Stolpe. Here he remained two years, which were full of pastoral and literary work, as well as rich in personal and moral progress. He relieved Friedrich Schlegel entirely of his nominal responsibility for the translation of Plato, which they had together undertaken, and regarded the completion of it as the work of his life. The first volume was published in 1804, and the last (the *Republic*) in 1828. At the same time another work, *Grundlinien einer Kritik der bisherigen Sittenlehre* (1803), the first of his strictly critical and philosophical productions, occupied him. This work is a severe criticism of all previous moral systems, especially those of Kant and Fichte, Plato's and Spinoza's finding most favor; its leading principles are that the tests of the soundness of a moral system are the completeness of its view of the laws and ends of human life as a whole and the harmonious arrangement of its subject-matter under one fundamental principle; and, though it is almost exclusively critical and negative, the book announces clearly the division and scope of moral science which Schleiermacher subsequently adopted, attaching prime importance to a "Güterlehre," or doctrine of the ends to be obtained by moral action. But the obscurity of the style of the book as well as its almost purely negative results proved fatal to its immediate success. In 1804 Schleiermacher removed as university preacher and professor of theology to Halle, where he remained until 1807, and where he quickly obtained a reputation as professor and preacher, and exercised a powerful influence in spite of the contradictory charges of his being an atheist, Spinozist and pietist. In this period he wrote his dialogue the *Weihnachtsfeier* (1806), a charming production, which holds a place midway between his *Reden* and his great dogmatic work the *Christliche Glaube*, and presents in the persons of its speakers phases of his growing appreciation of Christianity as well as the conflicting elements of the theology of the period. After the battle of Jena he returned to Berlin (1807), was soon appointed pastor of the Trinity Church there, and the next year married the widow of his friend Willich. At the foundation of the Berlin university (1810), in which he took a prominent part, he was called to a theological chair, and soon became secretary to the Academy of Sciences. He was thus placed in a position suited to his powers and in domestic and social surroundings adapted to meet the wants of his rich nature. At the same time he approved himself in the pulpit and elsewhere as a large-hearted and fearless patriot in that time of national calamity and humiliation, acquiring a name and place in his country's annals with Arndt, Fichte, Stein, and Scharnhorst. He took a prominent part too in the reorganization of the Prussian church, and became the most powerful advocate of the union of the Lutheran and Reformed divisions of German Protestantism. The twenty-four years of his professional career in Berlin were opened with his short but important outline of theological study (*Kurze Darstellung des theologischen Studiums*, 1811), in which he sought to do for theology what he had done for religion in his *Reden*. While he preached every Sunday, he also gradually took up in his lectures in the university almost every branch of theology and philosophy—New Testament exegesis, introduction to and interpretation of the New Testament, ethics (both philosophic and Christian), dogmatic and practical theology, church history, history of philosophy, psychology, dialectics (logic and metaphysics), politics, pædagogy, and æsthetics. His own materials for these lectures and his students' notes and reports of them are the only form in which the larger proportion of his works exist,—a circumstance which has greatly increased the difficulty of getting a clear and harmonious view of fundamental portions of his philosophical and ethical system, while it has effectually deterred all but the most courageous and patient students from reading these posthumous collections. As a preacher he produced a powerful effect, yet not at all by the force of his oratory but by his intellectual strength, his devotional spirit, and the philosophical breadth and unity of his thought. In politics he was an earnest friend of liberty and progress, and in the period of reaction which followed the overthrow of Napoleon he was charged by the Prussian Government with "demagogic agitation" in conjunction with the great patriot Arndt. At the same time he prepared for the press his chief theological work *Der christliche Glaube nach den Grundsätzen der evangelischen Kirche* (1821–22; 2d edition, greatly altered, 1830–31). The fundamental principle of this classical work is, that religious feeling, the sense of absolute dependence on God as communicated by Jesus Christ through the church, and not the creeds or the letter of Scripture or the rationalistic understanding, is the source and law of dogmatic theology. The work is therefore simply a description of the facts of religious feeling, or of the inner life of the soul in its relations to God, and these inward facts are looked at in the various stages of their development and presented in their systematic connection. The aim of the work was to reform Protestant theology by means of the fundamental ideas of the *Reden*, to put an end to the unreason and superficiality of both supernaturalism and rationalism, and to deliver religion and theology from a relation of dependence on perpetually changing systems of philosophy. Though the work added to the reputation of its author, it naturally aroused the increased opposition of the theological schools it was intended to overthrow, and at the same time Schleiermacher's defence of the right of the church to frame its own liturgy in opposition to the arbitrary dictation of the monarch or his ministers brought upon him fresh troubles. He felt himself in Berlin more and more isolated, although his church and his lecture-room continued to be largely attended. But he prosecuted his translation of Plato and prepared a new and greatly altered edition of his *Christliche Glaube*, anticipating the latter in two letters to his friend Lücke (in the *Studien und Kritiken*, 1829), in which he defended with a masterly hand his theological position generally and his book in particular against opponents on the right and the left. The same year he lost his only son —a blow which, he said, "drove the nails into his own coffin." But he continued to defend his theological position against Hengstenberg's party on the one hand and the rationalists Von Cölln and D. Schulz on the other, protesting against both subscription to the ancient creeds and the imposition of a new rationalistic formulary. In the midst of such labors, and enjoying still full bodily and mental vigor, he was carried off

after a few days' illness by inflammation of the lungs. He died thinking "the profoundest speculative ideas which were one with his deepest religious feeling," and partaking of the sacrament of the Lord's supper, February 12, 1834.

Schleiermacher's friend, the naturalist and poet Steffens, has left the following description of his appearance about the beginning of the century: "Schleiermacher was of small stature, a little deformed, yet hardly enough to disfigure him; all his movements were animated, and his features in the highest degree expressive; a certain keenness in his glance produced perhaps a repellent effect; indeed, he appeared to see through every one; his face rather long, all his features sharply cut, the lips firmly closed, the chin projecting, the eyes animated and flashing, his look always serious, collected, and thoughtful."

Philosophical system.

Schleiermacher's Philosophical System.—A great antithesis lies at the basis of all thought and life—that of the real and the ideal, of organism, or sense, and intellect. But the antithesis is not absolute, for in life and being both elements are united—though without its presence life and thought would be impossible. In the actual world the antithesis appears as reason and nature, in each of which, however, there is a combination of its two elements—the ideal and the real,—the reason having a preponderance of the first and nature a preponderance of the second. At the basis of nature lies universal reason as its organizing principle, and when reason becomes a conscious power in man it finds itself in conflict as well as in harmony with external nature. The whole effort and end of human thought and action is the gradual reduction of the realm and the power of this antithesis in the individual, the race, and the world. Though the antithesis is real and deep, the human mind cannot admit its absolute nature; we are compelled to suppose a transcendental reality or entity in which the real and the ideal, being and thought, subject and object, are one. Consciousness itself involves the union of the antithetic elements, and prior to moral action nature is found organized and reason manifested or symbolized therein. We are ourselves proofs of the unity of the real and the ideal, of thought and being, for we are both, our self-consciousness supplying the expression of the fact. As we have in ourselves an instance of the identity of thought and being, we must suppose a universal identity of the ideal and real behind the antithesis which constitutes the world. This supposition is the basis of all knowledge, for thought becomes knowledge only when it corresponds to being. The supposition may be called a belief, but it is so only in the sense in which belief appears in the religious department, where it is the ultimate ground of all action. The supposition is the basis of all ethics, for without the conviction of the correspondence of thought and reality action would be fruitless and in the end impossible. It is above all the substance of religious feeling, which is the immediate consciousness of the unity of the world, of the absolute oneness behind the infinite multiplicity of contrasts; indeed, it is the religious conviction of the unity which is the best guarantee of the truth of the suppositions of philosophy. It is "the religious consciousness of the unity of the intellectual and physical world in God" which is to overcome the skepticism of the critical philosophy. But, though this unity must be laid down as the basis of knowledge, it is absolute and transcendental. In contrast with the "world," as the totality of being in its differentiation, this absolute unity, or God, in whom the real as manifold, and the spirit as one, find their unifying base, by its very nature is unphenomenal, indefinable, and inconceivable. The idea is outside the boundary of thought, though its necessary postulate, and it is no less inaccessible to religious feeling, though it is its life and soul. Neither member of the antithesis of the real and the ideal must be conceived as producing the other; they are both equally existent and equally constituent elements of the world; but in God they are one, and therefore the world must not be identified with Him. The world and God are distinct, but correlative, and neither can be conceived without the other. The world without God would be "chaos," and God without the world an empty "phantasm." But though God is transcendent and unknowable He is immanent in the world. In self-consciousness God is present as the basis of the unity of our nature in every transition from an act of knowledge to an act of will, and *vice versa*. As far as man is the unity of the real and the ideal, God is in him. He is also in all things, inasmuch as in everything the totality of the world and its transcendental basis is presupposed by virtue of their being and correlation. The unity of our personal life amidst the multiplicity of its functions is the symbol of God's immanence in the world, though he may not conceive of the Absolute as a person. The idea of the world as the totality of being is, like the correlative idea of God, only of regulative value; it is transcendent, as we never do more than make approaches to a knowledge of the sum of being. The one idea is the transcendental *terminus a quo* and the other the transcendental *terminus ad quem* of all knowledge. But though the world cannot be exhaustively known it can be known very extensively, and though the positive idea of God must always remain unattainable we are able to reject those ideas which involve a contradiction of the postulate of the Absolute. Thus the pantheistic and the theistic conceptions of God as the supreme power, as the first cause, as a person, are alike unallowable, since they all bring God within the sphere of antithesis and preclude His absolute unity. On the other hand, the world can be known as the realm of antithesis, and it is the correlative of God. Though He may not be conceived as the absolute cause of the world, the idea of absolute causality as symbolized in it may be taken as the best approximate expression of the contents of the religious consciousness. The unbroken connection of cause and effect throughout the world becomes thus a manifestation of God. God is to be sought only in ourselves and in the world. He is completely immanent in the universe. It is impossible that His causality should have any other sphere than the world, which is the totality of being. "No God without a world, and no world without God." The divine omnipotence is quantitatively represented by the sum of the forces of nature, and qualitatively distinguished from them only as the unity of infinite causality from the multiplicity of its finite phenomena. Throughout the world—not excepting the realm of mind—absolute necessity prevails. As a whole the world is as good and perfect as a world could possibly be, and everything in it, as occupying its necessary place in the whole, is also good, evil being only the necessary limitation of individual being.

Schleiermacher's psychology takes as its basis the phenomenal dualism of the ego and the non-ego, and regards the life of man as the interaction of these elements with their interpenetration as its infinite destination. The dualism is therefore not absolute, and, though present in man's own constitution as composed of body and soul, is relative only even there. The ego is itself both body and soul,—the conjunction of both constitutes it; our "organization" or sense nature has its intellectual element, and our "intellect" its organic elements. There is no such thing as "pure mind" or "pure body." The one general function of the ego, thought, becomes in relation to the non-ego either receptive or spontaneous action, and in both forms of action its organic, or sense, and its intellectual energies coöperate; and in relation to man, nature, and the universe the ego gradually finds its true individuality by becoming a part of them, "every extension of consciousness being higher life." The specific functions of the ego, as determined by the relative predominance of sense or intellect, are either functions of the senses (or organism) or functions of the intellect. The former fall into the two classes of feelings (subjective) and perceptions (objective); the latter, according as the receptive or the spontaneous element predominates, into cognition and volition. In cognition being is the object and in volition it is the purpose of thought: in the first case we receive (in our fashion) the object of thought into ourselves; in the latter we plant it out into the world. Both cognition and volition are functions of thought as well as forms of moral action. It is in those two functions that the real life of the ego is manifested, but behind them is *self-consciousness* permanently present, which is always both subjective and objective—consciousness of ourselves and of the non-ego. This self-consciousness is the third special form or function of thought,—which is also called feeling and immediate knowledge. In it we cognize our own inner life as affected by the non-ego. As the non-ego helps or hinders, enlarges or limits, our inner life, we feel pleasure or pain. Æsthetic, moral, and religious feelings are respectively produced by the reception into consciousness of large ideas,—nature, mankind, and the world; those feelings are the sense of being one with these vast objects. Religious feeling therefore is the highest form of thought and of life; in it we are conscious of our unity with the world and God; it is thus the sense of absolute dependence. Schleiermacher's doctrine of knowledge accepts the fundamental principle of Kant that knowledge is bounded by experience, but it seeks to remove Kant's skepticism as to knowledge of the *Ding an sich*, or *Sein*, as Schleiermacher's term is. The idea of knowledge or scientific thought as distinguished from the passive form of thought—of æsthetics and religion—is thought which is produced by all thinkers

in the same form and which corresponds to being. All knowledge takes the form of the concept (*Begriff*) or the judgment (*Urtheil*), the former conceiving the variety of being as a definite unity and plurality, and the latter simply connecting the concept with certain individual objects. In the concept therefore the intellectual and in the judgment the organic or sense element predominates. The universal uniformity of the production of judgments presupposes the uniformity of our relations to the outward world, and the uniformity of concepts rests similarly on the likeness of our inward nature. This uniformity is not based on the sameness of either the intellectual or the organic functions alone but on the correspondence of the forms of thought and sensation with the forms of being. The essential nature of the concept is that it combines the general and the special, and the same combination recurs in being; in being the system of substantial or permanent forms answers to the system of concepts and the relation of cause and effect to the system of judgments, the higher concept answering to "force" and the lower to the phenomena of force, and the judgment to the contingent interaction of things. The sum of being consists of the two systems of substantial forms and interactional relations, and it reappears in the form of concept and judgment, the concept representing being and the judgment being in action. Knowledge has under both forms the same object, the relative difference of the two being that when the conceptual form predominates we have speculative science and when the form of judgment prevails we have empirical or historical science. Throughout the domain of knowledge the two forms are found in constant mutual relations, another proof of the fundamental unity of thought and being or of the objectivity of knowledge. It is obvious that Plato, Spinoza, and Kant had contributed characteristic elements of their thought to this system, and directly or indirectly it was largely indebted to Schelling for fundamental conceptions.

Ethics.

Schleiermacher's Ethics.—Next to religion and theology it was to the moral world, of which, indeed, the phenomena of religion and theology were in his systems only constitnent elements, that he specially devoted himself. In his earlier essays he endeavored to point out the defects of ancient and modern ethical thinkers, particularly of Kant and Fichte, Plato and Spinoza only finding favor in his eyes. He failed to discover in previous moral systems any necessary basis in thought, any completeness as regards the phenomena of moral action, any systematic arrangement of its parts, and any clear and distinct treatment of specific moral acts and relations. His own moral system is an attempt to supply these deficiencies. It connects the moral world by a deductive process with the fundamental idea of knowledge and being; it offers a view of the entire world of human action which at all events aims at being exhaustive; it presents an arrangement of the matter of the science which tabulates its constituents after the model of the physical sciences; and it supplies a sharply defined treatment of specific moral phenomena in their relation to the fundamental idea of human life as a whole. Schleiermacher defines ethics as the theory of the nature of the reason, or as the scientific treatment of the effects produced by human reason in the world of nature and man. As a theoretical or speculative science it is purely descriptive and not practical, being correlated on the one hand to physical science and on the other to history. Its method is the same as that of physical science, being distinguished from the latter only by its matter. The ontological basis of ethics is the unity of the real and the ideal, and the psychological and actual basis of the ethical process is the tendency of reason and nature to unite in the form of the complete organization of the latter by the former. The end of the ethical process is that nature (*i. e.*, all that is not mind, the human body as well as external nature) may become the perfect symbol and organ of mind. Conscience, as the subjective expression of the presupposed identity of reason and nature in their bases, guarantees the practicability of our moral vocation. Nature is preordained or constituted to become the symbol and organ of mind, just as mind is endowed with the impulse to realize this end. But the moral law must not be conceived under the form of an "imperative" or a "*Sollen*;" it differs from a law of nature only as being descriptive of the fact that it ranks the mind as conscious will, or *zweckdenkend*, above nature. Strictly speaking, the antitheses of good and bad and of free and necessary have no place in an ethical system, but simply in history, which is obliged to compare the actual with the ideal, but as far as the terms "good" and "bad" are used in morals they express the rule or the contrary of reason, or the harmony or the contrary of the particular and the general. The idea of "free" as opposed to necessary expresses simply the fact that the mind can propose to itself ends, though a man cannot alter his own nature. In contrast to Kant and Fichte and modern moral philosophers Schleiermacher reintroduced and assigned preëminent importance to the doctrine of the *summum bonum*, or highest good. It represents in his system the ideal and aim of the entire life of man, supplying the ethical view of the conduct of individuals in relation to society and the universe, and therewith constituting a philosophy of history at the same time. Starting with the idea of the highest good and of its constituent elements (*Güter*), or the chief forms of the union of mind and nature, Schleiermacher's system divides itself into the doctrine of moral ends, the doctrine of virtue, and the doctrine of duties; in other words, as a development of the idea of the subjection of nature to reason it becomes a description of the actual forms of the triumphs of reason, of the moral power manifested therein, and of the specific methods employed. Every moral good or product has a fourfold character; it is individual and universal; it is an organ and symbol of the reason, that is, it is the product of the individual with relation to the community, and represents or manifests as well as classifies and rules nature. The first two characteristics provide for the functions and rights of the individual as well as those of the community or race. Though a moral action may have these four characteristics at various degrees of strength, it ceases to be moral if one of them is quite absent. All moral products may be classified according to the predominance of one or the other of these characteristics. Universal organizing action produces the forms of intercourse, and universal symbolizing action produces the various forms of science; individual organizing action yields the forms of property and individual symbolizing action the various representations of feeling, all these constituting the relations, the productive spheres, or the social conditions of moral action. Moral functions cannot be performed by the individual in isolation but only in his relation to the family, the state, the school, the church, and society,—all forms of human life which ethical science finds to its hand and leaves to the science of natural history to account for. The moral process is accomplished by the various sections of humanity in their individual spheres, and the doctrine of virtue deals with the reason as the moral power in each individual by which the totality of moral products is obtained. Schleiermacher classifies the virtues under the two forms of *Gesinnung* and *Fertigkeit*, the first consisting of the pure ideal element in action and the second the form it assumes in relation to circumstances, each of the two classes falling respectively into the two divisions of wisdom and love and of intelligence and application. In his system the doctrine of duty is the description of the method of the attainment of ethical ends, the conception of duty as an imperative, or obligation, being excluded, as we have seen. No action fulfils the conditions of duty except as it combines the three following antitheses: reference to the moral idea in its whole extent and likewise to a definite moral sphere; connection with existing conditions and at the same time absolute personal production; the fulfilment of the entire moral vocation every moment though it can only be done in a definite sphere. Duties are divided with reference to the principle that every man make his own the entire moral problem and act at the same time in an existing moral society. This condition gives four general classes of duty: duties of general association or duties with reference to the community (*Rechtspflicht*), and duties of vocation (*Berufspflicht*)—both with a universal reference, duties of the conscience (in which the individual is sole judge), and duties of love or of personal association. It was only the first of the three sections of the science of ethics—the doctrine of moral ends—that Schleiermacher handled with approximate completeness; the other two sections were treated very summarily. In his *Christian Ethics* he dealt with the subject from the basis of the Christian consciousness instead of from that of reason generally; the ethical phenomena dealt with are the same in both systems, and they throw light on each other, while the Christian system treats more at length and less aphoristically the principal ethical realities—church, state, family, art, science, and society. Rothe, amongst other moral philosophers, bases his system substantially, with important departures, on Schleiermacher's. In Beneke's moral system his fundamental idea was worked out in its psychological relations.

Religious system.

Schleiermacher's Religious System.—From Leibnitz, Lessing, Fichte, Jacobi, and the Romantic school he had imbibed a profound and mystical view of the inner depths of the human personality. The ego, the person, is an individualization of universal reason; and the primary act of self-consciousness is the first conjunction of universal and individual life, the immediate union or marriage of the universe with incarnated reason. Thus every person becomes a specific and original representation of the universe and a compendium of humanity, a microcosmos in which the world is immediately reflected.

While therefore we cannot, as we have seen, attain the idea of the supreme unity of thought and being by either cognition or volition, we can find it in our own personality, in immediate self-consciousness or (which is the same in Schleiermacher's terminology) feeling. Feeling in this higher sense (as distinguished from "organic" sensibility, *Empfindung*), which is the minimum of distinct antithetic consciousness, the cessation of the antithesis of subject and object, constitutes likewise the unity of our being, in which the opposite functions of cognition and volition have their fundamental and permanent background of personality and their transitional link. Having its seat in this central point of our being, or indeed consisting in the essential fact of self-consciousness, religion lies at the basis of all thought and action. At various periods of his life Schleiermacher used different terms to represent the character and relation of religious feeling. In his earlier days he called it a feeling or intuition of the universe, consciousness of the unity of reason and nature, of the infinite and the eternal within the finite and the temporal. In later life he described it as the feeling of absolute dependence, or, as meaning the same thing, the consciousness of being in relation to God. In our consciousness of the world the feelings of relative dependence and relative independence are found; we are acted upon, but we also react. In our religious consciousness the latter element is excluded, and everything within and without us is referred to its absolute cause, that is, God. But, when we call this absolute cause God, the name stands solely as indicating the unknown *source* of our receptive and active existence; on the one hand it means that the world upon which we can react is not the source of the feeling, on the other, that the Absolute is not an object of thought or knowledge. This feeling of absolute dependence can arise only in combination with other forms of consciousness. We derive the idea of a totality by means of its parts, and the transcendental basis of being comes to us through the agency of individual phenomena. As in every affection of our being by individual phenomena we are brought into contact with the whole universe, we are brought into contact with God at the same time as its transcendental cause. This religious feeling is not knowledge in the strict sense, as it is purely subjective or immediate; but it lies at the basis of all knowledge. As immediate knowledge, however, it is no more than the consciousness of the unity of the world, a unity which can never be reached by human inquiry. Religious truths, such as the determination of all things by God, are simply the implications of the feeling of absolute dependence. While that feeling is the characteristic of religion generally, this assumes various forms as the religions of the world. The so-called natural as distinguished from positive religion, or the religion of reason, is a mere abstraction. All religions are positive, or their characteristics and value are mainly determined by the manner in which the world is conceived and imagined. But these varying conceptions with their religious meaning become religiously productive only in the souls of religious heroes, who are the authors of new religions, mediators of the religious life, founders of religious communities. For religion is essentially social. It everywhere forms churches, which are the necessary instruments and organs of its highest life. The specific feature of Christianity is its mediatorial element, its profound feeling of the striving of the finite individual to reach the unity of the infinite whole, and its conception of the way in which Deity deals with this effort by mediatorial agencies, which are both divine and human. It is the religion of mediatorial salvation, and, as Schleiermacher emphatically taught in his riper works, of salvation through the mediation of Christ; that is, its possessors are conscious of having been delivered by Jesus of Nazareth from a condition in which their religious consciousness was overridden by the sense-consciousness of the world and put into one in which it dominates, and everything is subordinated to it. The consciousness of being saved in this sense is now transmitted and mediated by the Christian church, but in the case of Jesus, its originator, it was an entirely new and original factor in the process of religious development, and in so far, like every new and higher stage of being, a supernatural revelation. It was at the same time a natural attainment, in as far as man's nature and the universe were so constituted as to involve its production. The appearance of the Saviour in human history is therefore as a divine revelation neither absolutely supernatural nor absolutely beyond reason, and the controversy of the 18th century between the rationalists and supernaturalists rests on false grounds, leads to wrong issues, and each party is right and wrong (see RATIONALISM). As regards Christian theology, it is not its business to formulate and establish a system of objective truth, but simply to present in a clear and connected form a given body of Christian faith as the contents of the Christian consciousness. Dogmatic theology is a connected and accurate account of the doctrine held at a particular time in a given section of the Christian church. But such doctrines as constitute no integral part of the Christian consciousness—*e.g.*, the doctrine of the Trinity—must be excluded from the theological system of the evangelical theologian. As regards the relation of theology and philosophy, it is not one of dependence or of opposition on either side, but of complete independence, equal authority, distinct functions, and perfect harmony. Feeling is not a mental function subordinate to cognition or volition, but of equal rank and authority; yet feeling, cognition, and volition alike conduct to faith in the unknown Absolute, though by different paths and processes.

The marked feature of Schleiermacher's thought in every department is the effort to combine and reconcile in the unity of a system the antithetic conceptions of other thinkers. He is realistic and idealistic, individualistic and universalistic, monistic and dualistic, sensationalist and intellectualist, naturalist and supernaturalist, rationalist and mystic, gnostic and agnostic. He is the prince of the *Vermittler* in philosophy, ethics, religion, and theology. But he does not seek to reconcile the antitheses of thought and being by weakening and hiding the points of difference; on the contrary, he brings them out in their sharpest outlines. His method is to distinctly define the opposing elements and then to seek their harmonious combination by the aid of a deeper conception. Apart from the positive and permanent value of the higher unities which he succeeds in establishing, the light and suggestiveness of his discussions and treatment of the great points at issue in all the principal fields of human thought, unsatisfactory as many of his positions may be considered, make him one of the most helpful and instructive of modern thinkers. And, since the focus of his almost universal thought and inquiry and of his rich culture and varied life was religion and theology, he must be regarded as the classical representative of modern effort to reconcile science and philosophy with religion and theology, and the modern world with the Christian church.

Schleiermacher's collected works have been published in three sections: I. Theological, II. Sermons, III. Philosophical and Miscellaneous, Berlin, 1835–64, in 30 vols. Of lives of him the best are his own correspondence, *Aus Schleiermacher's Leben in Briefen*, published by W. Dilthey (Berlin, 1858–1863, in 4 vols., Eng. transl. by Rowan); *Leben Schleiermacher's* by Wilhelm Dilthey (vol. i., the period from 1768–1804, all published as yet); *Friedrich Schleiermacher, ein Lebens- u. Charakterbild*, by D. Schenkel (Elberfeld, 1868). The accounts and critiques of his philosophy, ethics, and theology are numerous; some of the most valuable are: J. Schaller, *Vorlesungen über Schleiermacher* (Halle, 1844); Weissenborn, *Darstellung und Kritik der Schleiermacherschen Glaubenslehre* (1849); Siegwart, "Schleiermacher's Erkenntnisstheorie und ihre Bedeutung für die Glaubenslehre," in the *Jahrbb. f. Deut. Theol.*, vol. ii. pp. 267–327, 829–864; Zeller, "Schleiermacher's Lehre von der Persönlichkeit Gottes," in the *Theol. Jahrbb.*, 1842, pp. 263 *sq.*; F. Vorländer, *Schleiermacher's Sittenlehre* (Marburg, 1851); W. Bender, *Schleiermacher's Theologie mit ihren philosophischen Grundlagen* (1876–78). See also the histories of philosophy and theology by Zeller, Ueberweg, Chalybæus, Dorner, and Gass, and the article by the last-named in Herzog's *Encyklopädie*. (J. F. S.)

SCHLESWIG (Danish *Slesvig*), the capital of the Prussian province of Schleswig-Holstein, is situated at the west end of the long narrow arm of the sea called the Schlei, 30 miles to the northwest of Kiel. The town consists mainly of a single street, 3½ miles long forming a semicircle round the Schlei, and is divided into the Altstadt (with the Holm), the Lollfuss, and the Friedrichsberg. The principal church, erected as a cathedral about 1100, but renewed in the Gothic style in the 15th century, contains a very fine carved oak altar-screen, regarded as the most valuable work of art in Schleswig-Holstein. Between Friedrichsberg and Lollfuss is the old chateau of Gottorp, now despoiled of its art treasures and used as a barracks. The former commercial importance of the town has disappeared, and the Schlei now affords access to small vessels only. Fishing and the manufacture of a few articles of common use are the chief occupations of the inhabitants. The population in 1885 was 15,187, all Protestants except about 250 Roman Catholics and 70 Jews.

Schleswig (ancient forms *Sliesthorp, Sliaswic, i.e.*, the town or bay of the Slia or Schlei) is a town of very remote origin, and seems to have been a trading place of considerable importance as early as the 9th century. It served as a medium of commercial intercourse between the North Sea and the Baltic, and was known to the old Arabian geographers. The first Christian church in this district was built here by

Ansgarius about 850, and it became the seat of a bishop about a century later. The town also became the seat of the dukes of Schleswig, but its commerce gradually dwindled owing to the rivalry of Lübeck, the numerous wars in which the district was involved, and the silting up of the Schlei. At the partition of 1544 the old chateau of Gottorp, originally built in 1160 for the bishop, became the residence of the ducal or Gottorp line of Schleswig-Holstein, which remained here till expelled by Frederick IV. in 1713. From 1731 to 1846 it was the seat of the Danish governors of the duchies. In the wars of 1848 and 1864 Schleswig was an important strategical point on account of its proximity to the Danewerk, and was occupied by the different contending parties in turn. It has been the capital of Schleswig-Holstein since its incorporation by Prussia.

To the south of Schleswig are the scanty remains of the *Danewerk* or *Dannewirke*, a line of entrenchments between the Schlei and the Treene, believed to have been originally thrown up in the 9th century or even earlier, and afterwards repeatedly strengthened and enlarged. After the union of Schleswig and Holstein it lost its importance as a frontier defence, and was allowed to fall into disrepair. The Danewerk was stormed by the Prussians in 1848, but was afterwards so greatly extended and strengthened by the Danes that it would have been almost impregnable if defended by a sufficient number of troops. In the war of 1864, however, the Danish army was far too small for this task, and General de Meza abandoned the Danewerk without striking a blow, a step which caused deep disappointment to the Danes and led to the dismissal of the general. Since then the works have been entirely levelled.

SCHLESWIG-HOLSTEIN, a maritime province in the northwest of Prussia, formed out of the once Danish duchies of Schleswig-Holstein and Lauenburg, is bounded on the W. by the German Ocean, on the N. by Jutland, on the E. by the Baltic, Lübeck, and Mecklenburg, and on the S. by Mecklenburg and the lower course of the Elbe (separating it from Hanover). It thus consists of the southern half of the Cimbric peninsula, and forms the connecting link between Germany and Denmark. In addition to the mainland, which decreases in breadth from south to north, the province includes several islands, the most important being Alsen and Fehmarn in the Baltic, and Röm, Sylt, and Föhr in the North Sea. The total area of the province is 7280 square miles, 450 of which belong to the small duchy of Lauenburg in the southeast corner, while the rest are divided almost equally between Holstein to the south of the Eider and Schleswig to the north of it. From north to south the province is about 140 miles long, while its breadth varies from 90 miles in Holstein to 35 miles at the narrower parts of Schleswig.

Schleswig-Holstein belongs to the great North-German plain, of the characteristic features of which it affords a faithful reproduction in miniature, down to the continuation of the Baltic ridge or plateau (see GERMANY) by a range of low wooded hills skirting its eastern coast and culminating in the Bunsberg (570 feet), a little to the north of Eutin. This hilly district contains the most productive land in the province, the soil consisting of diluvial drift or boulder clay. The central part of the province forms practically a continuation of the great Lüneburg Heath, and its thin sandy soil is of little use in cultivation. Along the west coast extends the "Marshland," a belt of rich alluvial soil formed by the deposits of the German Ocean, and varying in breadth from five to fifteen miles. It is seldom more than a few feet above the sea-level, while at places it is actually below it, and it has consequently to be defended by an extensive system of dykes or embankments, 25 feet high, resembling those of Holland. The more ancient geological formations are scarcely met with in Schleswig-Holstein. The contrast between the two coast-lines of the province is very marked. The Baltic coast, about 300 miles in length, has generally steep well-defined banks and is very irregular in form, being pierced by numerous long and narrow fjords, which run deep into the interior of the land and often afford excellent harbors. The islands of Alsen and Fehmarn are separated from the coast by very narrow channels. The North Sea coast (200 miles), on the other hand, is very low and flat, and its smooth outline is interrupted only by the estuary of the Eider and the peninsula of Eiderstedt. Dunes or sand-hills, though rare on the protected mainland, occur on Sylt and other islands, while the small unprotected islands called "Halligen" are being gradually washed away by the sea. The numerous islands on the west coast probably formed part of the peninsula at no very remote period, and the sea between them and the mainland is very shallow and full of sandbanks. The climate of Schleswig-Holstein is mainly determined by the proximity of the sea, and the mean annual temperature, varying from 45° Fahr. in the north to 49° Fahr. in the south, is rather higher than is usual in the same latitude. Rain and fog are frequent, but the climate is on the whole very healthy. The lower course of the Elbe forms the southern boundary of Holstein for 65 miles, but the only river of importance within the province is the Eider, which rises in Holstein, and after a course of 120 miles falls into the North Sea, forming an estuary 3 to 12 miles in breadth. It is navigable from its mouth as far as Rendsburg, and the waterway between the two seas is completed by a canal from Rendsburg to Kiel. The new Baltic Canal, which is to be navigable for large vessels, will also intersect Holstein. There are numerous lakes in northeast Holstein, the largest of which are the Plöner See (12 square miles) and the Selenter See (9 square miles).

Of the total area of the province 58.3 per cent. is occupied by tilled land, 28.5 per cent. by meadows and pastures, and only 6.4 per cent. by forests. The ordinary cereals are all cultivated with success and there is generally a considerable surplus for exportation; rape is grown in the marsh lands and flax on the east coast, while large quantities of apples and other fruit are raised near Altona for the Hamburg and English markets. In 1883 the province contained 156,534 horses, 727,505 cattle, 320,768 sheep, 268,061 pigs, and 42,580 goats. The marsh lands afford admirable pasture, and a greater proportion of cattle (65 per 100 inhabitants) is reared in Schleswig-Holstein, mainly by small owners, than in any other Prussian province. Great numbers of fat cattle are exported to England. The Holstein horses are also in request, but sheep-farming is comparatively neglected. Bee-keeping is found a productive industry, and in 1883 the province possessed 113,836 hives. The hills skirting the bays of the Baltic coast are generally pleasantly wooded, but the forests are nowhere of great extent except in the duchy of Lauenburg. The fishing in the Baltic is productive; Eckernförde is the chief fishing station in Prussia. The oysters from the beds on the west coast of Schleswig are widely known under the misnomer of "Holstein natives." The mineral resources of the province are almost confined to a few layers of rock-salt near Segeberg. The manufacturing industry is also insignificant and does not extend much beyond the large towns, such as Altona, Kiel, and Flensburg. The shipbuilding of Kiel and other seaports is, however, important; and lace is made by the peasants of North Schleswig. The commerce and shipping of Schleswig-Holstein, stimulated by its position between two seas, as well as by its excellent harbors and waterways, are much more prominent than its manufactures. Kiel[1] is the chief seaport of Prussia, while an overseas trade is also carried on by Altona and Flensburg. The main exports are grain, cattle, horses, fish, and oysters, in return for which come timber, coal, salt, wine, and colonial produce. The trading fleet of Schleswig-Holstein in 1884 consisted of 713 vessels (142 steamers), with a total burthen of 115,600 tons; more than half of the ships belonged to the North Sea coast, but 90 per cent. of the steamers and 65 per cent. of the tonnage must be credited to the Baltic.

The population of the province in 1880 was 1,127,149, comprising 1,111,383 Protestants, 8903 Roman Catholics, and 3522 Jews. The urban and rural communities are in the proportion of 4 to 6. About 38 per cent. of the population are supported by agriculture, 26 per cent. by manufacturing industry, 10 per cent. by trade, while 12 per cent. are domestic servants and day-laborers, 6 per cent. is absorbed by the official and professional classes, and 5½ per cent. by those who returned no occupation. The great bulk of the Holsteiners and more than half the Schles-

[1] [Chief naval port. For commerce Stettin is named in vol. xx. p. 20.—AM. ED.]

wigers are of genuine German stock, but there are about 150,000 Danes in the north part of Schleswig. Among the Germans the prevalent tongue is Low German, but the North Frisians on the west cost of Schleswig and the North Sea islands (about 30,000 in all) still speak a Frisian dialect, which, however is gradually dying out. The peninsula of Angeln, between the Gulf of Flensburg and the Schlei, is supposed to have been the original seat of the English, and most observers profess to see a striking resemblance between this district and the counties of Keut and Surrey. The peasants of Dithmarschen also retain many of their ancient peculiarities. The boundary between the Danish and German languages is approximately a line between Flensburg and Toudern; not morc than 15 per cent. of the cntire population of the province speak Danish as their mother-tongue. The chief educational institution in Schleswig-Holstein is the university of Kiel; and the excellence of the ordiuary school system is proved by the fact that in 1883–84 the Schleswig-Holstein recruits showed a smaller proportion of illiteracy (0.11 per cent.) than those from any other part of the German empire. Schleswig is the official capital of the province, but Altona and Kiel are the largest towns, the former being also the headquarters of an army corps and the latter the chief naval station of Germany. Kiel and Friedrichsort are fortified, and the old lines of Düppel are also maintained. The province sends ten members to the reichstag and nineteen to the Prussian house of deputies. The provincial estates meet in Rendsburg.

History.—The history of the southern part of the Cimbric peninsula is the record of a struggle between the Danes and the Germans, ending in the meantime in favor of the latter. The earliest inhabitants of whose existence we have any trace seem to have bcen of German stock, and German authorities maintain that it was the emigration to England of the Jutes and Angles that first gave the Scandiuavian or Danish element scope to develop in the district. In the early part of the ninth century we find Charlemagne in conflict with the Danish rulers of South Jutlaud or Schleswig[1] and establishing a "Danish mark" betweeu the Eider and the Schlei. Some attempt to introduce Christianity was also made at this time by Bishop Ansgarius, but it was not till the middle of the following century that the new creed found anything approaching to general acceptance. In 1027 the Danish kiug Knud (the English Canute) obtained from Conrad the recognitiou of Schleswig's independence of the empire, and henceforth the Eider became the recognized boundary between Germany and Denmark ("Eidora Romani terminus imperii"). Schleswig, though a Dauish province, was not merged in the other possessions of Denmark, but enjoyed a certain measure of independence under the rule of viceroys or dukes chosen from the younger sons of the royal house. One of the most vigorous of these rulers was Knud Laward (1115–1131), who extended his sway over the Wendish district of Wagria (see below) and held it as a fief of the German empire. He was thus the first ruler of Schleswig to hold that singular double relationship to the king of Denmark and the German empire which afterwards became so important a factor in the history of the country. Valdemar, son of Knud, became king of Denmark, and Knud's grandson, King Valdemar II., conferred the duchy of South Jutland or Schleswig on his son Abel in 1232. The terms of this investmeut afterwards became a fertile subject of dispute between the dukes and the crown, the former maintaining that they held their land as an hereditary and inalienable fief, while the kings argued that the fief was revocable at pleasure. The dukes, however, assisted by their kinsmen, the counts of Holstein, succeeded in establishing their position and finally remained in undisputed possessiou of their duchy. In 1326 Duke Valdemar V. of Schleswig was raised to the throne of Denmark through the influence of his uncle, Count Gerhard of Holstein, to whom in return he ceded his duchy. Valdemar had to abdicate in 1330 and received his duchy back agaiu, granting, however, the "Constitutio Valdemaria," which ensured the rights of eventual succession in Schleswig to the Holstein counts. This compact came to fruition in 1375, when the male ducal line became extinct, and Margaret of Denmark formally recognized the union of the two territories in 1386. Henceforth we have the same prince ruling over Schleswig and Holstein, holding the first as a fief of the Danish crown and the other as a fief of the German empire.

The history of Holstein before its union with Schleswig has beeu partly indicated in the foregoing paragraph. Nordalbingia, or the laud to the north of the Elbe, was iuhabited by the Saxons, under whom it was divided iuto four *gaus* or hundreds: DITHMARSCHEN (*q.v.*) on the west, Holstein proper or Holtsaten ("men of the forest") in the middle, Wagria on the east, and Stormarn on the south. The Nordalbingians were the last of the Saxons to be subdued by Charlemagne (804), who gave Wagria to his Wendish allies the Obotrites, and established a Weudish mark on thcir frontier at the same time that he established a Danish mark on the Eidcr. The other three gaus were incorporated with the duchy of Saxony, Dithmarschen being included in the countship of Stade while Holstein and Stormarn had a count of their own. In 1110 the countship of Holstein was confcrred upon Adolphus I. of Schauenburg, who founded the influential line that eventually ruled over Schleswig-Holstein. Wagria was addcd to Holstein by Adolphus II. about 1140. In the beginning of the 13th century the Danish kings extended their sway over all German territory to the north of the Elbe, and their conquests were confirmed by an imperial grant in 1214. This state of affairs, however, was of no long continuance, and Adolphus III. of Holstein succeeded in reestablishing his independence in 1225. The Holstein family now became split up into several branch-lines, of which that of Rendsburg proved the most lasting and important. A daughter of this line married Duke Abel of Schleswig, and the Holstcin counts lent faithful aid to their kinsmen in resisting the encroachments and claims of the kings of Denmark. In the distracted state of Denmark at the beginning of the 14th century Count Gerhard of Holstein became the practical ruler of the kingdom, but preferred to place the crown on the head of his nephew Valdemar. Lcgally speaking, Holstein remained a mediate fief of Saxony; but with the decline of the Saxon duchy this relationship became obscured, aud, when the Holstein lands were created a duchy in 1474, the new duke held his lands directly from the emperor.

In 1448 the royal line of Denmark became extinct, and the crown was offered to Adolphus VII. of Schleswig-Holstein, who refused it for himself but exerted his influence to secure it for his nephew Christian of Oldenburg. Adolphus died in 1459, leaving no sons. Christian was the legal heir of Schleswig, but his claims to Holstein were by no means so strong. The estates of Schleswig-Holstein, however, decided in his favor on the plea that the duchies[2] could not be separated, and exacted from him a confirmation of this indissoluble connection. It was also formally stipulated that the duchies should uever be actually incorporated with the kingdom of Denmark, while the hereditary nature of the fief was given up and the estates acquired the right to choose as their duke any one of Christian's descendants. This Succession Act was the basis of the union of the two duchies for the next four hundred years, and the practical contradiction betweeu their own inseparable connection and their feudal duty to different sovereigns is at once the cause and the explanation of the complicated "Schleswig-Holstein question."

Now follows a series of endless shiftings, divisions, aud reunions of the two duchies. After 1580 the various collateral lines of the Oldenburg family thus formed are represented by two main branches,—the royal or Glückstadt line and the Gottorp or ducal line. In the division of Schleswig-Holstein between these two no regard was paid to the boundary of the Eider; each of them ruled over detached parts of both duchies, though the whole of Schleswig was still under the sovereignty of Denmark aud the whole of Holstein under that of Germany. Practically Schleswig came to be regarded merely as a part of Denmark, while Holstein's connection with Germany preserved for it a flicker of independence. In 1660 Denmark became an absolute monarchy and the principle of femalo succession was acknowledged. As in Schleswig-Holstcin the right of inheritance was confined to the male line, the policy of Denmark was vigorously directed towards doing away as far as possible with all separate rights in the duchy and to getting the Gottorp or ducal portions into the possession of the crown. This policy was naturally more successful in Schleswig than in Holstein, and in 1721 Frederick IV. was able to gain the guarantee of the powers for the incorporation of the whole of Schleswig with the Danish monarchy. He had, however, to give up his claim to Holstein. In 1762 the Holstein-Gottorp line succeeded to the throne of Russia in the person of Peter III., and this led in 1773 to an agreement by which the Gottorp line resigned its share of Holstein to the king of Denmark in

[1] The name of Schleswig did not come into general use for this part of the Cimbric peninsula until the end of the 14th century.

[2] This use of the term "duchies" anticipates a little, as Holstein was not made a duchy till 1474. Dithmarschen, indeed, which was supposed to be a part of ducal Holstein, was not subdued till 1559.

exchange for Oldenburg and Delmenhorst. The whole of Schleswig-Holstein thus came once more under the sway of a ruler who was at the same time king of Denmark.

The period from 1773 to 1846 was one of peace for the duchies, with considerable progress in material prosperity. The fall of the German empire in 1806 released Holstein for a time from any connection with a power outside of Denmark, but in 1815 the Danish monarch had to enter the German Confederation for Holstein and for the recently acquired duchy of LAUENBURG (*q.v.*). A strong feeling of German patriotism gradually arose in Holstein, affecting part of Schleswig also, and dissatisfaction with the delay of the Danish crown in recognizing the constitutional rights of the duchies led to the events forming the recent history of Schleswig-Holstein. These will be found described with some detail in the articles DENMARK (vol. vii. pp. 77, 78, and GERMANY (vol. x. pp. 454, 456, 457–8).

(J. F. M.)

SCHLETTSTADT, a small town in Lower Alsace, stands on the Ill, 26 miles to the south of Strasburg. It possesses two fine churches, relics of a period of former importance, and carries on manufactures of wire gauze, and a considerable trade in country produce. The population in 1880 was 8979 (7755 Roman Catholics), showing a slight decrease since it has passed into German hands.

Schlettstadt is a place of very early origin, and became a free town of the empire in the 13th century. In the 15th century it was the seat of a celebrated academy, founded by Agricola, which contributed not a little to the revival of learning in this part of Germany; Erasmus of Rotterdam was one of its students. In 1634 the town came into the possession of France, and it was afterwards fortified by Vauban. It offered little resistance, however, to the Germans in 1870, and the fortifications have been razed.

SCHLÖZER, AUGUST LUDWIG VON (1735–1809), German historian, was born at Gaggstedt, in the county of Hohenlohe-Kirchberg, on the 5th July, 1735. Having studied at the universities of Wittenberg and Göttingen, he went in 1755 as a tutor to Stockholm, and afterwards to Upsala; and while in Sweden he wrote in the Swedish language an *Essay on the History of Trade* (1758). In 1759 he returned to Göttingen, where he began the study of medicine. Afterwards he went to St. Petersburg with Müller, the Russian historiographer, as Müller's literary assistant and as tutor in his family. Here Schlözer learned the Russian language and devoted himself to the study of Russian history; and in 1762 he was made an adjunct of the Academy and a teacher at the Rasumovski educational institute. A quarrel with Müller placed him in a position of some difficulty, from which he was happily delivered by a call to a professorship at the university of Göttingen. He began his career at Göttingen in 1767, and soon ranked among the foremost historical writers of his day. His most important works were his *Allgemeine nordische Geschichte* (1772) and his translation of the Russian chronicler Nestor to the year 980 (1802–9). He awoke much intelligent interest in universal history by his *Weltgeschichte im Auszuge und Zusammenhange* (1792–1801); and in several works he helped to lay the foundations of statistical science. He also produced a strong impression by his political writings, the *Briefwechsel* (10 vols., 1776–82) and the *Staatsanzeigen* (18 vols., 1782–93). In 1804 he was ennobled by the emperor of Russia. He withdrew from active life in 1805, and died on the 9th September, 1809.

See Zermelo, *August Ludwig Schlözer* (1875), and Wesendonk (*Die Begründung der neuern deutschen Geschichtschreibung durch Gatterer und Schlözer* (1876). Schlözer's daughter, Dorothea, born on the 10th August, 1770, was one of the most learned women of her time, and received in 1787 the degree of doctor. She was recognized as an authority on several subjects, especially on Russian coinage. After her marriage with Rodde, the burgomaster of Lübeck, she devoted herself to domestic duties. She died on the 12th July, 1825. Schlözer's son Christian (born 1774, died 1831) was a professor at Bonn, and published *Anfangsgründe der Staatswirthschaft* (1804–6) and his father's *Oeffentliches und Privat-Leben aus Originalurkunden* (1828).

SCHMALKALDEN, a town of Prussia, in the province of Hesse-Nassau, lies about 30 miles to the southwest of Erfurt, and in 1885 contained 6788 inhabitants, chiefly employed in the manufacture of hardware articles. It still possesses the inn in which the important Protestant League of Schmalkalden or Smalkald was concluded in 1531, and also the house in which the articles were drawn up in 1537 by Luther, Melanchthon, and other Reformers. See GERMANY, vol. x. p. 447, and LUTHER, vol. xv. p. 84.

SCHNEIDEMÜHL (Polish *Pila*), a small town of Prussia, in the province of Posen, lies on the Küddow, 45 miles north of Posen and 140 miles east by north of Berlin. It is a railway junction of some importance, carries on a trade in wool, grain, and potatoes, and possesses an iron foundry, several glass works and machine-shops, and other industrial establishments. In 1885 the population was 12,259, of whom 7700 were Protestants and about 1000 Poles.

SCHNORR VON KAROLSFELD, JULIUS (1794–1872), of a family of artists, was born in 1794 at Leipsic, where he received his earliest instruction from his father, a draughtsman, engraver, and painter. At seventeen he entered the Academy of Vienna, from which Overbeck and others of the new school who rebelled against the old conventional style had been expelled about a year before. In 1818 he followed the founders of the new school of German pre-Raphaelites in the general pilgrimage to Rome. This school of religious and romantic art abjured modern styles with three centuries of decadence, and reverted to and revived the principles and practice of earlier periods. At the outset an effort was made to recover fresco painting and "monumental art," and Schnorr soon found opportunity of proving his powers, when commissioned to decorate with frescos, illustrative of Ariosto, the entrance hall of the Villa Massimo, near the Lateran. His fellow-laborers were Cornelius, Overbeck, and Veit. His second period dates from 1825, when he left Rome, settled in Munich, entered the service of King Louis, and transplanted to Germany the art of wall-painting learnt in Italy. He showed himself qualified as a sort of poet-painter to the Bavarian court; he organized a staff of trained executants, and set about clothing five halls in the new palace with frescos illustrative of the *Nibelungenlied*. Other apartments his prolific pencil decorated with scenes from the histories of Charlemagne, Frederick Barbarossa, and Rudolph of Hapsburg. These vast and interminable compositions display the master's merits and defects: they are creative, learned in composition, masterly in drawing, but exaggerated in thought and extravagant in style. Schnorr's third period is marked by his "Bible Pictures" or Scripture History in 180 designs. The artist was a Lutheran, and took a broad and unsectarian view which won for his Pictorial Bible ready currency throughout Christendom. The merits are unequal: frequently the compositions are crowded and confused, wanting in harmony of line and symmetry in the masses; thus they suffer under comparsion with Raphael's Bible. Chronologically speaking, the style is severed from the simplicity and severity of early times, and surrendered to the florid redundance of the later Renaissance. Yet throughout are displayed fertility of invention, academic knowledge with facile execution; and modern art has produced nothing better than Joseph Interpreting Pharaoh's Dream, the Meeting of Rebecca and Isaac, and the Return of the Prodigal Son. The completion of the arduous work was celebrated in 1862 by the artists of Saxony with a festival, and other German states offered congratulations and presented gifts.

Biblical drawings and cartoons for frescos formed a natural prelude to designs for church windows. The painter's renown in Germany secured commissions in Great Britain. Schnorr made designs, carried out in the royal factory, Munich, for windows in Glasgow

cathedral and in St. Paul's cathedral, London. This Munich glass provoked controversy: mediævalists objected to its want of lustre, and stigmatized the windows as colored blinds and picture transparencies. But the opposing party claimed for these modern revivals, "the union of the severe and excellent drawing of early Florentine oil-paintings with the coloring and arrangement of the glass-paintings of the latter half of the 16th century." Schnorr's busy life closed at Munich in 1872.

SCHOLASTICISM is the name usually employed to denote the most typical products of mediæval thought. The final disappearance of ancient philosophy may be dated about the beginning of the 6th century of our era. Boetius, its last representative in the West, died in 525, and four years later the Athenian schools were closed by order of the emperor Justinian. Before this time Christian thought had already been active in the fathers of the church, but their activity had been entirely devoted to the elaborating and systematizing of theological dogmas. Although the dogmas unquestionably involve philosophical assumptions, the fathers deal with them throughout simply as churchmen, and do not profess to supply for them a philosophical or rational basis. Only incidentally do some of them —like Augustine, for example—digress into strictly philosophical discussion. After the centuries of intellectual darkness during which the settlement of the new races and their conversion to Christianity proceeded and the foundations of the modern European order were being laid, the first symptoms of renewed intellectual activity appear contemporaneously with the consolidation of the empire of the West in the hands of Charlemagne. That enlightened monarch endeavored to attract to his court the best scholars of Britain and Ireland (where the classical tradition had never died out), and by imperial decree (787) commanded the establishment of schools in connection with every abbey in his realms. Peter of Pisa and Alcuin of York were his advisers in directing this great work, and under their fostering care the opposition long supposed to exist between godliness and secular learning speedily disappeared. Besides the celebrated school of the Palace, where Alcuin had among his hearers the members of the imperial family and the dignitaries of the empire as well as talented youths of humbler origin, we hear of the episcopal schools of Lyons, Orleans, and St. Denis, the cloister schools of St. Martin of Tours, of Fulda, Corbie, Fontenelle, and many others, besides the older monasteries of St. Gall and Reichenau. These schools became the centres of mediæval learning and speculation, and from them the name of Scholasticism is derived. They were designed to communicate instruction in the seven liberal arts which constituted the educational curriculum of the Middle Ages—grammar, dialectic and rhetoric forming the trivium of arts proper, while geometry, arithmetic, astronomy, and music constituted the quadrivium of the sciences. The name *doctor scholasticus* was applied originally to any teacher in such an ecclesiastical gymnasium, but, as the study of dialectic or logic soon became the object of absorbing interest to the best intellects of the time, it tended to overshadow the more elementary disciplines, and the general acceptation of "doctor" came to be one who occupied himself with the teaching of logic and the discussion of the philosophical questions arising therefrom. The philosophy of the later Scholastics is more extended in its scope; but to the very end of the mediæval period philosophy centres in the discussion of the same logical problems which began to agitate the teachers of the 9th and 10th centuries.

Chronological limits.

Scholasticism in the widest sense thus extends from the 9th to the end of the 14th or the beginning of the 15th century—from Erigena to Occam and his followers. The belated Scholastics who lingered beyond the last-mentioned date served only as marks for the obloquy heaped upon the schools by the men of the new time. But, although every systematic account of Scholasticism finds it necessary to begin with Erigena, that philosopher is of the spiritual kindred of the Neoplatonists and Christian mystics rather than of the typical Scholastic doctors. In a few obscure writings of the 9th century we find the beginnings of discussion upon the logical questions which afterwards proved of such absorbing interest; but these are followed by the intellectual interregnum of the 10th century. The activity of Scholasticism is therefore mainly confined within the limits of the 11th and the 14th centuries. It is clearly divisible (by circumstances to be presently explained) into two well-marked periods,—the first extending to the end of the 12th century and embracing as its chief names Roscellinus, Anselm, William of Champeaux, and Abelard, while the second extended from the beginning of the 13th century to the Renaissance and the general distraction of men's thoughts from the problems and methods of Scholasticism. In this second period the names of Albertus Magnus, Thomas Aquinas, and Duns Scotus represent (in the 13th century and the first years of the 14th century) the culmination of Scholastic thought and its consolidation into system.

Logic and theology.

It is a remark of Prantl's that there is no such thing as philosophy in the Middle Ages; there are only logic and theology. If pressed literally the remark is hypercritical, for it overlooks two facts,—in the first place that the main objects of theology and philosophy are identical, though the method of treatment is different, and in the second place that logical discussion commonly leads up to metaphysical problems, and that this was preëminently the case with the logic of the schoolmen. But the saying draws attention in a forcible way to the two great influences which shaped mediæval thought —on the one side the traditions of ancient logic, on the other the system of Christian theology. Scholasticism opens with a discussion of certain points in the Aristotelian logic; it speedily begins to apply its logical distinctions to the doctrines of the church; and when it attains its full stature in St. Thomas it has, with the exception of certain mysteries, rationalized or Aristotelianized the whole churchly system. Or we might say with equal truth that the philosophy of St. Thomas is Aristotle Christianized. It is, moreover, the attitude of the Schoolmen to these two influences that yields the general characteristic of the period. Their attitude throughout is that of interpreters rather than of those conducting an independent investigation. And though they are at the same time the acutest of critics, and offer the most ingenious developments of the original thesis, they never step outside of the charmed circle of the system they have inherited. They appear to contemplate the universe of nature and man not at first hand with their own eyes but in the glass of Aristotelian formulæ. Their chief works are in the shape of commentaries upon the writings of "the philosopher."[1] Their problems and solutions alike spring from the master's dicta—from the need of reconciling these with one another and with the conclusions of Christian theology.

Reason and authority.

The fact that the channels of thought during the Middle Ages were determined in this way by the external influence of a twofold tradition is usually expressed by saying that reason in the Middle Age is subject to authority. It has not the free play which characterizes its activity in Greece and in the philosophy of modern times. Its conclusions are predetermined, and the initiative of the individual thinker is almost confined, therefore, to formal details in the treatment of his thesis. From the side of the church this characteristic of the period is expressed in the saying

[1] The common designation of Aristotle in the Middle Ages.

that reason has its proper station as the handmaid of faith (*ancilla fidei*). But it is only fair to add that this principle of the subordination of the reason wears a different aspect according to the century and writer referred to. In Scotus Erigena, at the beginning of the Scholastic era, there is no such subordination contemplated, because philosophy and theology in his work are in implicit unity. According to his memorable expression, "Conficitur inde veram esse philosophiam veram religionem, conversimque veram religionem esse veram philosophiam" (*De Divisione Naturae*, i. 1). Reason in its own strength and with its own instruments evolves a system of the universe which coincides, according to Erigena, with the teaching of Scripture. For Erigena, therefore, the speculative reason is the supreme arbiter (as he himself indeed expressly asserts); and in accordance with its results the utterances of Scripture and of the church have not infrequently to be subjected to an allegorical or mystical interpretation. But this is only to say again in so many words that Erigena is more of a Neoplatonist than a Scholastic. In regard to the Scholastics proper, Cousin suggested in respect of this point a threefold chronological division,—at the outset the absolute subordination of philosophy to theology, then the period of their alliance, and finally the beginning of their separation. In other words, we note philosophy gradually extending its claims. Dialectic is, to begin with, a merely secular art, and only by degrees are its terms and distinctions applied to the subject-matter of theology. The early results of the application, in the hands of Berengarius and Roscellinus, did not seem favorable to Christian orthodoxy. Hence the strength with which a champion of the faith like Anselm insists on the subordination of reason. To Bernard of Clairvaux and many other conservative churchmen the application of dialectic to the things of faith at all appears as dangerous as it is impious. At a later date, in the systems of the great Schoolmen, the rights of reason are fully established and amply acknowledged. The relation of reason and faith remains, it is true, an external one, and certain doctrines—an increasing number as time goes on—are withdrawn from the sphere of reason. But with these exceptions the two march side by side; they establish by different means the same results. For the conflicts which accompanied the first intrusion of philosophy into the theological domain more profound and cautious thinkers with a far ampler apparatus of knowledge had substituted a harmony. "The constant effort of Scholasticism to be at once philosophy and theology"[1] seemed at last satisfactorily realized. But this harmony proved more apparent than real, for the further progress of Scholastic thought consisted in a withdrawal of doctrine after doctrine from the possibility of rational proof and their relegation to the sphere of faith. Indeed, no sooner was the harmony apparently established by Aquinas than Duns Scotus began this negative criticism, which is carried much farther by William of Occam. But this is equivalent to a confession that Scholasticism had failed in its task, which was to rationalize the doctrines of the church. The two authorities refused to be reconciled. The Aristotelian form refused to fit a matter for which it was never intended; the matter of Christian theology refused to be forced into an alien form. The Scholastic philosophy speedily ceased therefore to possess a *raison d'être*, and the spread of the skeptical doctrine of a twofold truth proclaims the destruction of the fabric erected by mediæval thought. The end of the period was thus brought about by the internal decay of its method and principles quite as much as by the variety of external causes which contributed to transfer men's interests to other subjects.

But, although the relation of reason to an external authority thus constitutes the badge of mediæval thought, it would be in the last degree unjust to look upon Scholasticism as philosophically barren, and to speak as if reason, after an interregnum of a thousand years, resumed its rights at the Renaissance. Such language was excusable in the men of the Renaissance, fighting the battle of classic form and beauty and of the many-sidedness of life against the barbarous terminology and the monastic ideals of the schools, or in the protagonists of modern science protesting against the complete absorption of human talent by metaphysics—an absorption never witnessed to the same extent before or since. The new is never just to the old; we do not expect it to be so. It belongs to a later and calmer judgment to recognize how the old contained in itself the germs of the new; and a closer study of history is invariably found to diminish the abruptness of the picturesque new beginnings which furnish forth our current divisions of epochs and periods. In the schools and universities of the Middle Age the intellect of the semi-barbarous European peoples had been trained for the work of the modern world. It had advanced from a childish rudeness to an appreciation of the subtlest logical and metaphysical distinctions. The debt which modern philosophy owes to the Schoolmen for this formal training has been amply acknowledged even by a writer like J. S. Mill. But we may go further and say that, in spite of their initial acceptance of authority, the Scholastics are not the antagonists of reason; on the contrary they fight its battles. As has often been pointed out, the attempt to establish *by argument* the authority of faith is in reality the unconscious establishment of the authority of reason. Reason, if admitted at all, must ultimately claim the whole man. Anselm's motto, *Credo ut intelligam*, marks well the distance that has been traversed since Tertullian's *Credo quia absurdum est.* The claim of reason has been recognized to manipulate the data of faith, at first blindly and immediately received, and to weld them into a system such as will satisfy its own needs. Scholasticism that has outlived its day may be justly identified with obscurantism, but not so the systems of those who, by their mighty intellectual force alone, once held all the minds of Europe in willing subjection. The scholastic systems, it is true, are not the free products of speculation; in the main they are *summæ theologiæ*, or they are modified versions of Aristotle. But each system is a fresh recognition of the rights of reason, and Scholasticism as a whole may be justly regarded as the history of the growth and gradual emancipation of reason which was completed in the movements of the Renaissance and the Reformation. Indeed, the widening of human interests which then took place is not without its prelude in the systems of the second period of Scholasticism. The complementary sciences of theology and philosophy remain, of course, the central and dominating interest; but Albertus Magnus was keenly interested in natural science, and a system like that of Aquinas is as wide as Aristotle's in its range, and holds no part of nature to lie outside its inquiries.

Scholasticism not unprogressive.

In speaking of the origin of Scholasticism—name and thing—it has been already noted that mediæval speculation takes its rise in certain logical problems. To be more precise, it is the nature of "universals" which forms the central theme of Scholastic debate. This is the case almost exclusively during the first period, and only to a less extent during the second, where it reappears in a somewhat different form as the difficulty concerning the principle of individuation. Otherwise expressed, the question on which centuries of discussion were thus expended concerns the nature of genera and species and their relation to the individual. On this, Nominalists and Realists take opposite sides; and exclusively logical as the point may at first sight seem to be, adherence

"Universals."

[1] Milman's *Latin Christianity*, ix. 101.

to one side or the other is an accurate indication of philosophic tendency. The two opposing theories express at bottom, in the phraseology of their own time, the radical divergence of pantheism and individualism—the two extremes between which philosophy seems pendulum-wise to oscillate, and which may be said still to await their perfect reconciliation. First, however, we must examine the form which this question assumed to the first mediæval thinkers, and the source from which they derived it. A single sentence in Porphyry's *Isagoge* or "introduction" to the *Categories* of Aristotle furnished the text of the prolonged discussion. The treatise of Porphyry deals with what are commonly called the predicables—*i.e.*, the notions of genus, species, difference, property, and accident; and he mentions, but declines to discuss, the various theories that have been held as to the ontological import of genera and species. In the Latin translation of Boetius, in which alone the *Isagoge* was then known, the sentence runs as follows: "Mox de generibus et speciebus illud quidem sive subsistant, sive in solis nudis intellectibus posita sint, sive subsistentia corporalia sint an incorporalia, et utrum separata a sensibilibus an in sensibilibus posita et circa haec consistentia, dicere recusabo; altissimum enim negotium est hujusmodi et majoris egens inquisitionis." The second of these three questions may be safely set aside; the other two indicate with sufficient clearness three possible positions with regard to universals. It may be held that they exist merely as conceptions in our minds (*in solis nudis intellectibus*); this is Nominalism or Conceptualism. It may be held, in opposition to the Nominalistic view, that they have a substantial existence of their own (*subsistentia*), independent of their existence in our thoughts. But Realism, as this doctrine is named, may be again of two varieties, according as the substantially existent universals are supposed to exist apart from the sensible phenomena (*separata a sensibilibus*) or only in and with the objects of sense as their essence (*in sensibilibus posita et circa haec consistentia*). The first form of Realism corresponds to the Platonic theory of the transcendence of the ideas; while the second reproduces the Aristotelian doctrine of the essence as inseparable from the individual thing. But, though he implies an ample previous treatment of the questions by philosophers, Porphyry gives no references to the different systems of which such distinctions are the outcome, nor does he give any hint of his own opinion on the subject, definite enough though that was. He simply sets the discussion aside as too difficult for a preliminary discourse, and not strictly relevant to a purely logical inquiry. Porphyry, the Neoplatonist, the disciple of Plotinus, was an unknown personage to those early students of the *Isagoge*. The passage possessed for them a mysterious charm, largely due to its isolation and to their ignorance of the historic speculations which suggested it. And accordingly it gave rise to the three great doctrines which divided the mediæval schools: Realism of the Platonic type, embodied in the formula *universalia ante rem;* Realism of the Aristotelian type, *universalia in re;* and Nominalism, including Conceptualism, expressed by the phrase *universalia post rem*, and also claiming to be based upon the Peripatetic doctrine.

Porphyry's *Isagoge.*

To form a proper estimate of the first stage of Scholastic discussion it is requisite above all things to have a clear idea of the appliances then at the disposal of the writers. In other words, what was the extent of their knowledge of ancient philosophy? Thanks to the researches of Jourdain and others, it is possible to answer this question with something like precision. To begin with, we know that till the 13th century the Middle Age was ignorant of Greek, and possessed no philosophical works in their Greek original, while in translations their stock was limited to the *Categories* and the *De Interpretatione* of Aristotle in the versions of Boetius, and the *Timæus* of Plato in the version of Chalcidius. To these must be added, of course, Boetius's translation of Porphyry's *Isagoge* already referred to. The whole metaphysical, ethical, and physical works of Aristotle were thus unknown, and it was not till the 12th century (after the year 1128) that the *Analytics* and the *Topics* became accessible to the logicians of the time. Some general information as to the Platonic doctrines (chiefly in a Neoplatonic garb) was obtainable from the commentary with which Chalcidius (6th cent.) accompanied his translation, from the work of Apuleius (2d cent.) *De Dogmate Platonis*, and indirectly from the commentary of Macrobius (*c.* 400) on the *Somnium Scipionis* of Cicero, and from the writings of St. Augustine. As aids to the study of logic, the doctors of this period possessed two commentaries by Boetius on the *Isagoge* (*Ad Porphyrium a Victorino translatum* and *In Porphyrium a se translatum*), two commentaries by the same author on the *De Interpretatione* and one on the *Categories*, as well as another, mainly rhetorical, *Ad Ciceronis Topica*. To these are to be added the following original treatises of Boetius: *Introductio ad Categoricos Syllogismos*, *De Syllogismo Categorico*, *De Syllogismo Hypothetico*, *De Divisione*, *De Definitione*, and *De Differentiis Topicis*, the last dealing almost exclusively with rhetoric. There were also in circulation two tracts attributed to St. Augustine, the first of which, *Principia Dialecticae*, is probably his, but is mainly grammatical in its import. The other tract, known as *Categoriae Decem*, and taken at first for a translation of Aristotle's treatise, is really a rapid summary of it, and certainly does not belong to Augustine. To this list there must be added three works of an encyclopædic character, which played a great part as text-books in the schools, Of these the oldest and most important was the *Satyricon* of Marcianus Capella (close of 5th century) a curious medley of prose and allegorical verse, the greater part of which is a treatise on the seven liberal arts, the fourth book dealing with logic. Similar in its contents is the work of Cassiodorus (468–562), *De Artibus ac Disciplinis Liberalium Literarum*, of which the third work referred to, the *Origines* of Isidore of Seville (*ob.* 636), is little more than a reproduction. The above constitutes without exception the whole material which the earlier Middle Age had at its disposal.

Extent of the early Schoolmen's knowledge.

The grandly conceived system of Erigena (see ERIGENA and MYSTICISM) stands by itself in the 9th century like the product of another age. John the Scot was still acquainted with Greek, seeing that he translated the work of the pseudo-Dionysius; and his speculative genius achieved the fusion of Christian doctrine and Neoplatonic thought in a system of quite remarkable metaphysical completeness. It is the only complete and independent system between the decline of ancient thought and the system of Aquinas in the 13th century, if indeed we ought not to go further, to modern times, to find a parallel. Erigena pronounces no express opinion upon the question which was even then beginning to occupy men's minds; but his Platonico-Christian theory of the Eternal Word as containing in Himself the exemplars of created things is equivalent to the assertion of *universalia ante rem*. His whole system, indeed, is based upon the idea of the divine as the exclusively real, of which the world of individual existence is but the theophany; the special and the individual are immanent, therefore, in the general. And hence at a much later date (in the beginning of the 13th century) his name was invoked to cover the pantheistic heresies of Amalrich of Bena. Erigena does not separate his Platonic theory of preëxistent exemplars from the Aristotelian doctrine of the universal as *in* the individuals. As Ueberweg points out, his theory is rather a result of the transference of the Aristotelian conception of substance to the Pla-

Erigena.

tonic Idea, and of an identification of the relation of accidents to the substance in which they inhere with that of the individuals to the Idea of which, in the Platonic doctrine, they are copies (*Hist. of Philosophy*, i. 363, Eng. trans.). Hence it may be said that the universals are in the individuals, constituting their essential reality (and it is an express part of Erigena's system that the created but creative Word, the second division of Nature, should pass into the third stage of created and non-creating things); or rather, perhaps, we ought to say that the individuals exist in the bosom of their universal. At all events, while Erigena's Realism is pronounced, the Platonic and Aristotelian forms of the doctrine are not distinguished in his writings. Prantl has professed to find the headstream of Nominalism also in Scotus Erigena; but beyond the fact that he discusses at considerable length the categories of thought and their mutual relations, occasionally using the term "voces" to express his meaning, Prantl appears to adduce no reasons for an assertion which directly contradicts Erigena's most fundamental doctrines. Moreover Erigena again and again declares that dialectic has to do with the stadia of a real or divine classification: "Intelligitur quod ars illa, quae dividit genera in species et species in genera resolvit, quae διαλεκτική dicitur, non ab humanis machinationibus sit facta, sed in natura rerum ab auctore omnium artium, quae verae artes sunt, condita et a sapientibus inventa" (*De Divisione Naturae*, iv. 4).

The immediate influence of Erigena's system cannot have been great, and his works seem soon to have dropped out of notice in the centuries that followed. The real germs of Realism and Nominalism, as they took shape in mediæval thought, are to be found in the 9th century, in scattered commentaries and glosses (mostly still in manuscript) upon the statements of Porphyry and Boetius. Boetius in commenting upon Porphyry had already started the discussion as to the nature of universals. He is definitely anti-Platonic, and his language sometimes takes even a nominalistic tone, as when he declares that the species is nothing more than a thought or conception gathered from the substantial similarity of a number of dissimilar individuals. The expression "substantial similarity" is still, however, sufficiently vague to cover a multitude of views. He concludes that the genera and species exist as universal only in thought; but, inasmuch as they are collected from singulars on account of a real resemblance, they have a certain existence independently of the mind, but not an existence disjoined from the singulars of sense. "Subsistunt ergo circa sensibilia, intelliguntur autem prater corpora." Or, according to the phrase which recurs so often during the Middle Ages, "universale intelligitur, singulare sentitur." Boetius ends by declining to adjudicate between Plato and Aristotle, remarking in a semi-apologetic style that, if he has expounded Aristotle's opinion by preference, his course is justified by the fact that he is commenting upon an introduction to Aristotle. And, indeed, his discussion cannot claim to be more than semi-popular in character. The point in dispute has not in his hands the all-absorbing importance it afterwards attained, and the keenness of later distinctions is as yet unknown. In this way, however, though the distinctions drawn may still be comparatively vague, there existed in the schools a Peripatetic tradition to set over against the Neoplatonic influence of John the Scot, and amongst the earliest remains of Scholastic thought we find this tradition asserting itself somewhat vigorously. There were Nominalists before Roscellinus among these early thinkers.

Influence of Boetius.

Alcuin, the first head of the school of the Palace, does nothing more in his *Dialectic* than abridge Boetius and the other commentators. But in the school of Fulda, presided over by his pupil Hrabanus Maurus (776–856), there are to be found some fresh contributions to the discussion. The collected works of Hrabanus himself contain nothing new, but in some glosses on Aristotle and Porphyry, first exhumed by Cousin, there are several noteworthy expressions of opinion in a Nominalistic sense. The author interprets Boetius's meaning to be "Quod eadem res individuum et species et genus est, et non esse universalia individuis quasi quoddam diversum." He also cites apparently with approval, the view of those who held Porphyry's treatise to be not *de quinque rebus* but *de quinque vocibus*. A genus, they said, is essentially something which is predicated of a subject; but a thing cannot be a predicate (*res enim non praedicatur*). These glosses, it should be added, however, have been attributed by Prantl and Kaulich, on the ground of divergence from doctrines contained in the published works of Hrabanus, to some disciple of his rather than to Hrabanus himself. Fulda had become through the teaching of the latter an intellectual centre. Eric or Heiricus, who studied there under Haimon, the successor of Hrabanus, and afterwards taught at Auxerre, wrote glosses on the margin of his copy of the pseudo-Augustinian *Categoriae*, which have been published by Cousin and Hauréau. He there says in words which recall the language of Locke (*Essay*, iii. 3) that because proper names are innumerable, and no intellect or memory would suffice for the knowing of them, they are all as it were comprehended in the species ("Sciendum autem, quia propria nomina primum sunt innumerabilia, ad quae cognoscenda intellectus nullus seu memoria sufficit, haec ergo omnia coartata species comprehendit, et facit primum gradum"). Taken in their strictness these words state the position of extreme Nominalism; but even if we were not forbidden to do so by other passages, in which the doctrine of moderate Realism is adopted (under cover of the current distinction between the singular as felt and the pure universal as understood), it would still be unfair to press any passage in the writings of this period. As Cousin says, "Realism and Nominalism were undoubtedly there in germ, but their true principles with their necessary consequences remained profoundly unknown; their connection with all the great questions of religion and politics was not even suspected. The two systems were nothing more as yet than two different ways of interpreting a phrase of Porphyry, and they remained unnoticed in the obscurity of the schools. . . . It was the 11th century which gave Nominalism to the world."[1]

Hrabanus Maurus.

Eric.

Remi or Remigius of Auxerre, pupil of Eric, became the most celebrated professor of dialectic in the Parisian schools of the 10th century. As he reverted to Realism, his influence, first at Rheims and then in Paris, was doubtless instrumental in bringing about the general acceptance of that doctrine till the advent of Roscellinus as a powerful disturbing influence. "There is one genus more general than the rest," says Remi (*apud* Hauréau, *De la Philosophie Scolastique*, i. 146). "beyond which the intellect cannot rise, called by the Greeks *οὐσία*, by the Latins *essentia*. The essence, indeed, comprehends all natures, and everything that exists is a portion of this essence, by participation in which everything that is hath its existence." And similarly with the intermediate genera. "Homo est multorum hominum substantialis unitas." Remigius is thus a Realist, as Hauréau remarks, not so much in the sense of Plato as in the spirit of Parmenides, and Hauréau applies to this form of Realism Bayle's description of Realism in general as "le Spinosisme non developpé." The 10th century as a whole is especially marked out as a dark age, being partly filled with civil troubles and partly characterized by a reac-

Remi.

[1] *Ouvrages inédits d'Abélard*. Introd., p. lxxxv.

tion of faith against reason. In the monastery of St. Gall there was considerable logical activity, but nothing of philosophical interest is recorded. The chief name of the century is that of Gerbert (died as Pope Sylvester II. in 1003). He studied at Aurillac under Otto of Clugny, the pupil of Remigius, and later among the Moors in Spain, and taught afterwards himself in the schools of Tours, Fleury, Sens, and Rheims. He was a man of universal attainments, but only his treatise *De Rationali et Ratione uti* need be mentioned here. It is more interesting as a display of the logical acquirements of the age than as possessing any direct philosophical bearing. The school of Chartres, founded in 990 by Fulbert, one of Gerbert's pupils, was distinguished for nearly two centuries not so much for its dialectics and philosophy as for its humanistic culture. The account which John of Salisbury gives of it in the first half of the 12th century, under the presidency of Theodoric and Bernard, gives a very pleasant glimpse into the history of the Middle Ages. Since then, says their regretful pupil, "less time and less care have been bestowed on grammar, and persons who profess all arts, liberal and mechanical, are ignorant of the primary art, without which a man proceeds in vain to the rest. For albeit the other studies assist literature, yet this has the sole privilege of making one lettered."[1]

Gerbert.

School of Chartres.

Hitherto, if dialectical studies had been sometimes viewed askance by the stricter churchmen it was not because logic had dared to streteh forth its hands towards the ark of God, but simply on the ground of the old opposition between the church and the world: these secular studies absorbed time and ability which might have been employed for the glory of God and the service of the church. But now bolder spirits arose who did not shrink from applying the distinctions of their human wisdom to the mysteries of theology. It was the excitement caused by their attempt, and the heterodox conclusions which were its first result, that lifted these Scholastie disputations into the central position which they henceforth occupied in the life of the Middle Ages. And whereas, up to this time, discussion had been in the main of a purely logical character, the next centuries show that peculiar combination of logic and theology which is the mark of Scholasticism, especially in the period before the 13th century. For reason, having already asserted itself so far, could not simply be put under a ban. Orthodoxy had itself to put on the armor of reason; and so panoplied its champions soon proved themselves superior to their antagonists on their own battlefield.

Application of logic to theology.

One of the first of these attacks was made by Berengarius of Tours (999[2]–1088) upon the doctrine of transubstantiation; he denied the possibility of a change of substance in the bread and wine without some corresponding change in the accidents. Berengarius had studied at Chartres, where his exclusive devotion to dialectic caused Fulbert more than once to remonstrate with his pupil. According to the testimony of his opponent and former fellow-student, Lanfranc, he seems even in his student days to have been by temperament a rebel against authority. "When we were in the schools together," says Lanfranc, "it was your part always to collect authorities against the Catholic faith." M. de Rémusat characterizes his view on the Eucharist as a specific application of Nominalism ("un nominalisme special ou restreint à une seule question"). More intimately connected with the progress of philosophical thought was the tritheistic view of the Trinity propounded by Roscellinus as one of the results of his Nominalistic theory of knowing and being. The sharpness and one-sidedness with which he formulated his position were the immediate occasion of the contemporaneous crystallization of Realism in the theories of Anselm and William of Champeaux. Henceforth discussion is carried on with a full consciousness of the differences involved and the issues at stake; and, thanks to the heretical conclusion disclosed by Roscellinus, Realism became established for several centuries as the orthodox philosophical creed. Roscellinus (*ob. c.* 1125) was looked upon by later times as the originator of the *sententia vocum*, that is to say, of Nominalism proper. Unfortunately, we are reduced for a knowledge of his position to the scanty and ill-natured notices of his opponents (Anselm and Abelard). From these we gather that he refused to recognize the reality of anything but the individual; he treated "the universal substance," says Anselm, as no more than "flatum vocis," a verbal breathing or sound; and in a similar strain he denied any reality to the parts of which a whole, such as a house, is commonly said to be composed. The parts in the one case, the general name or common attributes in the other, are only, he seems to have argued, so many subjective points of view from which we choose to regard that which in its own essence is one and indivisible, existing in its own right apart from any connection with other individuals. This pure individualism, consistently interpreted, involves the denial of all real relation whatsoever; for things are related and classified by means of their general characteristics. Accordingly, if these general characteristics do not possess reality, things are reduced to a number of characterless and mutually indifferent points. It is possible, as Hauréau maintains, that Roscellinus meant no more than to refute the untenable Realism which asserts the substantial and, above all, the independent existence of the universals. Some of the expressions used by Anselm in controverting his position favor this idea, since they prove that the Realism of Anselm himself embraced positions discarded by the wiser advocates of that doctrine. Anselm upbraids Roscellinus, for example, because he was unable to conceive whiteness apart from its existence in something white. But this is precisely an instance of the hypostatization of abstractions in exposing which the chief strength and value of Nominalism lie. Cousin is correct in pointing out, from the Realistic point of view, that it is one thing to deny the hypostatization of an accident like color or wisdom, and another thing to deny the foundation in reality of those "true and legitimate universals" which we understand by the terms genera and species. "The human race is not a word, or, if it is, we are driven to assert that there is really nothing common and identical in all men—that the brotherhood and equality of the human family are pure abstractions, and that, since individuality is the sole reality, the sole reality is difference, that is to say, hostility and war, with no right but might, no duty but interest, and no remedy but despotism. These are the sad but necessary consequences which logic and history impose upon Nominalism and Empiricism."[3] It is not for a moment to be supposed that the full scope of his doctrine was present to the mind of Roscellinus; but Nominalism would hardly have made the sensation it did had its assertions been as innocent as Hauréau would make them. Like most innovators, Roscellinus stated his position in bold language, which emphasized his opposition to accepted doctrines; and his words, if not his intentions, involved the extreme Nominalism which, by making universality merely subjective, pulverizes existence into detached particulars. And though we may acquit Roscellinus of consciously propounding a theory so subversive of all knowledge, his criticism of the doctrine of the Trinity is proof at least of the determination with which he was prepared to carry out his individualism. If we are not prepared to say that the three Persons are one thing—in which case the Father and the Holy Ghost must have been incar-

Berengarius.

Roscellinus.

[1] *Metalogicus*, i. 27, quoted in Poole's *Illustrations of Mediæval Thought*.

[2] [This is Ueberweg's date. Article BERENGARIUS, vol. iii. p. 505, says 998.—AM. ED.]

[3] *Ouvrages inédits d'Abélard*, Introd., p. cvi.

nate along with the Son—then, did usage permit, he says, we ought to speak of three Gods.

Anselm.

It was this theological deduction from his doctrine that drew upon Roscellinus the polemic of his most celebrated opponent, Anselm of Canterbury (1033–1109). Roscellinus appears at first to have imagined that his tritheistic theory had the sanction of Lanfranc and Anselm, and the latter was led in consequence to compose his treatise *De Fide Trinitatis*. From this may be gathered, in a somewhat indirect and incidental fashion, his views on the nature of universals. "How shall he who has not arrived at understanding how several men are in species one man comprehend how in that most mysterious nature several persons, each of which is perfect God, are one God?" The manner in which humanity exists in the individual was soon to be the subject of keen discussion, and to bring to light diverging views within the Realistic camp; but St. Anselm does not go into detail on this point, and seems to imply that it is not surrounded by special difficulties. In truth, his Realism, as has just been seen, was of a somewhat uncritical type. It was simply accepted by him in a broad way as the orthodox philosophic doctrine, and the doctrine which, as a sagacious churchman, he perceived to be most in harmony with Christian theology. But Anselm's heart was not in the dialectical subtleties which now began more and more to engross the schools. The only logical treatise which he wrote, *De Grammatica*, falls so far below the height of his reputation that it leads Prantl into undue depreciation of Anselm's eminence as a thinker. Anselm's natural element was theology, and the high metaphysical questions which are as it were the obverse of theology. Hauréau calls him with truth "the last of the fathers;" the sweep of his thought recalls St. Augustine rather than the men of his own time. On the other hand, as the first to formulate the ontological argument for the existence of God, he joins hands with some of the profoundest names in modern philosophy. This celebrated argument, which fascinated in turn Descartes, Leibnitz, and Hegel, not to mention other names, appears for the first time in the pages of Anselm's *Proslogium*. To Anselm specially belongs the motto *Credo ut intelligam*, or, as it is otherwise expressed in the sub-title of his *Proslogium*, *Fides quaerens intellectum*. "His method," says Cousin (p. ci.), "is to set out from the sacred dogmas as they are given by the hand of authority, and without at any time departing from these dogmas to impregnate them by profound reflection, and thus as it were raise the darkness visible of faith to the pure light of philosophy." In this spirit he endeavored to give a philosophical demonstration not only of the existence of God but also of the Trinity and the Incarnation, which were placed by the later Scholastics among the "mysteries." The Christological theory of satisfaction expounded in the *Cur Deus Homo* falls beyond the scope of the present article. But the Platonically conceived proof of the being of God contained in the *Monologium* shows that Anselm's doctrine of the universals as substances in things (*universalia in re*), was closely connected in his mind with the thought of the *universalia ante rem*, the exemplars of perfect goodness and truth and justice, by participation in which all earthly things are judged to possess these qualities. In this way he rises like Plato to the absolute Goodness, Justice, and Truth, and then proceeds in Neoplatonic fashion to a deduction of the Trinity as involved in the idea of the divine Word.

William of Champeaux.

Besides its connection with the speculations of Anselm, the doctrine of Roscellinus was also of decisive influence within the schools in crystallizing the opposite opinion. William of Champeaux is reputed the founder of a definitely formulated Realism, much as Roscellinus is regarded as the founder of Nominalism. William of Champeaux (1070–1121) was instructed by Roscellinus himself in dialectic. His own activity as a teacher belongs to the first years of the 12th century. He lectured in Paris in the cathedral school of Notre Dame till the year 1108, when he retired to the priory of St. Victor on the outskirts of Paris. But soon afterwards, unable to resist the importunities of his friends and pupils, he resumed his lectures there, continuing them till his removal to the see of Châlons in 1113, and thus laying the foundation of the reputation which the monastery soon acquired. Unfortunately none of the philosophical works of William have survived, and we are forced to depend for an account of his doctrine upon the statements of his opponent Abelard, in the *Historia Calamitatum Mearum*, and in certain manuscripts discovered by Cousin. From these sources it appears that William professed successively two opinions on the nature of the universals, having been dislodged from his first position by the criticism of Abelard, his quondam pupil. There is no obscurity about William's first position. It is a Realism of the most uncompromising type, which by its reduction of individuals to accidents of one identical substance seems to tremble on the very verge of Spinozism. He taught, says Abelard, that the same thing or substance was present in its entirety and essence in each individual, and that individuals differed no whit in their essence, but only in the variety of their accidents. "Erat autem in ea sententia de communitate universalium, ut eandem essentialiter rem totam simul singulis suis inesse adstrueret individuis, quorum quidem nulla esset in essentia diversitas, sed sola multitudine accidentium varietas." Thus "Socratitas" is merely an accident of the substance "humanitas," or, as it is put by the author of the treatise *De Generibus et Speciebus*,[1] "Man is a species, a thing essentially one (*res una essentialiter*), which receives certain forms which make it Socrates. This thing, remaining essentially the same, receives in the same way other forms which constitute Plato and the other individuals of the species man; and, with the exception of those forms which mould that matter into the individual Socrates, there is nothing in Socrates that is not the same at the same time under the forms of Plato. . . . According to these men, even though rationality did not exist in any individual, its existence in nature would still remain intact" (Cousin, *Introduction*, etc., p. cxx.). Robert Pulleyn expresses the same point of view concisely when he makes the Realist say, "Species una est substantia, ejus vero individua multae personae, et hae multae personae sunt illa una substantia." But the difficulties in the way of treating the universal as substance or thing are so insuperable, and at the same time so obvious, that criticism was speedily at work upon William of Champeaux's position. He had said expressly that the universal essence, by the addition of the individual forms, was individualized and present *secundum totam suam quantitatem* in each individual. But if *homo* is wholly and essentially present in Socrates, then it is, as it were, absorbed in Socrates; where Socrates is not, it cannot be, consequently not in Plato and the other *individua hominis*. This was called the argument of the *homo Socraticus;* and it appears to have been with the view of obviating such time and space difficulties, emphasized in the criticism of Abelard, that William latterly modified his form of expression. But his second position is enveloped in considerable obscurity. Abelard says, "Sic autem correxit sententiam, ut deinceps rem eamdem non essentialiter sed individualiter diceret." In other words, he merely sought to avoid the awkward consequences of his own doctrine by substituting "individualiter" for "essentialiter" in his definition. If

[1] This treatise, first published by Cousin in his *Ouvrages inédits d'Abélard*, was attributed by him to Abelard, and he was followed in this opinion by Hauréau; but Prantl adduces reasons which seem satisfactory for believing it to be the work of an unknown writer of somewhat later date (see Prantl, *Geschichte d. Logik*, ii. 143).

we are to put a sense upon this new expression, William may probably have meant to recall any words of his which seemed, by locating the universal in the entirety of its essence in each individual to confer upon the individual an independence which did not belong to it—thus leading in the end to the demand for a separate universal for each individual. In opposition to this Nominalistic view, which implied the reversal of his whole position, William may have meant to say that, instead of the universal being multiplied, it is rather the individuals which are reduced to unity in the universal. The species is essentially one, but it takes on individual varieties or accidents. If, however, we are more ill-natured, we may regard the phrase, with Prantl, as simply a meaningless makeshift in extremities; and if so, Abelard's account of the subsequent decline of William's reputation would be explained. But there is in some of the manuscripts the various reading of "indifferenter" for "individualiter," and this is accepted as giving the true sense of the passage by Cousin and Rémusat (Hauréau and Prantl taking, on different grounds, the opposite view). According to this reading, William sought to rectify his position by asserting, not the numerical identity of the universal in each individual, but rather its sameness in the sense of indistinguishable similarity. Ueberweg cites a passage from his theological works which apparently bears out this view, for William there expressly distinguishes the two senses of the word "same." Peter and Paul, he says, are the same in so far as they are both men, although the humanity of each is, strictly speaking, not identical but similar. In the Persons of the Trinity, on the other hand, the relation is one of absolute identity.

Theory of indifference.

Whether this view is to be traced to William or not, it is certain that the theory of "indifference" or "non-difference" (*indifferentia*) was a favorite solution in the Realistic schools soon after his time. The inherent difficulties of Realism, brought to light by the explicit statement of the doctrine and by the criticism of Abelard, led to a variety of attempts to reach a more satisfactory formula. John of Salisbury, in his account of the controversies of these days (*Metalogicus*, ii. 17) reckons up nine different views which were held on the question of the universals, and the list is extended by Prantl (ii. 118) to thirteen. In this list are included of course all shades of opinion, from extreme Nominalism to extreme Realism. The doctrine of indifference as it appears in later writers certainly tends, as Prantl points out, towards Nominalism, inasmuch as it gives up the substantiality of the universals. The universal consists of the non-different elements or attributes in the separate individuals, which alone exist substantially. If we restrict attention to these non-different elements, the individual becomes for us the species, the genus, etc.; everything depends on the point of view from which we regard it. "Nihil omnino est praeter individuum, sed et illud aliter et aliter attentum species et genus et generalissimum est." Adelard of Bath (whose treatise *De Eodem et Diverso* must have been written between 1105 and 1117) was probably the author or at all events the elaborator of this doctrine, and he sought by its means to effect a reconciliation between Plato and Aristotle: "Since that which we see is at once genus and species and individual, Aristotle rightly insisted that the universals do not exist except in the things of sense. But, since those universals, so far as they are called genera and species, cannot be perceived by any one in their purity without the admixture of imagination, Plato maintained that they existed and could be beheld beyond the things of sense, to wit, in the divine mind. Thus these men, although in words they seem opposed, yet held in reality the same opinion." Prantl distinguishes from the system of indifference the "status" doctrine attributed by John of Salisbury to Walter of Mortagne (*ob.* 1174), according to which the universal is essentially united to the individual, which may be looked upon, *e.g.*, as Plato, man, animal, etc., according to the "status" or point of view which we assume. But this seems only a different expression for the same position, and the same may doubtless be said of the theory which employed the outlandish word "maneries" (Fr. *manière*) to signify that genera and species represented the different ways in which individuals might be regarded. The concessions to Nominalism which such views embody make them representative of what Hauréau calls "the Peripatetic section of the Realistic school."

Bernard of Chartres.

Somewhat apart from current controversies stood the teaching of the school of Chartres, humanistically nourished on the study of the ancients. Bernard of Chartres (*ob.* 1167), called by John of Salisbury "perfectissimus inter Platonicos seculi nostri," taught at Chartres in the beginning of the 12th century, when William was still lecturing at St. Victor. He endeavored, according to John of Salisbury, to reconcile Plato and Aristotle; but his doctrine is almost wholly derived from the former through St. Augustine and the commentary of Chalcidius. The *universalia in re* have little place in his thoughts, which are directed by preference to the eternal exemplars as they exist in the supersensible world of the divine thought. His *Megacosmus* and *Microcosmus* are little more than a poetic gloss upon the *Timaeus*. William of Conches, a pupil of Bernard's, was more eclectic in his views, and, devoting himself to psychological and physiological questions, was of less importance for the specific logico-metaphysical problem.

Gilbert de la Porrée.

But Gilbert de la Porrée (Gilbertus Porretanus, or, from his birthplace, Poitiers, also called Pictaviensis, 1075–1154), who was also a pupil of Bernard's, and who was afterwards for about twenty years chancellor of the cathedral of Chartres before he proceeded to lecture in Paris, is called by Hauréau the most eminent logician of the Realistic school in the 12th century and the most profound metaphysician of either school. The views which he expressed in his commentary on the pseudo-Boetian treatise, *De Trinitate*, are certainly much more important than the mediatizing systems already referred to. The most interesting part of the work is the distinction which Gilbert draws between the manner of existence of genera and species and of substances proper. He distinguishes between the *quod est* and the *quo est*. Genera and species certainly exist, but they do not exist in their own right as substances. What exists as a substance and the basis of qualities or forms (*quod est*) may be said *substare;* the forms on the other hand by which such an individual substance exists qualitatively (*quo est*) *subsistunt*, though it cannot be said that they *substant*. The intellect collects the universal, which exists but not as a substance (*est sed non substat*), from the particular things which not merely are (*sunt*) but also, as subjects of accidents, have substantial existence (*substant*), by considering only their substantial similarity or conformity. The universals are thus forms inherent in things—"native forms," according to the expression by which Gilbert's doctrine is concisely known. The individual consists of an assemblage of such forms; and it is individual because nowhere else is exactly such an assemblage to be met with. The form exists concretely in the individual things (*sensibilis in re sensibili*), for in sensible things form and matter are always united. But they may be conceived abstractly or non-sensuously by the mind (*sed mente concipitur insensibilis*), and they then refer themselves as copies to the Ideas their divine exemplars. In God, who is pure form without matter, the archetypes of material things exist as eternal immaterial forms. In this way Gilbert was at once Aristotelian and Platonist. The distinctions made by him above amount to a formal criticism of categories, and in the same spirit he teaches that no one of the categories can be applied in its literal sense

to God. Gilbert was also the author of a purely logical work, *De Sex Principiis*, in which he criticised the Aristotelian list of the ten categories, drawing a distinction between the first four—substance, quality, quantity, and relation (*i.e.*, according to Gilbert, indeterminate or potential relation)—which he called *formae inhaerentes*, and the remaining six, which he maintained belong to an object only through its actual relation to other objects (*respectu alterius*). To these six, therefore, he gave the name of *formae assistentes*. This distinction was adopted in all the schools till the 16th century, and the treatise *De Sex Principiis* was bound up with the *Isagoge* and the *Categories*.

Abelard.

But by far the most outstanding figure in the controversies of the first half of the 12th century is Abelard (Petrus Abælardus, also called Palatinus from Pallet, the place of his birth, 1079–1142). Abelard was successively the pupil of Roscellinus and William of Champeaux, and the contrast between their views doubtless emphasized to him at an early period the extravagances of extreme Nominalism and extreme Realism. He speedily acquired a reputation as an unrivalled dialectician, the name Peripateticus being bestowed upon him in later years to signify this eminence. Almost before he had emerged from the pupillary state, he came forward in public as the acute and vehement critic of his masters' doctrines, especially that of William of Champeaux, whom Abelard seems ultimately to have superseded in Paris. About Abelard's own system there is far from being perfect unanimity of opinion, some, like Ritter and Erdman, regarding it as a moderate form of Realism,—a return indeed to the position of Aristotle,—while others, like Cousin, Rémusat, Hauréau, and Ueberweg, consider it to be essentially Nominalistic, only more prudently and perhaps less consistently expressed than was the case with Roscellinus. His position is ordinarily designated by the name Conceptualism, though there is very little talk of concepts in Abelard's own writings; and Conceptualism, Hauréau tells us, "c'est le nominalisme raisonnable." There can be no doubt, at all events, that Abelard himself intended to strike out a *via media* between the extreme Nominalism of Roscellinus and the views of the ordinary Realists. As against Realism he maintains consistently *Res de re non praedicatur;* genera and species, therefore, which are predicated of the individual subject, cannot be treated as things or substances. This is manifestly true, however real the facts may be which are designated by the generic and specific names; and the position is fully accepted, as has been seen, by a Realist like Gilbert, who perhaps adopted it first from Abelard. Abelard also perceived that Realism, by separating the universal substance from the forms which individualize it, makes the universal indifferent to these forms, and leads directly to the doctrine of the identity of all beings in one universal substance or matter—a pantheism which might take either an Averroistic or a Spinozistic form. Against the system of non-difference Abelard has a number of logical and traditional arguments to bring, but it is sufficiently condemned by his fundamental doctrine that only the individual exists in its own right. For that system still seems to recognize a generic substance as the core of the individual, whereas, according to Cousin's rendering of Abelard's doctrine, "only individuals exist, and in the individual nothing but the individual." The individual Socrates may be said to be made Socrates by the form *Socratitas;* now "the subject of this form is not humanity in itself but that particular part of human nature which is the nature of Socrates. The matter in the individual Socrates is therefore quite as much individual as his form" (p. clxxiv.) Holding fast then on the one hand to the individual as the only true substance, and on the other to the traditional definition of the genus as that which is predicated of a number of individuals (*quod praedicatur de pluribus*), Abelard declared that this definition of itself condemns the Realistic theory; only a name, not a thing, can be so predicated,—not the name, however, as a *flatus vocis* or a collection of lettters, but the name as used in discourse, the name as a sign, as having a meaning—in a word, not *vox* but *sermo*. *Sermo est praedicabilis*. By these distinctions Abelard hoped to escape the consequences of extreme Nominalism, from which, as a matter of history, his doctrine has been distinguished under the name of Conceptualism, seeing that it lays stress not on the word as such but on the thought which the word is intended to convey. Moreover, Abelard evidently did not mean to imply that the distinctions of genera and species are of arbitrary or merely human imposition. His favorite expression for the universal is "quod de pluribus natum est praedicari" (a translation of Aristotle, *De Interpretatione*, 7), which would seem to point to a real or objective counterpart of the products of our thought; and the traditional definitions of Boetius, whom he frequently quotes, support the same view of the concept as gathered from a number of individuals in virtue of a real resemblance. What Abelard combats is the substantiation of these resembling qualities, which leads to their being regarded as identical in all the separate individuals, and thus paves the way for the gradual undermining of the individual, the only true and indivisible substance. But he modifies his Nominalism so as to approach, though somewhat vaguely, to the position of Aristotle himself. At the same time he has nothing to say against the Platonic theory of *universalia ante rem*, the Ideas being interpreted as exemplars, existing in the divine understanding before the creation of things. Abelard's discussion of the problem (which it is right to say is on the whole incidental rather than systematic) is thus marked by an eclecticism which was perhaps the source at once of its strength and its weakness. Rémusat characterizes his teaching as displaying "rather an originality of talent than of ideas," and Prantl says that in the sphere of logic his activity shows no more independence than that of perhaps a hundred others at the same time. But his brilliant ability and restless activity made him the central figure in the dialectical as in the other discussions of his time. To him was indirectly due, in the main, that troubling of the Realistic waters which resulted in so many modifications of the original thesis; and his own somewhat eclectic ruling on the question in debate came to be tacitly accepted in the schools, as the ardor of the disputants began to abate after the middle of the century.

Abelard's application of dialectic to theology betrayed the Nominalistic basis of his doctrine. He zealously combated the Tritheism of Roscellinus, but his own views on the Trinity were condemned by two councils (at Soissons in 1121 and at Sens in 1140). Of the alternatives—three Gods or *una res*—which his Nominalistic logic presented to Roscellinus, Roscellinus had chosen the first; Abelard recoiled to the other extreme, reducing the three Persons to three aspects or attributes of the Divine Being (Power, Wisdom, and Love). For this he was called to account by Bernard of Clairvaux (1091–1153), the recognized guardian of orthodoxy in France. Bernard declared that he "savored of Arius when he spoke of the Trinity, of Pelagius when he spoke of grace, and of Nestorius when he spoke of the person of Christ." "While he labored to prove Plato a Christian, he showed himself a heathen." Nor can it be said that the instinct of the saint was altogether at fault. The germs of Rationalism were unquestionably present in several of Abelard's opinions, and still more so, the traditionalists must have thought, in his general attitude towards theological questions. "A doctrine is believed," he said, "not because God has said it, but because we are convinced by reason that it is so." "Doubt is the road to inquiry, and by inquiry we perceive the truth." ("Dubitando enim ad inquisitionem venimus, inquirendo veritatem percipimus.") The application of dialectic to theology was not new.

Bernard of Clairvaux.

Anselm had made an elaborate employment of reason in the interest of faith, but the spirit of pious subordination which had marked the demonstrations of Anselm seemed wanting in the argumentations of this bolder and more restless spirit; and the church, or at least an influential section of it, took alarm at the encroachments of Rationalism. Abelard's remarkable compilation *Sic et Non* was not calculated to allay their suspicions. In bringing together the conflicting opinions of the fathers on all the chief points of Christian dogmatics, it may be admitted that Abelard's aim was simply to make these contradictions the starting point of an inquiry which should determine in each case the true position and *via media* of Christian theology. Only such a determination could enable the doctrines to be summarily presented as a system of thought. The book was undoubtedly the precursor of the famous *Books of Sentences* of Abelard's own pupil Peter Lombard and others, and of all the *Summae Theologiae* with which the church was presently to abound. But the antinomies, as they appeared in Abelard's treatise, without their solutions, could not but seem to insinuate a deep-laid skepticism with regard to authority. And even the proposal to apply the unaided reason to solve questions which had divided the fathers must have been resented by the more rigid churchmen as the rash intrusion of an over-confident Rationalism.

Realism was in the beginning of the 12th century the dominant doctrine and the doctrine of the church; the Nominalists were the innovators and the especial representatives of the Rationalistic tendency. In order to see the difference in this respect between the schools we have only to compare the peaceful and fortunate life of William of Champeaux (who enjoyed the friendship of St. Bernard) with the agitated and persecuted existence of Roscellinus and, in a somewhat less degree, of Abelard. But now the greater boldness of the dialecticians awakened a spirit of general distrust in the exercise of reason on sacred subjects, and we find even a Realist like Gilbert de la Porrée arraigned by Bernard and his friends before a general council on a charge of heresy (at Rheims, 1148). Though Gilbert was acquitted, the fact of his being brought to trial illustrates the growing spirit of suspicion. Those heresy-hunts show us the worst side of St. Bernard, yet they are in a way just the obverse of his deep mystical piety. This is the judgment of Otto of Freising, a contemporary: "He was, from the fervor of his Christian religion, as jealous as, from his habitual meekness, he was in some measure credulous; so that he held in abhorrence those who trusted in the wisdom of this world and were too much attached to human reasonings, and if anything alien from the Christian faith were said to him in reference to them he readily gave ear to it." The same attitude is maintained by the mystical school of St. Victor. Hugo of St. Victor (1097–1141) declares that "the uncorrupted truth of things cannot be discovered by reasoning." The perils of dialectic are manifold, especially in the over-bold spirit it engenders. Nevertheless Hugo, by the composition of his *Summa Sententiarum*, endeavored to give a methodical or rational presentation of the content of faith, and was thus the first of the so-called Summists. Richard of St. Victor, prior of the monastery from 1162 to 1173, is still more absorbed in mysticism, and his successor Walter loses his temper altogether in abuse of the dialecticians and the Summists alike. The Summists have as much to say against the existence of God as for it, and the dialecticians, having gone to school to the pagans, have forgotten over Aristotle the way of salvation. Abelard, Peter Lombard, Gilbert de la Porrée, and Peter of Poitiers he calls the "four labyrinths of France."

Hugo of St. Victor and the Summists.

This anger and contempt may have been partly justified by the discreditable state into which the study of logic had fallen. The speculative impulse was exhausted which marks the end of the 11th and the first half of the 12th century,— a period more original and more interesting in many ways than the great age of Scholasticism in the 13th century. By the middle of the century, logical studies had lost to a great extent their real interest and application, and had degenerated into trivial displays of ingenuity. On the other hand, the Summists[1] occupied themselves merely in the systematizing of authorities. The mystics held aloof from both, and devoted themselves to the practical work of preaching and edification. The intellect of the age thus no longer exhibited itself as a unity; disintegration had set in. And it is significant of this that the ablest and most cultured representative of the second half of the century was rather an historian of opinion than himself a philosopher or theologian.

Decline of logic.

John of Salisbury (Johannes Sarisberiensis) was educated in France in the years 1136–48—in Paris under Abelard (who had then returned to Paris, and was lecturing at St. Geneviève) and Robert of Melun, at Chartres under William of Conches, then again in Paris under Gilbert de la Porrée and Robert Pulleyn. The autobiographical account of these years contained in his *Metalogicus* is of the utmost value as a picture of the schools of the time; it is also one of the historian's chief sources as a record of the many-colored logical views of the period. John was a man of affairs, secretary to three successive archbishops of Canterbury, of whom Becket was one. He died in 1180 as bishop of Chartres. When a pupil there, he had imbibed to the full the love of classical learning which was traditional in the school. An ardent admirer of Cicero, he was himself the master of an elegant Latin style, and in his works he often appears more as a cultivated humanist than as a Scholastic divine. His *Policraticus*, it has been said, "is to some extent an encyclopædia of the cultivated thought of the middle of the 12th century." The *Metalogicus* is a defence of logic against those who despised all philosophical training. But John recoiled from the idle casuistry which occupied his own logical contemporaries; and, mindful probably of their aimless ingenuity, he adds the caution that dialectic, valuable and necessary as it is, is "like the sword of Hercules in a pigmy's hand" unless there be added to it the accoutrement of the other sciences. Catholic in spirit rather than dogmatic, John ranks himself at times among the Academics, "since, in those things about which a wise man may doubt, I depart not from their footsteps." The list which he gives of things which may be doubted (*quae sunt dubitabilia sapienti*) is at once curious and instructive. It is not fitting to subtilize overmuch, and in the end John of Salisbury's solution is the practical one, his charitable spirit pointing him in particular to that love which is the fulfilling of the law.

John of Salisbury.

The first period of Scholasticism being thus at an end, there is an interval of nearly half a century without any noteworthy philosophical productions. The cause of the new development of Scholasticism in the 13th century was the translation into Latin for the first time of the complete works of Aristotle. An inventory has been given of the scanty stock of works accessible to students in the 9th century. The stock remained unenlarged till towards the middle of the 12th century, when the remaining treatises of the

Extension of knowledge of the works of Aristotle.

[1] Among these may be mentioned Robert Pulleyn (*ob.* 1150), Peter Lombard (*ob.* 1164), called the *Magister Sententiarum*, whose work became the text-book of the schools, and remained so for centuries. Hundreds of commentaries were written upon it. Peter of Poitiers, the pupil of Peter the Lombard, flourished about 1160–70. Other names are Robert of Melun, Hugo of Amiens, Stephen Langton, and William of Auxerre. More important is Alain de Lille (Alanus de Insulis), who died at an advanced age in 1203. His *De Arte seu de Articulis Catholicae Fidei* is a *Summa* of Christian theology, but with a greater infusion than usual of philosophical reasoning. Alanus was acquainted with the celebrated *Liber de Causis*.

Organon became known. Abelard expressly states that he knew only the *Categories* and the *De Interpretatione;* but it seems from passages adduced by Prantl that he must, before the date of his *Dialectica*, have had some indirect and hearsay knowledge of the contents of the other treatises, though without being able himself to consult a copy. The books made their way almost noiselessly into the schools. In 1132 Adam de Petit-Pont, it is stated, made a version of the *Prior Analytics*. Gilbert de la Porrée, who died in 1154, refers to the *Analytics* as currently known. His disciple Otto of Freising carried the *Analytics*, the *Topica*, and the *Soph. Elenchi* from France to Germany, probably in the translation of Boetius. John of Salisbury was acquainted with these and also with newer and more literal translations. But, while the fuller knowledge of the ancient logic resulted in an increase of formal acuteness, it appears to have been of small benefit to serious studies till there was added to it a knowledge of the other works of Aristotle. This knowledge came to the Scholastics in the first instance through the medium of Arabian philosophy. (See ARABIAN PHILOSOPHY.) The doctrines and the works of Aristotle had been transmitted by the Nestorians to the Arabs, and among those kept alive by a succession of philosophers, first in the East and afterwards in the West. The chief of these, at least so far as regards the influence which they exerted on mediæval philosophy, were Avicenna, Avempace, and Averroes. The unification by the last-mentioned of Aristotle's active intellect in all men, and his consequent denial of individual immortality are well known. The universal human intellect is made by him to proceed from the divine by a series of Neoplatonic emanations. In the course of the 12th century the writings of these men were introduced into France by the Jews of Andalusia, of Marscilles, and Montpellier. "These writings contained," says Hauréau, "the text of the *Organon*, the *Physics*, the *Metaphysics*, the *Ethics*, the *De Anima*, the *Parva Naturalia*, and a large number of other treatises of Aristotle, accompanied by continuous commentaries. There arrived besides by the same channel the glosses of Theophrastus, of Simplicius, of Alexander, of Aphrodisias, of Philoponus, annotated in the same sense by the same hands. This was the rich but dangerous present made by the Mussulman school to the Christian" (i. 382). To these must be added the Neoplatonically inspired *Fons Vitae* of the Jewish philosopher and poet Ibn Gebirol, whom the Scholastics cited as Avicebron and believed to be an Arabian.

By special command of Raimund, archbishop of Toledo, the chief of these works were translated from the Arabic through the Castilian into Latin by the archdeacon Dominicus Gonzalvi with the aid of Johannes Avendeath (= ben David), a converted Jew, about 1150. About the same time, or not long after, the *Liber de Causis* became known—a work destined to have a powerful influence on Scholastic thought, especially in the period immediately succeeding. Accepted at first as Aristotle's, and actually printed in the first Latin editions of his works, the book is in reality an Arabian compilation of Neoplatonic theses. Of a similar character was the pseudo-Aristotelian *Theologia* which was in circulation at least as early as 1200.

First effects of the new knowledge.

The first effects of this immense acquisition of new material were markedly unsettling on the doctrinal orthodoxy of the time. The apocryphal Neoplatonic treatises and the views of the Arabian commentators obscured for the first students the genuine doctrine of Aristotle, and the 13th century opens with quite a crop of mystical heresies. The mystical pantheism taught at Paris by Amalrich of Bena (*ob.* 1207; see AMALRICH and MYSTICISM), though based by him upon a revival of Scotus Erigena, was doubtless connected in its origin with the Neoplatonic treatises which now become current. The immanence of God in all things and His incarnation as the Holy Spirit in themselves appear to have been the chief doctrines of the Amalricans. They are reported to have said, "Omnia unum, quia quicquid est est Deus." About the same time David of Dinant, in a book *De Tomis* (rendered by Albertus *De Divisionibus*), taught the identity of God with matter (or the indivisible principle of bodies) and nous (or the indivisible principle of intelligences)—an extreme Realism culminating in a materialistic Pantheism. If they were diverse, he argued, there must exist above them some higher or common element or being, in which case this would be God, nous, or the original matter. The spread of the Amalrican doctrine led to fierce persecutions, and the provincial council which met at Paris in 1209, after condemning the heresies of Amalrich and David, expressly decreed "that neither the books of Aristotle on natural philosophy, nor commentaries on the same, should be read, whether publicly or privately, at Paris." In 1215 this prohibition is renewed in the statutes of the university of Paris, as sanctioned by the papal legate. "Et quod legant libros Aristotelis de dialectica tam veteri quam de nova. . . Non legantur libri Aristotelis de metaphysica et naturali philosophia, nec summa de iisdem." Permission is thus given to lecture on the logical books, both those which had been known all along and those introduced since 1128, but the veto upon the *Physics* is extended to the *Metaphysics* and the summaries of the Arabian commentators. By 1231, however, the fears of the church were beginning to be allayed. A bull of Gregory IX. in that year makes no mention of any Aristotelian works except the *Physics*. As these had been "prohibited by the provincial council for specific reasons," they are not to be used in the university "till such time as they have been examined and purged of all suspicion of errors." Finally, in the year 1254, we find the university officially prescribing how many hours are to be devoted to the explanation of the *Metaphysics* and the principal physical treatises of Aristotle. These dates enable us to measure accurately the stages by which the church accommodated itself to, and as it were took possession of, the Aristotelian philosophy. Growing knowledge of Aristotle's works and the multiplication of translations enabled students to distinguish the genuine Aristotle from the questionable accompaniments with which he had made his first appearance in Western Europe. Fresh translations of Aristotle and Averroes had already been made from the Arabic by Michael Scot and Hermannus Alemannus, at the instance of the emperor Frederick II.; so that the whole body of Aristotle's works was at hand in Latin translations from about 1210 to 1225. Soon afterwards efforts began to be made to secure more literal translations direct from the Greek. Robert Grosseteste (*ob.* 1253) was one of the first to stir in this matter, and he was followed by Albertus Magnus and Thomas Aquinas. Half a century thus sufficed to remove the ban of the church, and soon Aristotle was recognized on all hands as "the philosopher" *par excellence*, the master of those that know. It even became customary to draw a parallel between him as the *praecursor Christi in naturalibus* and John the Baptist, the *praecursor Christi in gratuitis*.

This unquestioned supremacy was not yielded, however, at the very beginning of the period. The earlier doctors who avail themseves of Aristotle's works, while bowing to his authority implicitly in matters of logic, are generally found defending a Christianized Platonism against the doctrine of the *Metaphysics*. So it is with Alexander of Hales (*ob.* 1245), the first Scholastic who was acquainted with the whole of the Aristotelian works and the Arabian commentaries upon them. He was more of a theologian than a philosopher; and in his chief work, *Summa Universae Theologiae*, he simply

Alexander of Hales.

employs his increased philosophical knowledge in the demonstration of theological doctrines. So great, however, did his achievement seem that he was honored with the titles of *Doctor Irrefragabilis* and *Theologorum Monarcha*.[1] Alexander of Hales belonged to the Franciscan order, and it is worth remarking that it was the mendicant orders which now came forward as the protagonists of Christian learning and faith and, as it were, reconquered Aristotle for the church. During the first half of the 13th century, when the university of Paris was plunged in angry feuds with the municipality, feuds which even led at one time (1229) to the flight of the students in a body, the friars established teachers in their convents in Paris. After the university had settled its quarrels these continued to teach, and soon became formidable rivals of the secular lecturers. After a severe struggle for academical recognition they were finally admitted to all the privileges of the university by a bull of Alexander IV. in 1253. The Franciscans took the lead in this intellectual movement with Alexander of Hales and Bonaventura, but the Dominicans were soon able to boast of two greater names in Albert the Great and Thomas Aquinas. Still later Duns Scotus and Occam were both Franciscans. Alexander of Hales was succeeded in his chair of instruction by his pupil John of Rochelle, who died in 1271 but taught only till 1253. His treatise *De Anima*, on which Hauréau lays particular stress, is interesting as showing the greater scope now given to psychological discussions. This was a natural result of acquaintance with Aristotle's *De Anima* and the numerous Greek and Arabian commentaries upon it, and it is observable in most of the writers that have still to be mentioned. Even the nature of the universals is no longer discussed from a purely logical or metaphysical point of view, but becomes connected with psychological questions. And on the whole, the widening of intellectual interests is the chief feature by which the second period of Scholasticism may be distinguished from the first. In some respects there is more freshness and interest in the speculations which burst forth so ardently in the end of the 11th and the first half of the 12th century. Albert and Aquinas no doubt stood on a higher level than Anselm and Abelard, not merely by their wider range of knowledge but also by the intellectual massiveness of their achievements; but it may be questioned whether the earlier writers did not possess a greater force of originality and a keener talent. Originality was at no time the strong point of the Middle Ages, but in the later period it was almost of necessity buried under the mass of material suddenly thrust upon the age to be assimilated. On the other hand, the influence of this new material is everywhere evident in the wider range of questions which are discussed by the doctors of the period. Interest is no longer to the same extent concentrated on the one question of the universals. Other questions, says Hauréau, are "placed on the order of the day,—the question of the elements of substance, that of the principle of individuation, that of the origin of the ideas, of the manner of their existence in the human understanding and in the divine thought, as well as various others of equal interest" (i. 420). Some of these, it may be said, are simply the old Scholastic problem in a different garb; but the extended horizon of which Hauréau speaks is amply proved by mere reference to the treatises of Albert and St. Thomas. They there seek to reproduce for their own time all the departments of the Aristotelian system.

Mendicant friars.

John of Rochelle.

General characteristics of second period.

John of Rochelle was succeeded in 1253 by John Fidanza, better known as Bonaventura (1221–74), who had also been a pupil of Alexander of Hales. But the fame of "the Seraphic Doctor" is connected more closely with the history of mysticism (see MYSTICISM) than with the main stream of Scholastic thought. Like his master, he defended Plato—or what he considered to be the Platonic theory—against the attacks of Aristotle. Thus he defended the *universalia ante rem* as exemplars existent in the divine intelligence, and censured Aristotle's doctrine of the eternity of the world. Among the earlier teachers and writers of this century we have also to name William of Auvergne (*ob.* 1249), whose treatises *De Universo* and *De Anima* make extensive use of Aristotle and the Arabians, but display a similar Platonic leaning. The existence of intellections in our minds is, he maintains, a sufficient demonstration of the existence of an intelligible world just as the ideas of sense are sufficient evidence of a sensible world. This archetypal world is the Son of God and true God. Robert Grosseteste, important in the sphere of ecclesiastical politics, has been already mentioned as active in procuring translations of Aristotle from the Greek. He also wrote commentaries on logical and physical works of Aristotle. Michael Scot, the renowned wizard of popular tradition, earned his reputation by numerous works on astrology and alchemy. His connection with philosophy was chiefly in the capacity of a translator. Vincent of Beauvais (*ob.* 1264) was the author of an encyclopædic work called *Speculum Majus*, in which, without much independent ability, he collected the opinions of ancient and mediæval writers on the most diverse points, transcribing the fragments of their works which he deemed most interesting.

Bonaventura.

William of Auvergne.

Grosseteste.

Michael Scot.

Vincent of Beauvais.

Albertus Magnus introduces us at once to the great age of Scholasticism. Born in Swabia in 1193, he lived to the great age of eighty-seven, dying at Cologne in 1280. The limits of his life thus include that of his still greater pupil Thomas Aquinas, who was born in 1227 and died while still comparatively young in 1274. For this reason, and because the system of Thomas is simply that of Albert rounded to a greater completeness and elaborated in parts by the subtle intellect of the younger man, it will be convenient not to separate the views of master and scholar, except where their differences make it necessary; and in giving an account of their common system it will be well to present it at once in its most perfect form. Albert was "the first Scholastic who reproduced the whole philosophy of Aristotle in systematic order with constant reference to the Arabic commentators, and who remodelled it to meet the requirements of ecclesiastical dogma" (Ueberweg, i. 436). On this account he was called by his contemporaries "the Universal Doctor." But in Albert it may be said that the matter was still too new and too multifarious to be thoroughly mastered. The fabric of knowledge is not fitly jointed together in all its parts; the theologian and the philosopher are not perfectly fused into one individual, but speak sometimes with different voices. In St. Thomas this is no longer so; the fusion is almost perfect. The pupil entering into his master's labors, was able from the first to take a more comprehensive survey of the whole field; and in addition he was doubtless endowed with an intellect which was finer, though it might not be more powerful than his master's. Albert had the most touching affection for his distinguished scholar. When he went to Paris in 1245 to lecture and to take his doctor's degree, his pupil accompanied him; and, on their return to Cologne, Aquinas taught along with his master in the great Dominican school there. At a later date, when Aquinas proceeded to Paris to lecture independently, he occupied the Dominican chair at the same time that Bonaventura held the Franciscan professorship. They received the degree of doctor in the same year,

Albert and Aquinas.

[1] [Also *Fons Vitæ*. See vol. i. p. 429.—AM. ED.]

1257. Rivals in a manner though they were, and differing on points of philosophy, the Angelic and Seraphic Doctors were united in friendship and Christian charity.

"Mysteries" excluded from philosophy.

The monotheistic influence of Aristotle and his Arabian commentators shows itself in Albert and Aquinas, at the outset, in the definitive fashion in which the "mysteries" of the Trinity and the Incarnation are henceforth detached from the sphere of rational or philosophical theology. So long as the Neoplatonic influence remained strong, attempts were still made to demonstrate the doctrine of the Trinity, chiefly in a mystical sense as in Erigena, but also by orthodox churchmen like Anselm. Orthodoxy, whether Catholic or Protestant, has since generally adopted Thomas's distinction. The existence of God is maintained by Albert and Aquinas to be demonstrable by reason; but here again they reject the ontological argument of Anselm, and restrict themselves to the *a posteriori* proof, rising after the manner of Aristotle from that which is prior for us (*πρότερον πρὸς ἡμᾶς*) to that which is prior by nature or in itself (*πρότερον φύσει*). God is not fully comprehensible by us, says Albert, because the finite is not able to grasp the infinite, yet he is not altogether beyond our knowledge; our intellects are touched by a ray of his light, and through this contact we are brought into communion with him. God, as the only self-subsistent and necessary being, is the creator of all things. Here the Scholastic philosophy comes into conflict with Aristotle's doctrine of the eternity of the world. Albert and Aquinas alike maintain the beginning of the world in time; time itself only exists since the moment of this miraculous creation. But Thomas, though he holds the fact of creation to be rationally demonstrable, regards the beginning of the world *in time* as only an article of faith, the philosophical arguments for and against being inconclusive.

The question of universals, though fully discussed, no longer forms the centre of speculation. The great age of Scholasticism presents, indeed, a substantial unanimity upon this vexed point, maintaining at once, in different senses, the existence of the universals *ante rem*, *in re*, and *post rem*. Albert and Aquinas both profess the moderate Aristotelian Realism which treats genera and species only as *substantiae secundae*, yet as really inherent in the individuals, and constituting their form or essence. The universals, therefore, have no existence, as universals, *in rerum natura;* and Thomas endorses, in this sense, the polemic of Aristotle against Plato's hypostatized abstractions. But, in the Augustinian sense of ideas immanent in the divine mind, the universal *ante rem* may well be admitted as possessing real existence. Finally, by abstraction from the individual things of sense, the mind is able to contemplate the universal apart from its accompaniments (*animal sine homine, asino, et aliis speciebus*); these subjective existences are the *universalia post rem* of the Nominalists and Conceptualists. But the difficulties which embarrassed a former age in trying to conceive the mode in which the universal exists in the individual reappear in the systems of the present period as the problem of the *principium individuationis*. The universal, as the form or essence of the individual, is called its *quidditas* (its "what-ness" or nature); but, besides possessing a general nature and answering to a general definition (*i.e.*, being a "what"), every man, for example, is this particular man, here and now. It is the question of the particularity or "this-ness" (*haecceitas*, as Duns Scotus afterwards named it) that embarrasses the Scholastics. Albert and Aquinas agree in declaring that the principle of individuation is to be found in matter, not, however, in matter as a formless substrate but in determinate matter (*materia signata*), which is explained to mean matter quantitatively determined in certain respects. "The variety of individuals," says Albert, "depends entirely upon the division of matter" (*individuorum multitudo fit omnis per divisionem materiae*); and Aquinas says "the principle of the diversity of individuals of the same species is the quantitative division of matter" (*divisio materiae secundum quantitatem*), which his followers render by the abbreviated phrase *materia quanta*. A tolerably evident shortcoming of such a doctrine is that, while declaring the quantitative determination of matter to be the individual element in the individual, it gives no account of how such quantitative determination arises. Yet the problem of the individual is really contained in this prior question; for determinate matter already involves particularity or this-ness. This difficulty was presently raised by Duns Scotus and the realistically-inclined opponents of the Thomist doctrine. But, as Ueberweg points out, it might fairly be urged by Aquinas that he does not pretend to explain how the individual is actually created, but merely states what he finds to be an invariable condition of the existence of individuals. Apart from this general question, a difficulty arises on the Thomist theory in regard to the existence of spirits or disembodied personalities. This affects first of all the existence of angels, in regard to whom Aquinas admits that they are immaterial or separate forms (*formae separatae*). They possess the principle of individuation in themselves, he teaches, but plurality of individuals is in such a case equivalent to plurality of species (*in eis tot sunt species quot sunt individua*). The same difficulty, however, affects the existence of the disembodied human spirit. If individuality depends in matter, must we not conclude with Averroes that individuality is extinguished at death, and that only the universal form survives? This conclusion, it is needless to say, is strenuously opposed both by Albert and Thomas. Albert wrote a special treatise *De Unitate Intellectus contra Averroistas*, and Thomas in his numerous writings is even more explicit. It is still admissible, however, to doubt whether the hateful consequence does not follow consistently from the theory laid down. Aquinas regards the souls of men, like the angels, as immaterial forms; and he includes in the soul-unit, so to speak, not merely the *anima rationalis* of Aristotle, but also the vegetative, sensitive, appetitive, and motive functions. The latter depend, it is true, on bodily organs during our earthly sojourn, but the dependence is not necessary. The soul is created by God when the body of which it is the entelechy is prepared for it. It is the natural state of the soul to be united to a body (*Animae prius convenit esse unitam corpori quam esse a corpore separatam*), but being immaterial it is not affected by the dissolution of the body. The soul must be immaterial since it has the power of cognizing the universal; and its immortality is further based by St. Thomas on the natural longing for unending existence which belongs to a being whose thoughts are not confined to the "here" and "now," but are able to abstract from every limitation.

The principle of individuation.

Thomism, which was destined to become the official philosophy of the Roman Catholic Church, became in the first instance the accepted doctrine of the Dominican order, who were presently joined in this allegiance by the Augustinians. The Franciscan order, on the other hand, early showed their rivalry in attacks upon the doctrines of Albert and Aquinas. One of the first of these was the *Reprehensorium seu Correctorium Fratris Thomae*, published in 1285 by William Lamarre, in which the Averroistic consequences of the Thomist doctrine of individuation are already pressed home. More important was Richard of Middletown (died about 1300), who anticipated many of the objections urged soon after him by Duns Scotus.

Duns Scotus.

This renowned opponent of the Thomist doctrine was born in the second half of the 13th century, and after achieving an extraordinary success as a lecturer in Oxford and Paris died at an early age in the year 1308. His system is conditioned throughout by its relation to that of Aquinas, of which it is in effect

an elaborate criticism. The chief characteristic of this criticism is well expressed in the name bestowed on Duns by his contemporaries—*Doctor Subtilis*. It will be sufficient therefore to note the chief points in which the two great antagonists differ. In general it may be said that Duns shows less confidence in the power of reason than Thomas, and to that extent Erdmann and others are right in looking upon his system as the beginning of the decline of Scholasticism. For Scholasticism, as perfected by Aquinas, implies the harmony of reason and faith, in the same sense that they both teach the same truths. To this general position Aquinas, it has been seen, makes several important exceptions; but the exceptions are few in number and precisely defined. Scotus extends the number of theological doctrines which are not, according to him, susceptible of philosophical proof, including in this class the creation of the world out of nothing, the immortality of the human soul, and even the existence of an almighty divine cause of the universe (though he admits the possibility of proving an ultimate cause superior to all else). His destructive criticism thus tended to reintroduce the dualism between faith and reason which Scholasticism had labored through centuries to overcome, though Scotus himself, of course, had no such skeptical intention. But the way in which he founded the leading Christian doctrines (after confessing his inability to rationalize them) on the arbitrary will of God was undoubtedly calculated to help in the work of disintegration. And it is significant that this primacy of the undetermined will (*voluntas superior intellectu*) was the central contention of the Scotists against the Thomist doctrine. Voluntary action, St. Thomas had said, is action originating in self or in an internal principle. As compared with the animals, which are immediately determined to their ends by the instinct of the moment, man determines his own course of action freely after a certain process of rational comparison (*ex collatione quadam rationis*). It is evident that the freedom here spoken of is a freedom from the immediacy of impulse—a freedom based upon our possession of reason as a power of comparison, memory, and forethought. Nothing is said of an absolute freedom of the will; the will is, on the contrary, subordinated to the reason in so far as it is supposed to choose what reason pronounces good. Accordingly, the Thomist doctrine may be described as a moderate determinism. To this Scotus opposed an indeterminism of the extremest type, describing the will as the possibility of determining itself motivelessly in either of two opposite senses. Transferred to the divine activity, Thomas's doctrine led him to insist upon the *perseitas boni*. The divine will is, equally with the human, subject to a rational determination; God commands what is good because it is good. Scotus, on the other hand, following out his doctrine of the will, declared the good to be so only by arbitrary imposition. It is good because God willed it, and for no other reason; had He commanded precisely the opposite course of conduct, that course would have been right by the mere fact of His commanding it. Far removed from actuality as such speculations regarding the priority of intellect or will in the Divine Being may seem to be, the side taken is yet a sure index of the general tendency of a philosophy. Aquinas is on the side of rationalism, Scotus on the side of skepticism.

Freedom of the will.

While agreeing with Albert and Thomas in maintaining the threefold existence of the universals, Duns Scotus attacked the Thomist doctrine of individuation. The distinction of the universal essence and the individualizing determinations in the individual does not coincide, he maintained, with the distinction between form and matter. The additional determinations are as truly "form" as the universal essence. If the latter be spoken of as *quidditas*, the former may be called *haecceitas*. Just as the genus becomes the species by the addition of formal determinations called the difference, so the species becomes the individual by the addition of fresh forms of difference. As *animal* becomes *homo* by the addition of *humanitas*, so *homo* becomes Socrates by the addition of the qualities signified by *Socratitas*. It is false, therefore, to speak of matter as the principle of individuation; and if this is so there is no longer any foundation for the Thomist view that in angelic natures every individual constitutes a species apart. Notwithstanding the above doctrine, however, Scotus holds that all created things possess both matter and form—the soul, for example, possessing a matter of its own before its union with the body. But the matter of spiritual beings is widely different from the matter of corporeal things. In his treatment of the conception of matter, Duns shows that he inclined much more to the Realism which makes for pantheism than was the case with the Aristotelianism of Thomas. A perfectly formless matter (*materia prima*) was regarded by him as the universal substratum and common element of all finite existences. He expressly intimates in this connection his acceptance of Avicebron's position. *Ego autem ad positionem Avicebronis redeo*, that is, to the Neoplatonically conceived *Fons Vitae* of the Jew Gebirol.

In the end of the 13th century and the beginning of the 14th the Thomists and Scotists divided the philosophical and theological world between them. Among the Thomists may be named John of Paris, Ægidius of Lessines (wrote in 1278), Bernard of Trilia (1240–92), and Peter of Auvergne. More important was Ægidius of Colonna (1247–1316), general of the Augustinian order, surnamed *Doctor Fundatissimus* or *Fundamentarius*. Hervæus Natalis (*ob.* 1323) and Thomas Bradwardine (*ob.* 1349) were determined opponents of Scotism. Siger of Brabant and Gottfried of Fontaines, chancellor of the university of Paris, taught Thomism at the Sorbonne; and through Humbert, abbot of Prulli, the doctrine won admission to the Cistercian order. Among the disciples of Duns Scotus are mentioned John of Bassolis, Franciscus de Mayronis (*ob.* 1327), Antonius Andreæ (*ob. c.* 1320), John Dumbleton and Walter Burleigh (1275–1357) of Oxford, Nicolaus of Lyra, Peter of Aquila, and others. Henry Goethals or Henry of Ghent (Henricus Gandavensis, 1217–93), surnamed *Doctor Solennis*, occupied on the whole an independent and pre-Thomist position, leaning to an Augustinian Platonism. Gerard of Bologna (*ob.* 1317) and Raoul of Brittany are rather to be ranked with the Thomists. So also is Petrus Hispanus (died 1277 as Pope John XXI.), who is chiefly important, however, as the author of the much-used manual *Summulæ Logicales*, in which the logic of the schools was expanded by the incorporation of fresh matter of a semi-grammatical character. Petrus Hispanus had predecessors, however, in William of Shyreswood (died 1249 as chancellor of Lincoln) and Lambert of Auxerre, and it has been hotly disputed whether the whole of the additions are not originally due to the Byzantine *Synopsis* of Psellus. By far the greatest disciple of Aquinas is Dante Alighieri, in whose *Divina Commedia* the theology and philosophy of the Middle Ages, as fixed by Saint Thomas, have received the immortality which poetry alone can bestow. Two names stand apart from the others of the century—Raymond Lully (1234–1315) and Roger Bacon (1214–94). The *Ars Magna* of the former professed by means of a species of logical machine to give a rigid demonstration of all the fundamental Christian doctrines, and was intended by its author as an unfailing instrument for the conversion of the Saracens and heathen. Roger Bacon was rather a pioneer of modern science than a Scholastic, and persecution and imprisonment were the penalty of his opposition to the spirit of his time.

Thomists and Scotists.

The last stage of Scholasticism preceding its dissolution is marked by the revival of Nominalism in a militant form. This doctrine is already to be found in Petrus Aureolus (*ob.* 1321), a Franciscan trained in

the Scotist doctrine, and in William Durand of St. Pourçain (*ob.* 1332), a Dominican who passed over from Thomism to his later position. But the name with which the Nominalism of the 14th century is historically associated is that of the "Invincible Doctor," William of Occam (*ob.* 1347), who, as the author of a doctrine which came to be almost universally accepted, received from his followers the title *Venerabilis Inceptor*. The hypostatizing of abstractions is the error against which Occam is continually fighting. His constantly recurring maxim—known as Occam's razor—is *Entia non sunt multiplicanda praeter necessitatem*. The Realists, he considers, have greatly sinned against this maxim in their theory of a real universal or common element in all the individuals of a class. From one abstraction they are led to another, to solve the difficulties which are created by the realization of the first. Thus the great problem for the Realists is how to derive the individual from the universal. But the whole inquiry moves in a world of unrealities. Everything that exists, by the mere fact of its existence, is individual (*Quaelibet res, eo ipso quod est, est haec res*). It is absurd therefore to seek for a cause of the individuality of the thing other than the cause of the thing itself. The individual is the only reality, whether the question be of an individual thing in the external world or an individual state in the world of mind. It is not the individual which needs explanation but the universal. Occam reproaches the "modern Platonists" for perverting the Aristotelian doctrine by these speculations, and claims the authority of Aristotle for his own Nominalistic doctrine. The universal is not anything really existing; it is a *terminus* or predicable (whence the followers of Occam were at first called Terminists). It is no more than a "mental concept signifying univocally several singulars." It is a natural sign representing these singulars, but it has no reality beyond that of the mental act by which it is produced and that of the singulars of which it is predicated. As regards the existence (if we may so speak) of the universal *in mente*, Occam indicates his preference, on the ground of simplicity, for the view which identifies the concept with the *actus intelligendi* ("une modalité passagère de l'âme," as Hauréau expresses it), rather than for that which treats ideas as distinct entities within the mind. And in a similar spirit he explains the *universalia ante rem* as being, not substantial existences in God, but simply God's knowledge of things—a knowledge which is not of universals but of singulars, since these alone exist *realiter*. Such a doctrine, in the stress it lays upon the singular, the object of immediate perception, is evidently inspired by a spirit differing widely even from the moderate Realism of Thomas. It is a spirit which distrusts abstractions, which makes for direct observation, for inductive research. Occam, who is still a Scholastic, gives us the Scholastic justification of the spirit which had already taken hold upon Roger Bacon, and which was to enter upon its rights in the 15th and 16th centuries. Moreover, there is no denying that the new Nominalism not only represents the love of reality and the spirit of induction, but also contains in itself the germs of that empiricism and sensualism so frequently associated with the former tendencies. St. Thomas had regarded the knowledge of the universal as an intellectual activity which might even be advanced in proof of the immortality of the soul. Occam, on the other hand, maintains in the spirit of Hobbes that the act of abstraction does not presuppose any activity of the understanding or will, but is a spontaneous secondary process by which the first act (perception) or the state it leaves behind (*habitus derelictus ex primo actu*=Hobbes's "decaying sense") is naturally followed, as soon as two or more similar representations are present.

William of Occam.

In another way also Occam heralds the dissolution of Scholasticism. The union of philosophy and theology is the mark of the Middle Ages, but in Occam their severance is complete. A pupil of Scotus, he carried his master's criticism farther, and denied that any theological doctrines were rationally demonstrable. Even the existence and unity of God were to be accepted as articles of faith. The *Gentiloquium Theologicum*, which is devoted to this negative criticism and to showing the irrational consequences of many of the chief doctrines of the church, has often been cited as an example of thoroughgoing skepticism under a mask of solemn irony. But if that were so, it would still remain doubtful, as Erdmann remarks, whether the irony is directed against the church or against reason. On the whole, there is no reason to doubt Occam's honest adhesion to each of the two guides whose contrariety he labored to display. None the less is the position in itself an untenable one and the parent of skepticism. The principle of the twofold nature of truth[1] thus embodied in Occam's system was unquestionably adopted by many merely to cloak their theological unbelief; and, as has been said, it is significant of the internal dissolution of Scholasticism. Occam denied the title of a science to theology, emphasizing, like Scotus, its practical character. He also followed his master in laying stress on the arbitrary will of God as the foundation of morality.

Nominalism was at first met by the opposition of the church and the constituted authorities. In 1339 Occam's treatises were put under a ban by the university of Paris, and in the following year Nominalism was solemnly condemned. Nevertheless the new doctrine spread on all hands. Dominicans like Armand de Beauvoir (*ob.* 1334) and Gregory of Rimini accepted it. It was taught in Paris by Albert of Saxony (about 1350–60) and Marsilius of Inghen (about 1364–77, afterwards at Heidelberg), as well as by Johannes Buridanus, who was rector of the university as early as 1327. We find, however, as late as 1473 the attempt made to bind all teachers in the university of Paris by oath to teach the doctrines of Realism; but this expiring effort was naturally ineffectual, and from 1481 onward even the show of obedience was no longer exacted. Pierre d'Ailly (1350–1425) and John Gerson (Jean Charlier de Gerson, 1363–1429), both chancellors of the university of Paris, and the former a cardinal of the church, are the chief figures among the later Nominalists. Both of them, however, besides their philosophical writings, are the authors of works of religious edification and mystical piety. They thus combine temporarily in their own persons what was no longer combined in the spirit of the time, or rather they satisfy by turns the claims of reason and faith. Both are agreed in placing repentance and faith far above philosophical knowledge. They belong indeed (Gerson in particular) to the history of mysticism rather than of Scholasticism, and the same may be said of another cardinal, Nicolaus of Cusa (1401–64), who is sometimes reckoned among the last of the Scholastics, but who has more affinity with Scotus Erigena than with any intervening teacher. The title "last of the Scholastics" is commonly given to Gabriel Biel, the summarizer of Occam's doctrine, who taught in Tübingen, and died in the year 1495. The title is not actually correct, and might be more fitly borne by Francis Suarez, who died in 1617. But after the beginning of the 15th century Scholasticism was divorced from the spirit of the time, and it is useless to follow its history further.[2] As has been indicated in the intro-

Spread of Nominalism.

The "last of the Scholastics."

[1] This principle appeared occasionally at an earlier date, for example in Simon of Tournay about 1200. It was expressly censured by Pope John XXI. in 1276. But only in the period following Occam did it become a current doctrine.

[2] [On 4th August, 1879, Pope Leo XIII. urged in an Encyclical all Catholic schools "to restore in full vigor and to propagate as far as possible the priceless wisdom of St. Thomas," and in consequence new editions of his works have been prepared and taken up as text books in Catholic seminaries quite generally. The acute

ductory remarks, the end came both from within and from without. The harmony of reason and faith had given place to the doctrine of the dual nature of truth. While this skeptical thesis was embraced by philosophers who had lost their interest in religion, the spiritually minded sought their satisfaction more and more in a mysticism which frequently cast itself loose from ecclesiastical trammels. The 14th and 15th centuries were the great age of German mysticism, and it was not only in Germany that the tide set this way. Scholasticism had been the expression of a universal church and a common learned language. The university of Paris, with its scholars of all nations numbered by thousands, was a symbol of the intellectual unity of Christendom; and in the university of Paris, it may almost be said, Scholasticism was reared and flourished and died. But the different nations and tongues of modern Europe were now beginning to assert their individuality, and men's interests ceased to be predominatingly ecclesiastical. Scholasticism, therefore, which was in its essence ecclesiastical, had no longer a proper field for its activity. It was in a manner deprived of its accustomed subject-matter and died of inanition. Philosophy, as Hauréau finely says, was the passion of the 13th century; but in the 15th humanism, art, and the beginings of science and of practical discovery were busy creating a new world, which was destined in due time to give birth to a new philosophy.

Authorities.—Besides the numerous works dealing with individual philosophers, the chief histories of Scholasticism are those of Hauréau (*De la Philosophie Scolastique*, 2 vols., 1850; revised and expanded in 1870 as *Histoire de la Phil. Scol.*), Kaulich (*Geschichte d. schol. Philosophie*) and Stöckl (*Gesch. der Phil. des Mittelalters*). Supplementary details are given in Hauréau's *Singularités Historiques et Littéraires*, 1861, and in R. L. Poole's *Illustrations of the History of Mediæval Thought* (1884). The accounts of mediæval thought given by Ritter, Erdmann, and Ueberweg in their general histories of philosophy are exceedingly good. There are also notices of the leading systems in Milman's *History of Latin Christianity*; and the same writers are considered from the theological side in many works devoted to theology and the history of dogma. Jourdain's *Recherches Critiques sur l'Âge et l'Origine des Traductions Latines d'Aristote* (Paris, 1819; 2d edition, 1843), Rousselot's *Études sur la Philosophie dans le Moyen-Âge* (1840–42), Cousin's Introduction to his *Ouvrages inédits d'Abélard* (1836), and Prantl's *Geschichte der Logik im Abendlande* (4 vols., 1855–70) are invaluable aids in studying the history of mediæval thought. (A. SE.)

SCHOMBERG, Frederick Armand, Duke of (*c.* 1619–1690), marshal of France and English general, was descended from an old family of the Palatinate, and was born about 1619. He began his military career under Frederick Henry, prince of Orange, and after his death in 1659 entered the service of France, acquiring ultimately a reputation as a general second only to that of Turenne and the prince of Condé. In Paris he made the acquaintance of Charles II., who, according to his own account, "admitted him to great familiarities with him." In 1660 he was sent to Portugal, and on his way thither passed through England to concert with Charles measures for supporting that country in the contest with Spain. For his services to Portugal he was in 1668 made a grandee, and received a pension of £5000 [$24,300] a year. In 1673 he was invited by Charles to England, with the view of taking command of the army, but so strong was the general sentiment against the appointment as savoring of French influence that it was not carried into effect. He therefore again entered the service of France, and after his capture of Bellegarde, 29th July, 1675, received the rank of marshal. In subsequent campaigns he continued to add to his reputation until the revocation of the edict of Nantes (22d October, 1685) compelled him as a Protestant to quit his adopted country. Ultimately he was chosen commander-in-chief of the forces of the elector of Brandenburg, and with the elector's consent he joined the prince of Orange on his expedition to England in 1688, as second in command to the prince. The following year he was made a knight of the Garter, created successively baron, marquis, and duke, and received from the House of Commons a vote of £100,000 [$486,000]. In August he was appointed commander-in-chief of the expedition to Ireland against James II. After capturing Carrickfergus he marched unopposed through a country desolated before him to Dundalk, but, as the bulk of his forces were raw and undisciplined as well as inferior in numbers to the enemy, he deemed it imprudent to risk a battle, and entrenching himself at Dundalk declined to be drawn beyond the circle of his defences. Shortly afterwards pestilence broke out, and when he retired to winter quarters in Ulster his forces were in a more shattered condition than if they had sustained a severe defeat. At the same time competent authorities were agreed that the policy of masterly inactivity which he pursued was the only one open to him. In the spring he began the campaign with the capture of Charlemont, but no advance southward was made until the arrival of William. At the Boyne (July 1, 1690 O.S.) Schomberg gave his opinion against the determination of William to cross the river in face of the opposing army. In the battle he held command of the centre, and, while riding through the river without his cuirass to rally his men, was surrounded by a band of Irish horsemen and met instantaneous death. He was buried in St. Patrick's cathedral, Dublin, where there is a monument to him, with a Latin inscription by Dean Swift. Schomberg was generally regarded in England with great respect, and his manners and bearing rendered him universally popular.

SCHÖNBEIN, Christian Friedrich (1799-1868), from 1828 professor of chemistry at Basel, is known as the discoverer of Ozone (*q.v.*).[1]

SCHÖNEBECK, a town of Prussian Saxony, on the left bank of the Elbe, 9 miles above Magdeburg. It contains manufactories of chemicals, machinery, percussion caps, starch, white lead, and various other articles, but is chiefly noted for its extensive salt springs and works, which produce about 70,000 tons of salt per annum. Large beds of rock salt also occur in the neighborhood, in which shafts have been sunk to a depth of more than 1200 feet. There is a harbor on the Elbe here, and a brisk trade is carried on in grain and timber. In 1885 Schönebeck contained 13,316 inhabitants (including the adjoining communities of Salze, Elmen, and Frohse, about 20,000).

SCHÖNEBERG, a so-called Prussian "village," in the province of Brandenburg, is now really a suburb of Berlin, which it adjoins on the southwest. It contains the royal botanic garden, a large maison de santé, and manufactories of paper collars, enamels, railway rolling-stock, and chemicals. The population in 1880 was 11,180. The foundation of Alt-Schöneberg is ascribed to Albert the Bear (12th century), while Neu-Schöneberg was founded by Frederick the Great in 1750 to accommodate some Bohemian weavers, exiled for their religion (*cf.* Rixdorf).

SCHONGAUER, or Schoen, Martin (1450-*c.* 1488), the most able engraver and painter of the early German school. His father was a goldsmith named Casper, a native of Augsburg, who had settled at Colmar, where the chief part of Martin's life was spent.[2]

speculative system of Rosmini Serbati (*q.v.*) who was a Thomist is deeply tinctured with Scholasticism.—Am. Ed.]

[1] [About 1846 he announced his discovery of gun-cotton.—Am. Ed.]

[2] The date of Schongauer's birth is usually given wrongly as *c.* 1420; he was really born about thirty years later, and is mentioned by A. Dürer as being a young apprentice in 1470. His portrait in the Munich Pinakothek is now known to be a copy by Burgkmair, painted after 1510, from an original of 1483,—not 1453 as has been supposed. The date of Schongauer's death, 1499, written on the back of the panel by Burgkmair is obviously a blunder; see Hensler in *Naumann's Archiv*, 1867, p. 129, and Wurzbach, *M. Schongauer*, Vienna, 1880. These contradict the view of Goutzwiller, in his *Martin Schongauer et son École*, Paris, 1875. *Cf.* Schnaase, "Gesch. M. Schongauers," in the *Mittheil. der K. K. Commission*, 1863, No. 7.[a]

[a] [Schnaase adheres to 1420 as the birth date, and to the authenticity of the picture date (1453) here called in question, which

Schongauer established at Colmar a very important school of engraving, out of which grew the "little masters" of the succeeding generation, and a large group of Nuremberg artists. As a painter, Schongauer was a pupil of the Flemish Roger Van der Weyden the Elder, and his rare existing pictures closely resemble, both in splendor of color and exquisite minuteness of execution, the best works of contemporary art in Flanders. Among the very few paintings which can with certainty be attributed to him, the chief is a magnificent altarpiece in the church of St. Martin, at Colmar, representing the Virgin and Child, crowned by Angels, with a background of roses —a work of the highest beauty, and large in scale, the figures being nearly life size. The Colmar Museum possesses eleven panels by his hand, and a small panel of David with Goliath's Head in the Munich Gallery is attributed to him. The miniature painting of the Death of the Virgin in the English National Gallery is probably the work of some pupil.[1] In 1488 Schongauer died at Colmar, according to the register of St. Martin's church.

The main work of Schongauer's life was the production of a large number of most highly finished and beautiful engravings, which were largely sold, not only in Germany, but also in Italy and even in England. In this way his influence was very widely extended. Vasari speaks of him with much enthusiasm, and says that Michelangelo copied one of his engravings—the Trial of St. Anthony.[2] Schongauer was known in Italy by the names "Bel Martino" and "Martino d'Anversa." His subjects are always religious; more than 130 prints from copper by his hand are still known, and about 100 more are the production of his *bottega*.[3] Most of his pupils' plates as well as his own are sigued M + S. Among the most beautiful of Schongauer's engravings are the series of the Passion and the Death and Coronation of the Virgin, and the series of the Wise and Foolish Virgins; as much as £420 [$2043.20] has been given for a fine state of the Coronation plate. All are remarkable for their miniature-like treatment, their brilliant touch, and their chromatic force. Some, such as the Death of the Virgin and the Adoration of the Magi, are richly-filled compositions of many figures, treated with much largeness of style in spite of their minute scale. Though not free from the mannerism of his age and country, Schongauer possessed a rare feeling for beauty and for dignity of pose; and in technical power over his graver and copper plate he has never been surpassed.

The British Museum possesses a fine collection of Schongauer's prints. Fine facsimiles of his engravings have been produced by Amand-Durand with text by Duplessis, Paris, 1881.

SCHOOLCRAFT,[4] Henry Rowe (1793-1864), a North-American traveller, ethnologist, and author, was born 28th March, 1793, at Watervliet (now called Guilderland), Albany county, New York, and died at Washington, 10th December, 1864. After studying chemistry and mineralogy at college he had several years' experience of their practical application, especially at a glass-factory of which his father was manager, and in 1817 published his *Vitreology*. In the following year he was appointed to the Geological Survey of Missouri and Arkansas, and in 1819 he published his *View of the Lead Mines of Missouri*. Soon after he accompanied General Cass as geologist in his expedition to the Lake Superior copper region, and evinced such capacity for good exploring work on the frontier that in 1823 he was appointed "agent for Indian affairs." He then married the granddaughter of an Indian chief: and during several years' official work near Lake Superior he acquired a vast fund of accurate information as to the physique, language, social habits, and tribal institutions of the American natives. From 1828 to 1832 Schoolcraft was an active member of the Michigan legislature, during the same period delivering lectures on the grammatical structure of the Indian language, which procured him the gold medal of the French Institute. In 1832 also, when on an embassy to some Indians, he ascertained the real source of the Mississippi to be Lake Itasca.

Previous to 1832 he had published *Travels in the Central Portions of the Mississippi Valley*, and in 1839 appeared his *Algic Researches*, containing "Memoirs of a Residence of Thirty Years with the Indian Tribes," and also, notably, "The Myth of Hiawatha and other Oral Legends,"—probably the first occurrence of the name immortalized (in 1855) in Longfellow's poem. Schoolcraft's literary activity was indeed remarkable, since, besides his ethnological writings, he composed a considerable quantity of poetry and several minor prose works, especially *Notes on the Iroquois* (1847), *Statistics of the Six Nations* (1845), *Scenes and Adventures in the Ozark Mountains* (1853). His principal book, *Historical and Statistical Information respecting the Indian Tribes of the United States*, illustrated with 336 well-executed plates from original drawings, was issued under the patronage of Congress in six quarto volumes, from 1851 to 1857. It is a vast mine of ethnological researches as to the Red Men of America, systematically arranged and fully, if not exhaustively, detailed,—describing not only their origin, history, and antiquities, but the physical and mental "type," the tribal characteristics, the vocabulary and grammar, the religion and mythology. Schoolcraft's diplomatic work on the Indian frontier was important,—more than sixteen millions of acres being added to the States' territory by means of treaties which he negotiated.

SCHOOLS. See Education, Blind, Deaf and Dumb, Conservatory, etc., and the relative sections of the articles on individual countries and states.

SCHOOLS OF PAINTING.

THE word "school" as applied to painting[5] is used with various more or less comprehensive meanings. In its widest sense it includes all the painters of one country, of every date,—as, for example, "the Italian school." In its narrowest sense it denotes a group of painters who all worked under the influence of one man,—as, for example, "the school of Raphael." In a third sense it is applied to the painters of one city or province who for successive generations worked under

Meaning of "school."

however, he does not discuss. See *Geschichte der bildenden Künste* im 15th. Jahrhundert, Stuttgart, 1879.—Am. Ed.]

[1] Another painting of the same subject in the Doria Palace in Rome (usually attributed to Dürer) is given to Schongauer by Crowe and Cavalcaselle, *Flemish Painters*, London, 1872. p. 359; but the execution is not equal to Schongauer's wonderful touch.

[2] An interesting example of Schongauer's popularity in Italy is given by the lovely Faenza plate in the British Museum, on which is painted a copy of Martin's beautiful engraving of the Death of the Virgin; see Pottery, vol. xix. p. 646.

[3] See Bartsch, *Peintre Graveur*, and Willshire, *Ancient Prints*, best edition of 1877. According to a German tradition Schongauer was the inventor of printing from metal plates; he certainly was one of the first who brought the art to perfection. See an interesting article by Sidney Colvin in the *Jahrbuch der k. preussischen Kunstsammlung*, vi. p. 69, Berlin, 1885.

[4] [Schoolcraft was appointed Indian agent on the Northwestern frontiers in 1822. His family name had been Calcraft. The principal source of information is his diary from 1812 to 1842, published with a biographical preface in 1851 as his *Personal Memoirs of a Residence of Thirty Years*, etc. To his exertions may be attributed the formation of the Michigan Historical Society and the Detroit Algic Society, and he prepared an Algonkin grammar. *Notes on the Iroquois* was the fruit of a commission to enumerate the Six Nations in New York. It was preceded by *Oneóta, or the Red Race of America*, (1844) which appeared four years later as *The Indian in his Wigwam*, and was an attempt to preserve aboriginal literary material. His first wife, Miss Johnson, whose father was of Irish origin, died in 1842. He married five years afterwards Mary Howard, of Beaufort, S. C., authoress of *The Black Gauntlet*, and for many years his amanuensis.

Schoolcraft's writings are impaired by verbal exuberance and a lack of critical analysis, and while they furnish in the rapidly changing tribal conditions invaluable material for ethnological and philological science, they have otherwise done little for its advancement.—Am. Ed.]

[5] For classical painting, see Archæology, vol. ii., p. 308; see also Fresco, Mural Decoration, Tempera, and the articles on separate painters.

some common local influence, and with some general similarity in design, color, or technique,—as, for example, "the Florentine school," "the Umbrian school." For many reasons the existence of well-defined schools of painting is now almost wholly a thing of the past, and the conditions under which the modern artist gains his education, finds his patrons, and carries out his work have little in common with those which were prevalent throughout the Middle Ages. Painters in the old times were closely bound together as fellow-members of a painters' guild, with its clearly defined set of rules and traditions; moreover, the universal system of apprenticeship, which compelled the young painter to work for a term of years in the *bottega* or studio of some established freedman of the guild, frequently caused the impress of the genius of one man to be very clearly stamped on a large number of pupils, who thus all picked up and frequently retained for life certain tricks of manner or peculiarities of method which often make it difficult to distinguish the authorship of a special painting.[1] The strong similarity which often runs through the productions of several artists who had been fellow-pupils under the same master was largely increased by the fact that most popular painters, such as Botticelli or Perugino, turned out from their *botteghe* many pictures to which the master himself contributed little beyond the general design, the actual execution being in part or even wholly the work of pupils or paid assistants. It was not beneath the dignity of a great painter to turn out works at different scales of prices to suit rich or poor, varying from the well-paid-for altar-piece given by some wealthy donor, which the master would paint wholly with his own hand, down to the humble bit of decorative work for the sides of a wedding *cassone*, which would be left entirely to the 'prentice hand of a pupil. In other cases the heads only in a picture would be by the master himself or possibly the whole of the principal figures, the background and accessories being left to assistants. The buyer sometimes stipulated in a carefully drawn up contract that the cartoon or design should be wholly the work of the master, and that he should himself transfer it on to the wall or panel. It will thus be seen how impossible it is always to decide whether a picture should be classed as a piece of *bottega* work or as a genuine production of a noted master; and this will explain the strange inequality of execution which is so striking in many of the works of the old masters, especially the Italians. Among the early Flemish and Dutch painters this method of painting does not appear to have been so largely practiced, probably because they considered minute perfection of workmanship to be of paramount importance.

Mediæval method of working.

1. *Italian.*

In Italy, as in other parts of Europe, the Byzantine school of painting was for many centuries universally prevalent,[2] and it was not till quite the end of the 13th century that one man of extraordinary talent—Giotto—broke through the long-established traditions and inaugurated the true Renaissance of the art. According to Vasari, it was Cimabue who first ceased to work in the Byzantine manner; but the truth is that his pictures, though certainly superior to those of his predecessors, are thoroughly characteristic specimens of the Byzantine style. Ghiberti, in his *Commentary* (a century earlier than Vasari's work), with greater accuracy remarks that both Duccio of Siena and Cimabue worked in the Byzantine manner, and that Giotto was the first who learnt to paint with naturalistic truth.

Byzantine influence.

In the 12th and the early part of the 13th century Pisa and Lucca were the chief seats of what rude painting then existed in Italy. A number of works of this date still exist, chiefly painted Crucifixions treated in the most conventional Byzantine manner. Giunta Pisano, who was painting in the first half of the 13th century, was a little superior to the otherwise dead level of hieratic conventionalism. He is said to have been Cimabue's master. In the 14th century painting in Pisa was either Florentine or Sienese in style.

Lucca and Pisa.

Fig. 1.—Centre of a triptych, by Duccio di Buoninsegna,—the Madonna with Angels, and, above, David and six Prophets. (National Gallery, London.)

No city, not even Florence, was so fertile as Siena in native painters during the 13th and 14th centuries. The earliest, working before 1300, did not emancipate themselves from the old Byzantine mannerism; Guido da Siena, Duccio (see Fig. 1) and Segna di Buoninsegna possessed many of the peculiarities of the old school,—its rigid attitudes, its thin stiff folds, and its greenish shadows in the flesh tints. In the first half of the 14th century a number of very able painters were carrying on at Siena a parallel development to that which Giotto had inaugurated at Florence; chief among them were Simone di Martino, Lippo Memmi, and especially Ambrogio Loren-

Siena.

Fig. 2.—Madonna, by Cimabue. (National Gallery.)

[1] This is especially the case with the numerous pupils of Perugino.

[2] See Mural Decoration, vol. xvii. p. 49-50.

zetti, a painter of both panels and large frescos, which show rich and noble imaginative power and much technical skill. It is important to note that Ambrogio and

FIG. 3.—Fresco in the church of Santa Croce, Florence, by Giotto—the Disciples of St. Francis discovering the Stigmata on his Body.

probably other painters of his time were, like the earlier Pisan Niccola, beginning to study the then rare examples of classical sculpture. Ghiberti, in his *Commentary*, speaks with enthusiasm of the beauty of an antique statue which he knew only from a drawing by Ambrogio Lorenzetti. In the second half of the 14th century Siena produced a large number of more mediocre painters; but these were succeeded by an abler generation among whom the chief were perhaps Sano di Pietro and Matteo di Giovanni, whose grand altarpiece (No. 1155), recently acquired, is one of the glories of the English National Gallery. Many excellent masters were working at Siena throughout the 15th century and even later; the last names of any real note are those of Peruzzi and Beccafumi. Sodoma, though he settled in Siena in 1501, does not belong to the school of Siena; his early life was passed at Milan, chiefly under the influence of Da Vinci. His talent was developed at Rome among the followers of Raphael.

On the whole the Florentine school surpasses in importance all others throughout Italy. Cimabue, though he did not emancipate himself from the Byzantine manner, was a painter of real genius (see Fig. 2). Giotto is perhaps the most important painter in the history of the development of art, for during the whole of the 14th century the painters of Florence may be said to have been his pupils and imitators (see Fig. 3). Orcagna alone developed rather a different line, more richly decorative in style and brighter in color,—a link between the art of Giotto and that of Siena. In the 15th century Florence reached its period of highest artistic splendor and developed an almost naturalistic school, which appears to have been inaugurated by Masolino and Masaccio. Some few painters, such as Fra Angelico (see Fig. 4) and his pupil Benozzo Gozzoli, produced more purely sacred and decorative work, following the lead of Orcagna. As Baron Rumohr has pointed out, the main bulk of the Florentine 15th-century painters may be divided into three groups with different characteristics. The first, including Masolino, Masaccio, Lippo Lippi, Botticelli, Filippino Lippi, and their pupils, aimed especially at strong action, dramatic force, and passionate expression (see Figs. 5 and 6). The second, including Baldovinetti, Rosselli, Ghirlandaio, and his pupils, are remarkable for realistic truth and vigorous individuality (see Fig. 7). To the third belong Ghiberti, who began life as a painter, Pollaiuolo,[1] Verrocchio, and his pupils Leonardo da Vinci and Lorenzo di Credi, a group largely

Florence.

FIG. 4.—Fresco over a door in the cloister of the convent of S. Marco at Florence, by Fra Angelico—Christ meeting St. Domenic and St. Francis.

FIG. 6.—The Annunciation, by Lippo Lippi. (National Gallery.)

FIG. 5.—Picture on canvas in the Uffizi, Florence, by Botticelli—the Birth of Venus.

FIG. 7.—Portrait head, by Ghirlandaio, from one of his frescos in the retro-choir of S. Maria Novella, at Florence.

[1] It is interesting to note how Ant. Pollaiuolo's fine figure of St. Sebastian in the National Gallery (London) resembles the statue of the same saint in Lucca cathedral by Matteo Civitale.

influenced by the practice of the arts of the goldsmith and the sculptor. Signorelli, whose chief works are at Orvieto and Monte Oliveto near Siena, was remarkable

FIG. 8.—The so-called School of Pan, by Signorelli, the most beautiful of his easel pictures. (Berlin Gallery.)

for his knowledge and masterly treatment of the nude (see Fig. 8), and had much influence on the early development of Michelangelo, whose gigantic genius in later life produced the most original and powerful works that the modern world has seen (see Fig. 9). Andrea

FIG. 9.—Fresco of Isaiah, by Michaelangelo, from the vault of the Sistine Chapel.

del Sarto was one of the last artists of the golden age of painting in Florence; the soft beauty of his works is, however, often marred by a monotonous mannerism. To him are wrongly attributed many paintings by Puligo and other scholars, who imitated his style with various degrees of closeness. The 16th century in Florence was a period of the most rapid decline and was for long chiefly remarkable for its feeble caricatures of Michelangelo's inimitable style.

Between the end of the 14th and the beginning of the 16th century the Umbrian school produced many painters of great importance grouped around a number of different centres, such as Gubbio, where Ottaviano Nelli lived; San Severino, with its two Lorenzos; Fabriano, famed for its able masters Allegretto Nuzi and Gentile da Fabriano; Foligno, whence Niccolo took his name; and above all Borgo San Sepolcro, where Piero della Francesca was born. Piero was one of the most charming of all painters for his delicate modelling, tender color, and

Umbria.

FIG. 10.—Baptism of Christ, by Piero della Francesca. (National Gallery.)

beauty of expression (see Fig. 10). His masterpiece, a large altar-painting of the Madonna enthroned, with

FIG. 11.—The Adoration of the Shepherds, by Fiorenzo di Lorenzo. (Gallery at Perugia.)

standing saints at the side and in front a kneeling portrait of Duke Federigo da Montefeltro, in the Brera gallery, is, strange to say, attributed to his pupil Fra Carnovale.[1] Gentile da Fabriano worked in the purely religious and richly decorative style that characterized Fra Angelico at Perugia. Fiorenzo di Lorenzo (see Fig. 11) and Bonfigli prepared the way for Perugino (see Fig. 12) and his pupils Pinturicchio, Raphael, Lo Spagna, and others. Timoteo Viti was another Umbrian painter of great ability, whose portrait by Raphael in black and red chalk is one of the mos beautiful of the drawings in the Print Room of th British Museum.

The Paduan school is chiefly remarkable for the

[1] The attribution of this magnificent picture to Fra Carnovale rests wholly on a statement, evidently erroneous, of Pungileoni; and hence many other works by Piero, such as the St. Michael in the National Gallery, are wrongly given to Carnovale. It is doubtful whether any genuine picture by the latter is now known; if the Brera picture were really by him he would not only be greater than his master Piero, but would be one of the chief painters of the 15th century.

great name of Andrea Mantegna, the pupil of Squarcione; his firm and sculpturesque drawing is combined with great beauty of color and vigorous expression (see Fig. 13). His pupil Montagna also studied under Gian. Bellini at Venice. Andrea Mantegna influenced and was influenced by the Venetian school; to him are attributed many of the early paintings of his brother-in-law Gian. Bellini, such as the Vatican Pietà, and other works more remarkable for vigor than for grace.

Padua.

Fig. 12.—Centre of triptych, by Perugino, painted for the Certosa near Pavia. (National Gallery.)

Fig. 14.—Centre of retable, by Crivelli, 1476. (National Gallery.)

The school of Arezzo was early in its development. Margaritone, who is absurdly overpraised by his fellow-townsman Vasari, was an artist of the most feeble abilities. In the 14th century Arezzo produced such able painters as Spinello di Luca, Niccolo di Gerini, and Lorenzo di Bicci. In the 15th century it possessed no native schools worth recording.

Arezzo.

Venice did not come into prominence till the 15th century; the Vivarini family of Murano were at work about the middle of it, and were perhaps influenced by the German style of a contemporary painter from Cologne, known as Johannes Alemannus, who had settled in Venice. Some years later the technical methods of Flanders were introduced by Antonello of Messina, who is said to have learnt the secret of an oil medium from the Van Eycks.[1] Crivelli, an able though mannered painter of the second half of the 15th century, adhered to an earlier type than his contemporaries (see Fig. 14). Gian. Bellini is one of the chief glories of the Venetian

Venice.

Fig. 13.—The Madonna between St. John Baptist and St. Mary Magdalene, by Andrea Mantegna, on canvas. (National Gallery.)

Fig. 15.—Portrait of Doge Loredano, by Gian. Bellini. (National Gallery.)

school (see Fig. 15); as are also in a secondary degree his brother Gentile and his pupil

[1] Antonello certainly possessed technical knowledge beyond that of his contemporaries in Venice, namely, that of glazing in transparent oil colors over a tempera ground, and he must either in Italy or in Flanders have come in contact with some painter of the Flemish school; many of the chief Flemish painters visited Italy in the 15th century.

Vittore Carpaccio.[1] In the following century Venice possessed a school which for glory of color and technical

FIG. 16.—So-called Sacred and Profane Love, by Titian. (Borghese Gallery, Rome.)

power has never been rivalled, though it soon lost the sweet religious sentiment of the earlier Venetians. The

FIG. 17.—Various saints by Paul Veronese. (Brera Gallery, Milan.)

chief names of this epoch are Palma Vecchio, Giorgione, Titian (see Fig. 16), and Lorenzo Lotto,—the last a mag-

FIG. 18.—Portrait of a Tailor, by Moroni. (National Gallery.)

nificent portrait painter, a branch of art in which Venice occupied the highest rank. In the 16th century Tintoretto and Paul Veronese were supreme (see Fig. 17).

[1] It should be noted that there are a large number of forged signatures of Gian. Bellini, many of them attached to their own pictures by his pupils, such as Catena and Rondinelli.

In the 17th and 18th centuries Venice produced some fairly good work.

Brescia. The Brescian school has bequeathed two very illustrious names,—Moretto and his pupil Moroni, both portrait painters of extraordinary power during the 16th century (see Fig. 18). Moretto also painted some fine large altar-pieces, remarkable for their delicate silver-gray tones and refined modelling. Romanino was an extremely able painter of frescos as well as of easel pictures.

Verona. The school of Verona, which existed from the 13th to the 17th century, contains few names of highest importance; except that of Pisanello, the chief were painters of the end of the 15th and the early part of the 16th century, as Domenico and Francesco Morone, Bonsignori, Girolamo dai Libri, and Cavazzola. Paul Veronese, though at first he painted in his native town, soon attached himself to the Venetian school.

Ferrara. Ferrara possessed a small native school in the 15th and 16th centuries, Cosimo Tura, Ercole Grandi, Dosso Dossi, and Garofalo being among the chief artists. The paintings of this school

Fig. 19.—Pietà by Francia. (National Gallery.)

are often vigorous in drawing, but rather mannered, and usually somewhat hard in color. After 1470 there was an intimate connection between the schools of Ferrara and Bologna.

Bologna. The Bologna school existed, though not in a very characteristic form, in the 14th century. Francia and Lorenzo Costa of Ferrara were its chief painters at the end of the 15th century (see Fig. 19). It was, however, in the 16th and 17th centuries that Bologna took a leading place as a school of Italian painting, the beginning of which dates from about 1480, when several able painters from Ferrara settled in Bologna. The three Caracci, Guido (see Fig. 20), Domenichino, and Guercino were the most admired painters of their time, and continued to be esteemed far beyond their real value till about the middle of the 19th century. Since then, however, the strong reaction in favor of earlier art has gone to the other extreme, and the real merits of the Bolognese school, such as their powerful drawing and skilful though visibly scholastic composition, are now usually overlooked.

Fig. 20.—Ecce Homo, by Guido. (National Gallery.)

Modena and Parma. Both Modena and Parma possessed mediocre painters in the 14th and 15th centuries. In the 16th Correggio and his pupil Parmigiano attained a very high degree of popularity. Correggio, who was largely influenced by the Ferrara-Bologna school, is sometimes weak in drawing and affected in composition, but will always be esteemed for the rich softness of his modelling and the delicate

pearly tone of his flesh tints. Fig. 21 is an exeellent example of his style, though mueh injured by repainting.

Cremona. The small school of Cremona occupies only a subordinate position. Boccaccino was its ablest painter; his rare works are remarkable for conscientious finish, combined with some provincial mannerism.

Fig. 21.—The Education of Cupid, by Correggio. (National Gallery.)

Milan. In the 15th and early part of the 16th century Milan had one of the most important schools in Italy. Its first member of any note was Vincenzo Foppa, who was painting in 1457 and was

Fig. 22.—The Mystic Marriage of St. Catherine of Alexandria and St. Catherine of Siena to Christ, by Ambrogio Borgognone. (National Gallery.)

the founder of the early school. Ambrogio Borgognone (born *c.* 1455) was an artist of great merit and strong religious sentiment. He followed in the footsteps of Foppa, and his pictures are remarkable for the calm beauty of the faces, and for their delicate color (see Fig. 22), which recalls the manner of Piero della Francesca. Leonardo da Vinci, though trained in Florence, may be said to have created the later Milanese school. Fig. 23 shows one of the very few pictures by his hand which still exist. The marvellous

Fig. 23.—The Madonna with the Rocks, by Leonardo da Vinci. (National Gallery.)

and almost universal genius of Leonardo caused his influence to be powerfully extended, not only among his immediate pupils, but among almost all the Lombard painters of his own and the succeeding generation. His closest followers were Salaino, Luini, Cesare da Sesto, Beltraffio, and Marco d'Oggiono, and in a lesser degree Andrea Solario, Gaudenzio Ferrari, and Sodoma, who introduced a new style of painting into Siena. Solario also studied in Flanders, and in Venice under Gian. Bellini, so that a curiously composite style is visible in some of his magnificent portraits (see Fig. 24). Most of the pictures and many drawings usually attributed to Da Vinci are really the work of his pupils and imitators. Luini, in his magnificent frescos, was one of the last painters who preserved the religious dignity and simplicity of the older mediæval schools. Fresco painting was practiced by the Milanese after it had been generally abandoned elsewhere.

Rome. Rome has always been remarkable for its absence of native talent in any of the fine arts, and nearly all the members of the so-called Roman school came from other cities. This school at first consisted of the personal pupils of Raphael,—Fran. Penni, Da Imola, Giulio Romano, and Del Vaga. Sassoferrato and Carlo Maratta were feeble but very popular painters in the 17th century.

Fig. 24.—Portrait of a Venetian Senator, by Andrea Solario. (National Gallery.)

Naples. The early history of the Neapolitan school is mostly mythical; it had no individual existence till the 16th century, and then chiefly in the person of Caravaggio. During the 15th

eentury many works of the Van Eycks and other Flemish painters were imported into Naples; some of these were afterwards claimed by the vanity of native writers as paintings by early Neapolitan artists, for whom imaginary names and histories were invented. The Spaniard Ribera, Salvator Rosa, and Giordano were its ehief members in the 17th century.

2. *German.*

German school.

It was espeeially at Cologne in Westphalia and in the Rhine provinees generally that German painting was developed at an early time. William of Cologne, who died about 1378, painted panels with much delieaey and richness of

Fig. 25.—St. Veronica, by William of Cologne. (National Gallery.)

color (see Fig. 25). A number of large and highly finished altarpieces were painted in this part of Germany during the 15th century, but the names of very few of the painters of that time are known. Artists such as Schongauer, Von Meckenen, Cranaeh, and others

Fig. 26.—Portrait of a Senator, by Albert Dürer. (National Gallery.)

were more at home in the engraving of eopper and wood than in painting, and to some extent the same might be said of Albert Dürer, an artist of the highest and most varied talents, who especially excelled as a portrait painter (see Fig. 26). The Hans Holbeins, father and son, especially the latter, attained the highest rank as portrait painters; nothing ean exceed the vivid truthfulness and exquisite workmanship of the portraits by the younger Holbein (see Fig. 27), who also painted very beautiful religious pictures. Sinee his time Germany has produced few noteworthy

Fig. 27.—Portrait of an Unknown Lady, by Holbein. (The Hague Gallery.)

painters. In the 19th century Overbeck was remarkable for an attempt to revive the long dead religious spirit in painting, and he attained much popularity, which, however, has now almost wholly died away.

3. *Flemish.*

The Van Eycks and their school.

Hubert and Jan van Eyck, who were painting at the beginning of the 15th century, were artists of the very highest rank; with their unrivalled teehnical skill, their exquisite finish, and the splendor of their color, they produced works which in some respects even surpassed those of any of the Italian painters. Probably no other artists ever lavished time and patient labor quite to the same extent to whieh Jan van Eyck did upon some of his works, such as the Arnolfini and other portraits in the National Gallery

Fig. 28.—Portrait, by Jan van Eyck; 1433. (National Gallery.)

(see Fig. 28), and the Madonna with the kneeling Donor in the Louvre. This last is one of the loveliest pictures in the world, both as a figure painting and from its exquisite miniature landscape and town

in the distance, all glowing with the warm light of the setting sun. The elder Van der Weyden was a most able pupil of the Van Eycks; he occasionally practiced a very different technical method from that usually employed in Flanders—that is to say, he painted in pure tempera colors on unprimed linen, the flesh tints especially being laid on extremely thin, so that the texture of the linen remains unhidden. Other colors, such as a smalto blue used for draperies, are applied

FIG. 29.—The Entombment of Christ, by Van der Weyden the elder, painted in tempera on unprimed linen. (National Gallery.)

in greater body, and the whole is left uncovered by any varnish. A very perfect example of this exists in the National Gallery (see Fig. 29). The special method used with such success by the Van Eycks and their school was to paint the whole picture carefully in tempera and then to glaze it over in transparent oil colors; the use of oil[1] as a medium was common in the 13th century and even earlier (see MURAL DECORATION). To the school of the Van Eyeks belong a number of

FIG. 30.—St. Mary Magdalene, attributed to the younger Van der Weyden. (National Gallery).

other very talented painters, who inherited much of their marvellous delicacy of finish and richness of color; the chief of these were Memling, Van der Meire, and the younger Van der Weyden, to whom is attributed No. 654 in the National Gallery (see Fig. 30). The

[1] Elaborate directions for painting in oil are given by the German monk Theophilus (*Sched. div. art.*, i. 37, 38), who wrote in the 12th century.

color of this lovely picture is magnificent beyond all description. Quintin Matsys (Massys) and Gheerardt David also produced works of great beauty and extraordinary finished execution.[2]

At the beginning of the 16th century Flemish art began to lose rapidly in vigor, a weaker style being substituted under the influence of Italy. To this period belong Mabuse, Van Orley, and Patinir, who appear to have been special admirers of Raphael's latest man-

Later Flemish art.

FIG. 31.—Portrait by Rubens, known as the "Chapeau de Poil." (National Gallery.)

ner. In the latter half of the century Antonij Mor, usually known as Antonio Moro, was a portrait painter of the very highest rank. A portrait of Queen Mary of England at Madrid, and one of a youth of the Farnese family at Parma, are real masterpieces of portraiture. He spent some time in England. The Breughel family in the 16th and 17th centuries produced feeble works finished with microscopic detail.

FIG. 32.—Portrait of Cornelius Van der Geest, by Vandyck or Rubens. (National Gallery.)

Rubens and his pupil Vandyck in the 17th century were among the greatest portrait painters the world has ever seen (see Figs. 31 and 32), and had many able followers on the Continent and in England.

[2] Though the elder Van der Weyden and other Flemish painters of his time visited Italy, the Italian style of painting appears to have had very little influence on their vigorous works. The weaker Flemish painters of the 16th century, on the contrary, were close imitators of the Italians and produced pictures of a rather feebly pretty type.

4. *Dutch.*

Dutch school.

This school was chiefly remarkable for its painters of *genre* subjects, often treated with a very ignoble realism, especially by the various members of the Teniers family. Rembrandt, the greatest painter of the school, developed a quite original style, remarkable for the force shown in his effective treatment of light and shade. The vigorous life and technical skill shown in some of his portraits have never been surpassed (see Fig. 33). As a rule, however, he cared but little for color, and used the etching needle with special enjoyment and dexterity. Terburg, Gerhard Dou (Douw), and Wouwerman had more sense of beauty, and worked with the most miniature-like delicacy. Another school excelled in landscape, especially Ruysdael and Hobbema (see Figs. 34 and 35). Vandevelde was remarkable for his sea-pieces, and Paul Potter for quiet pastoral scenes with exquisitely painted cattle. Throughout the 17th century the painters of the Dutch school far outnumbered those of any other, and many of them reached a very fair average of skill.

Fig. 33.—Portrait of an Old Woman, by Rembrandt. (National Gallery.)

Fig. 34.—Landscape, by Ruysdael. (National Gallery.)

Fig. 35.—View of Middelharnis in Holland, by Hobbema. (National Gallery.)

5. *Spanish.*

Spanish school.

The early Spanish painters of the 15th and 16th centuries were merely feeble imitators of Italian art. Many of them, such as Juan de Juanes, studied in Italy. Ribalta and Zurbaran were perhaps the first able artists who developed a national style. The latter is remarkable for his paintings of monks; Fig. 36 shows one of the best examples. His large altarpieces are less successful. Velazquez, one of the greatest masters of skilful execution the world has seen, was alike

Fig. 36.—Franciscan Friar, by Zurbaran. (National Gallery.)

Fig. 37.—Portrait of Philip IV. of Spain, by Velazquez. (National Gallery.)

great in portraiture (see Fig. 37) and in large figure subjects. His early religious paintings, executed under the influence of Ribalta, are far inferior to his later works, the best of which are at Madrid. Murillo is usually rather undervalued; he was very unequal in his work, and is well represented nowhere except at Seville. No words can describe the exquisite religious beauty and pathos of his great picture of Christ on the Cross bending down to embrace St. Francis. Goya, who lived into the 19th century, was an artist of great power, haunted by a hideous imagination. Fortuny, a very clever young painter, who died in Rome in 1874, was remarkable for his daring use of the most brilliant color, with which his pictures are studded like a mosaic. His success has caused him to have countless imitators, most of whom reproduce the faults rather than the merits of his work. His influence on modern Continental art has been very great.

6. *French.*

French art, like that of Spain, was almost wholly under Italian influence during the 15th and 16th centuries. Nicolas Poussin, in the 17th century, was the first to develop a native style, though he was much influenced by Titian. His best works are bacchanalian scenes, of

French school.

Fig. 38.—Bacchanalian scene, by Nicolas Poussin. (National Gallery.)

which one of the finest is in the National Gallery (see Fig. 38). When at his best his flesh painting resembles that of Titian, but it is frequently marred by unpleasant hot coloring. Claude Lorrain is remarkable for his beautiful and imaginative landscapes,—often wanting in a real study of nature (see Fig. 39). His finest works are in England (see p. 466). Throughout

Fig. 39.—Landscape, by Claude Lorrain. (National Gallery.)

the 18th century the French school was very prolific, but shared the mediocrity of the age, the corruption and artificiality of which impressed themselves strongly on the painting of the time. The most popular artists of that century were Watteau, Boucher, Greuze, Claude Vernet, Fragonard, and David, the reviver of the pseudo-classic style. In the first half of the 19th century Prud'hon, Ingres, Horace Vernet, and Delaroche—artists of only moderate merit—were in great repute, and more deservedly the very brilliant landscape painter Rousseau. Millet, though little valued during his lifetime, is now highly appreciated. Regnault, a very able painter, who while yet young was killed at the siege of Paris in 1871, belongs to the latest development of French art. At present (1886) Paris possesses by far the most important school of art existing, and French painters on the whole are supreme in power of drawing and in technical skill. Unhappily these great merits are often counterbalanced by false sentimentalism or excessive realism, and especially by gross sensuality. Art in France—that is, in Paris—is now in a state of the most prolific activity, and is branching out into new and startling phases, such as the impressionist style, in which *form* is suppressed for the sake of *color*, and the naturalist school, which leans rather to what is ugly or even loathsome; to the latter belong some of the technically ablest painters alive.[1] As in Spain and Italy, the influence of Fortuny is strong in Paris, and Parisian influence now extends very widely, as the École des Beaux-Arts is resorted to by art students from all countries except Germany

7. *British*

The modern British[2] school begins with the painters of miniature portraits in the 16th and 17th centuries, among whom the earliest were Nicholas Hilliard and Isaac Oliver, artists of some note in the reign of Elizabeth. Many very beautiful miniatures were produced by them and by the younger Peter Oliver, who rose into celebrity under the Commonwealth. Other able portrait painters of the 17th century were the Scotch Jamesone, a pupil of Rubens. William Dobson, a pupil of Vandyck,[3] and Samuel Cooper; but the chief court painters after the

British school.

Fig. 40.—Portrait of Dr. Johnson, by Reynolds. (National Gallery. A replica of this exists in Pembroke College, Oxford.)

[1] A few years ago a gold medal was won at the Salon by a picture of this class,—a real masterpiece of technical skill. It represented Job as an emaciated old man covered with ulcers, carefully studied in the Paris hospitals for skin diseases.

[2] For mediæval painting in England, see Mural Decoration, vol. xvii., p. 51 *sq.*

[3] Vandyck lived and worked in England from 1632 to 1641.

Restoration were the Flemish Sir Peter Lely and Sir Godfrey Kneller, whose influence on art in England was disastrous. The 18th century produced many painters of the highest merit, as Hogarth, who stands unrivalled as a caricaturist and moralist, Reynolds and his rival Gainsborough, notable among the chief portrait painters of the world (see Figs. 40 and 41), and Richard Wilson, the founder of the English school of landscape, the chief artistic

FIG. 41.—Portrait of Mrs. Siddons, by Gainsborough. (National Gallery.)

specialty of the country. The three brothers Smith of Chichester, Gainsborough, and later in the century John (Old) Crome of Norwich and James Ward, were all landscape painters of great ability. England has since the 18th century been specially famed for its school of water-color painters, of which Paul Sandby was one of the founders; he was followed by Wheatley, Webber, Girtin, and Prout. Sir Henry Raeburn was

FIG. 42.—Portrait of Rev. Arch. Alison, by Sir H. Raeburn. (National Portrait Gallery.)

a Scottish portrait painter of the highest rank (see Fig. 42), but was far less admired in England than the very feeble Lawrence. Little can be said in favor of many of the most popular painters of that time, as West, Barry, Fuseli, Northcote, and Shee, who practiced what was considered the highest branches of art, such as historical painting. William Blake, in spite of his wonderful poetical and imaginative power, lived and died with very inadequate recognition. To the first half of the 19th century belong Turner, the greatest of all landscape painters (see Fig. 43), and his very able contemporaries Constable, J. J. Chalon, Copley Fielding, and Stanfield. Scotland produced two of the chief painters of this time—Sir William Allan and Sir David Wilkie. Mulready was a fine draughtsman,

FIG. 43.—The Temeraire towed to her last Moorings, by Turner. (National Gallery.)

skilful in composition, but weak in color. Etty's scholastic drawing recalls the merits and faults of the Bolognese school, and he is frequently very fine in color. Eastlake was weak in drawing and feeble in composition. Sir Edwin Landseer excelled in animal painting, especially in his rendering of the texture of hair and fur, but was frequently rather harsh in color and commonplace in motive. David Roberts is worthy of note for his very clever water-colors of architectural scenes, J. F. Lewis for his exquisitely finished Oriental

FIG. 44.—Portrait, by Dante Gabriel Rossetti.

subjects, and J. S. Raven for his grand and imaginative landscapes, which, however, are very little known. Dante Gabriel Rossetti (see Fig. 44), who died in 1882, was one of the chief painters of the century, both for the richness of his coloring and for his strong poetical imagination; he was one of the founders of the pre-Raphaelite "brotherhood" (see ROSSETTI), whose rise, development, and widespread influence on painting in Britain have been the chief artistic events in this century, and have produced a few painters whose earnestness of purpose and originality of power give them a foremost and absolutely unique position in modern Europe.

List of Painters.

The following lists give the chief painters classified according to their schools in chronological order.[1]

1. *Italian Schools.*[2]

(i.) *Lucca and Pisa.*

Lotharius and Ranuccius of Lucca, known only from a document, a treaty with Pisa, signed by them in 1228.
Bonaventura Berlinghieri,[3] fl. 1235–44.
Enrico of Pisa, miniatures, fl. 1238.
Marco Berlinghieri, miniatures in a MS. Bible, fl. 1250.
Barone Berlinghieri, several crucifixes, fl. 1240–84.
Deodati Orlandi of Lucca, fl. 1288–1301.
Giunta Pisano, first half of 13th century.
Turino Vanni, second half of 14th century.

The names of many other Pisan painters of the later part of the 13th century are recorded in documents, but no paintings by them are known to exist.

(ii.) *Siena.*[4]

Guido da Siena, fl. 1220.
Diotisalvi, fl. 1270.
Duccio di Buoninsegna, fl. 1300.
Segna di Buoninsegna, fl. 1305.
Simone di Martino, *c.* 1285- *c.* 1344.
Lippo Memmi, d.*c.* 1357.
Berna, fl. early 14th century.
Pietro Lorenzetti, fl. 1320- *c.* 1348.
Ambrogio Lorenzetti, Pietro's brother, fl. 1330, d.*c.* 1348.
Niccolo di Segna, fl. 1342.
Jacopo di Mino, fl. 1342.
Lippo Vanni, fl. 1350-*c.* 1376.
Niccolo di Buonaccorso, fl. 1350-88.
Bartolo di Fredi, fl. 1353–1410.
Luca di Tommè, fl. 1367.
Paolo di Giovanni, fl. 1380.
Meo da Siena, fl. 1380.
Taddeo di Bartolo, 1363–1422.
Andrea di Bartolo, fl. 1380, d. 1428.
Gregorio Cecchi, fl. 1400.
Martino di Bartolomeo, fl. 1403, d. 1433.
Domenico di Bartolo, d. 1449.
Stefano di Giovanni, fl. 1428, d. 1450.
Giovanni di Paolo, *c.* 1403–1482.
Sano di Pietro, 1406–81.
Lorenzo di Pietro (Vecchietta), 1410–80, better known as a sculptor.
Matteo di Giovanni, 1420–95.
Benvenuto di Giovanni, 1436–1518.
Francesco di Giorgio, b. 1439.
Neroccio di Landi, 1447–1500.
Pietro di Domenico, 1457–1501.
Bernardino Fungai, 1460–1516.
Andrea di Niccolo, 1460–1529.
Girolamo di Benvenuto, 1470–1524.
Giacomo Pacchiarotto,[5] b. 1474.
Girolamo del Pacchia,[5] 1477 to after 1521.
Giov. Ant. Bazzi (Sodoma), 1477–1549; though not of the Sienese school, he had much influence on the Sienese painters in the early part of the 16th century.
Baldassare Peruzzi, 1481–1537.
Domenico Micharino (Beccafumi), 1486–1550.

The most important Sienese painters during the second half of the 16th and the 17th centuries were Arcangiolo Salimbeni, Alessandro Casolani, Pietro Savi, Ventura Salimbeni, Francesco Vanni, Francesco Rustici, Rutilio Manetti, Astolfo Petrazzi, and Raffaello Vanni.[6]

(iii.) *Florence.*

Andrea Tafi, 1213-? 1294 (Vasari).
Coppo di Marcovaldo, fl. 1261–75.
Gaddo Gaddi, 1239-1312 (according to Vasari).
Giovanni Gualtieri (Cimabue), 1240-? 1302.
Giotto di Bondone, 1276–1337.
Taddeo Gaddi, ? 1300 to after 1366.
Puccio Capanna, first half of 14th century.
Buonamico Christofani, (Buffalmacco), first half of 14th century.
Giovanni Jacobi da Milano, fl. 1365.
Giottino (real name doubtful), first half of 14th century.
Jacopo Landini, *c.* 1310-*c.* 1390.
Agnolo Gaddi (son of Taddeo Gaddi), 14th century.
Andrea Orcagna, *c.* 1316-*c.* 1376, and his brothers Lionardo[7] (fl. 1332-47) and Jacopo.
Francesco Traini, chief of Orcagna's pupils, fl. 1341–45.
Antonio Longhi (Veneziano), fl. 1370–87.
Gherardo Starnina, 1354, d. after 1406.
Giuliano d'Arrigo (Pesello), 1367 to after 1427.
Tommaso di Fini (Masolino), b. 1383.
Lorenzo Monaco, fl. 1404–13.
Fra Angelico (Guido di Vicchio), 1387–1455.
Andrea del Castagno, 1390-1457.
Paolo Uccello (*c.* 1396–1475.
Tommaso di S. Giovanni (Masaccio), 1402–29.
Fra Lippo Lippi, *c.* 1412–69.
Francesco di Pesello (Pesellino), 1422–57.
Alesso Baldovinetti, 1422–99.
Domenico Veneziano, fl. 1438, d. 1461.
Benozzo Gozzoli, 1424, d. after 1485.
Andrea Verrocchio, 1432- *c.* 1488.
Antonio Pollaiuolo, 1433–98.
Cosimo Rosselli, 1439–1507.
Luca Signorelli (Da Cortona), 1441–1523; his principal pupil was Girolamo Genga, 1476–1551.
Pietro Pollaiuolo, 1443, d. before 1496.
Sandro Botticelli, 1447–1515.
Domenico Bigordi (Ghirlandaio), 1449–94. His works were closely imitated by his pupil and brother-in-law Bastiano Mainardi.
Lorenzo di Credi, 1459–1537. His chief scholar was Sogliani, 1492–1544.
Filippino Lippi, 1460–1504.
Piero di Cosimo, 1462–1521.
Raffaellino del Garbo, 1466–1524.
Francesco Granacci, 1469–1543.
Giuliano Bugiardini, 1471–1554.
Mariotto Albertinelli, 1474–1515.
Fra Bartolomeo della Porta, 1475–1517.
Michelangelo Buonarroti, 1475–1564.
Francesco di Cristofano (Francia Bigio), 1482–1525.
Ridolfo Ghirlandaio, 1483–1560.
Andrea del Sarto, 1487-1531. His scholar Puligo closely imitated his style.
Jacopo Carucci da Pontormo, 1494–1557.
Giulio Clovio of Dalmatia, miniaturist, 1498–1578.
Angelo Bronzino, 1502–72.
Marcello Venusti, d.*c.* 1580.
Daniele da Volterra, 1509–66.
Francesco de' Rossi (called Del Salviati), 1510–63.
Giorgio Vasari, art historian 1512–74.
Alessandro Allori, 1535–1607.
Orazio Lomi de' Gentileschi, 1562–1646.
Cristoforo Allori, 1577–1621.
Carlo Dolci, 1616–86.

The other Florentine painters of the later part of the 16th and 17th centuries are of little importance.

(iv.) *Umbria.*

Oderisio of Gubbio, miniaturist (Dante, *Pur.*, xi. 79), fl. 1264- *c.* 1299.
Guido Palmerucci (Gubbio), 1280- *c.* 1345.
Allegretto Nusi, fl. 1346–85.
Gentile da Fabriano, b. between 1360 and 1370, d. 1450.
Ottaviano Nelli, fl. 1410–34.
Lorenzo da San Severino, b. 1374, fl. 1400.
Piero Borghese (Della Francesca), *c.* 1415 to after 1494.
Fra Carnovale, pupil of P. Borghese, second half of 15th century.
Benedetto Bonfigli, fl. 1450–96.
Niccolo of Foligno,[8] fl. 1458–99.
Lorenzo da San Severino the younger, fl. 1480–96.
Melozzo da Forli, 1438–94.
Fiorenzo di Lorenzo, fl. 1470–99.
Giovanni Santi (father of Raphael), pupil of Melozzo da Forli, d. 1494.
Pietro Vannucci (Perugino), 1446–1524.
Bernardino di Betto (Pinturicchio), 1454–1513.
Marco Palmezzano of Forli, *c.* 1456, d. after 1537.
Andrea Alovigi (L'Ingegno), fl. 1484.
Lodovico Angeli, fl. 1481–1506.
Giovanni di Pietro (Lo Spagna), fl. 1503, d. in or before 1530.
Giannicola Manni, fl. 1493, d. 1544.
Timoteo Viti, 1469–1523.
Raphael Sanzio, 1483–1520; belonged to the Perugian school only during the first few years of his career.

Less important Umbrian painters of the 15th century were Giov. Boccati, Girolamo di Giovanni, Matteo da Gualdo, Bartolomeo di Tommaso, and Pietro Antonio, also a number of third-rate painters who belonged to the school of Perugino.

(v.) *Padua.*

Guariento, fl. 1316–65.
Justus of Padua (Giusto Giovanni), *c.* 1330–1400, apparently a follower of Giotto.
Francesco Squarcione, 1394–1474.
Gregorio Schiavone, second half of 15th century.
Andrea Mantegna, 1431–1506. His chief pupils were his son Francesco (b. *c.* 1470, died after 1517), Carlo (called) del Mantegna, Giov. Fran. Carotto, and Francesco Bonsignori of Verona (1455–1519).
Bartolomeo Montagna (fl. 1487, d. 1523), a pupil of Mantegna and Gian. Bellini, founded a school at Vicenza, to which belonged Giovanni Speranza and Benedetto Montagna, the latter an able engraver.

(vi.) *Arezzo.*

Margaritone di Magnano[9] (according to Vasari), 1216–93.
Mantano di Arezzo, fl. 1305–10
Jacopo di Casentino, *c.* 1310-*c.* 1390.
Spinello di Luca (Aretino), chief pupil of Casentino.[10] *c.* 1330–1410.
Niccolo di Pietro Gerini, d. before 1389. His son Lorenzo was also a painter.
Lorenzo di Bicci, fl. 1370–1409.
Parri Spinelli, early 15th century.
Bicci di Lorenzo, fl. 1420, d. 1452.
Bartolomeo della Gatta, *c.* 1410–91. His pupils Domenico Pecori and Niccolo Soggi were men of but little talent.

(vii.) *Venice.*

Niccolo Semitecolo, fl. 1351–1400.
Lorenzo Veneziano, fl. 1357–79.
Stefano Veneziano, fl. 1369–81.
Jacobello del Fiore, fl. 1400–39.
Johannes Alemannus, probably of Cologne, fl. 1440 *sq.*
Jacopo Bellino, 1395–1470; and his two sons—
Gentile Bellini (1421–1507) and
Giovanni Bellini (1426–1516). Giovanni's closest imitator was Niccolo Rondinelli.
Giovanni Vivarini of Murano, fl. 1440–47.
Antonio Vivarini, fl. 1440–70.
Bartolomeo Vivarini, fl. 1459–98.
Alvise Vivarini, fl. 1464–1503.
Antonello da Messina, *c.* 1444- *c.* 1493.
Carlo Crivelli, fl. 1468 to after 1500.
Mansueti, fl. 1494–1500.
Vittore Carpaccio, *c.* 1450 to after 1522. His chief pupil was Lazzaro Sebastiani.
Marco Marziale, fl. 1492–1507.
Marco Basaiti, fl. 1470–1520.
Francesco Torbido (Moro), 1486–1546.
Vicenzo Catena, fl. 1495, d. after 1531.
Cima da Conegliano, fl. 1489–1517.
Macrino d'Alba, fl. 1496–1508.
Bartolomeo Veneziano, fl. *c.* 1505–30.
Marco Belli, fl. 1511.
Francesco Bissolo, fl. 1500–28
Pellegrino da San Daniele, *c.* 1465–1547.
Andrea Previtali, fl. 1506, d. 1528.
Lorenzo Lotto, *c.* 1476–1555.
Giorgio Barbarelli (Giorgione), 1477–1511.
Tiziano Vecellio, 1477–1576.
Jacopo Palma (Vecchio), 1480–1528.
Giov. Ant. Licinio (Pordenone), 1483–1539.
Sebastiano Luciani (Del Piombo), 1485–1547.
Girolamo da Treviso, 1497–1544.

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[1] When the years of a painter's birth and death are unknown, fl. for "flourished" is put before the date, which is taken either from existing dated pictures or from documentary records.

[2] Of recent years a more careful search for documents relating to Italian art has done much to correct the dates of many painters' lives; hence in many cases the years of a painter's birth and death given in the following list differ from those in most previous works on the subject.

[3] The three Berlinghieri were of a Milanese family, but worked mostly at Lucca.

[4] Most valuable assistance in the preparation of this list of Sienese painters was given by Mr. C. Fairfax Murray.

[5] The works of these two painters are frequently confounded; a chromo-lithograph of a fresco by Pacchia—a scene from the life of St. Catherine—has been published by the Arundel Society as being from a work of Pacchiarotto.

[6] See Lanzi, *Painting in Italy*, Bohn's ed., vol. i. p. 290.

[7] Wrongly called Bernardo by Vasari.

[8] Wrongly called Alunno by Vasari.

[9] Margaritone, a very bad painter, much overpraised by Vasari, belongs really to no special school; his works are inferior to contemporary and earlier paintings of the Byzantine school. The National Gallery possesses an ugly but interesting example of his work, signed "Margarit' de Aritio." Some other painters born at Arezzo belong to the Florentine school, among them Giorgio Vasari, a very feeble imitator of Michelangelo.

[10] These two painters belong rather to the Florentine school.

Bonifacio. There were three painters of this name,—Bonifacio of Verona, d.1540; another Veronese Bonifacio, d. 1553, both pupils of Palma Vecchio, and a Venetian, who was painting after 1579, probably a son of one of the elder Bonifacios.
Girolamo da Santacroce, fl. 1520–48.
Paris Bordone, 1500–71.
Jacopo da Ponte (Bassano), 1510–92. Four of his sons were painters.
Jacopo Robusti (Tintoretto), 1512–94.
Bernardino da Pordenone, 1520–70.
Andrea Schiavone, 1522–82.
Paolo Cagliari (Veronese), 1528–88.
Battista Zelotti, *c.* 1532–92.
Jacopo Palma (Giovane), 1544–1628.
Alessandro Varotari (Padovanino), 1590–1650.
Sebastiano Ricci, 1660–1734.
Giov. Batt. Tiepolo, 1696–1770.
Antonio Canale (Canaletto), 1697–1768.
Francesco Zuccherelli, 1702–93.
Francesco Guardi, 1712–93.
Bernardo Bellotto, 1720–80, nephew of Canaletto and a close imitator of his style.

(viii.) *Brescia.*

Vincenzo Foppa, fl.1450–66 (see also Milan).
Vincenzo Civerchio of Crema, fl.1495–1540.
Fioravante Ferramola, end of 15th century.
Girolamo Romani (Il Romanino), *c.*1486–*c.*1566.
Girolamo Savoldo, *c.*1487 to after 1540.
Alessandro Buonvicino (Moretto), 1498–1555.
Giov. Batt. Moroni of Bergamo, *c.* 1525–78.

(ix.) *Verona.*

Turone da Verona, fl.1360.
Altichiero da Zevio and Giacomo degli Avanzi, 14th century. The other Veronese painters of the 14th century were of little artistic power.
Vittore Pisano (Pisanello), 1380–*c.*1455. His chief pupils were Stefano da Zevio, Giovanni Oriolo, and Bono of Ferrara (see Ferrara).
Domenico Morone, d. after 1503.
Liberale da Verona, 1451–1536.
Francesco Bonsignori, 1455–1519.
Niccolo Giolfino, *c.*1465 to after 1518.
Francesco Morone, 1473–1529.
Girolamo dai Libri, 1474–1556.
Paolo Morando (Cavazzola), 1486–1522. Paolo Veronese and his imitator Battista Zelotti, a native of Verona, belong rather to the Venetian school.

(x.) *Ferrara.*

Cosimo Tura, 1430–? 1496.
Francesco Cossa, latter part of 15th century.
Bono da Ferrara, fl.1461, pupil of Pisanello.
Francesco Bianchi, *c.*1445–1510.
Ercole Grandi[1] (or Roberti), *c.* 1445, d. before 1513.
Giovanni Oriolo, fl.1449 to after 1461, pupil of Pisanello.
Lorenzo Costa, 1460–1535, belongs rather to the Bolognese school.
Gian. Battista Bartucci, fl.*c.*1506.
Dosso Dossi. 1480–1560. His brother Gianbattista was also a painter.

[1] As Comm. Morelli has pointed out, Grandi's signature and the date 1531 on a picture of the Entombment, formerly in the Borghese gallery in Rome, are a forgery,—Grandi really having died long before; it may, however, be by the younger painter of the same name.

Lodovico Mazzolino da Ferrara, 1478–? 1530.
Francesco Zagancili da Cotignola, fl.1505–18, and his brother Bernardino.
Benvenuto Tisio (Garofalo), 1481–1559.
Giovanni Battista Benvenuti, (L'Ortolano), early part of 16th century.
Girolamo Carpi, 1501–56.

(xi.) *Bologna.*

Guido da Bologna, fl. 1177.
Ventura, fl.1197–1217.
Ursone, fl.1226–48.[2]
Vitale da Bologna, fl.1320–50.
Lippo Dalmasii, fl.1376 to after 1410.
Simone (called) de' Crocifissi, fl.1370.
Giacomo degli Avanzi, fl. later part of 14th century, also classed with Veronese school.
Jacopo di Paolo, early 15th century.
Marco Zoppo, fl.1471–98.
Francesco Raibolini (called Francia after his master), *c.* 1450–1517.
Lorenzo Costa of Ferrara, 1460–1535.
Francesco Primaticcio, 1504–70.
Ludovico Caracci, 1555–1619.
Agostino Caracci, 1558–1601.
Annibale Caracci, 1560–1609.
Guido Reni, 1575–1642.
Francesco Albani, 1578–1660.
Domenico Zampieri (Domenichino), 1581–1641.
Francesco Barbieri (Guercino), 1591–1666.
Guido Cagnaccio, 1601–81.
Pier Fran. Mola, 1612–68.
Elisabetta Sirani, 1638–65.

(xii.) *Modena and Parma.*

Tommaso da Modena, fl.1350–60.
Barnabo da Modena, fl.1360–80.
Bartolomeo Grossi, fl.1462.
Jacopo Loschi, fl.*c.*1460.
Cristoforo Caselli, fl.1499.
Lodovico da Parma, pupil of Francia of Bologna, early 16th century.
Mazzuola, three brothers, Michele, Pierilario, and Filippo, early 16th century.
Antonio Allegri (Correggio), 1493–1534, closely connected with the Ferrara school.
Francesco Mazzuola (Parmigiano), 1504–40. His pupil Girolamo Mazzuola closely imitated his works.

(xiii.) *Cremona.*

Francesco Tacconi, fl.1464–90.
Altobello Melone, fl.1515–20.
Boccaccio Boccaccino, fl.1496, d. 1525.
Giulio Campi, 1500–72.

(xiv.) *Milan.*

Vincenzo Foppa, fl.1450–66 (see also Brescia).
Ambrogio Bevilacqua, fl.1486.
Vincenzo Civerchio (see Brescia), closely connected with early Milanese school.
Francesco Bianchi (Il Frare), 1447–1510.
Bernardo Zenale da Treviglio, d. after 1521.
Leonardo da Vinci, 1452–1519. To his school belong Bernardino Luini (*c.*1470 to after 1530), Sodoma (1477–1549), Andrea da Solario (*c.* 1458 to after 1515), and more directly Gian. Pietrino, Ambrogio Preda, Cesare da Sesto (1480–1521), Marco d'Oggiono (*c.* 1470–1549), Andrea Salaino, and Giov. Ant. Beltraffio (1467–1516).
Ambrogio da Fossano (Borgognone), *c.* 1455–1523; his two brothers were his pupils and assistants.
Bartolomeo Suardi (Bramantino) (fl. 1495–1529) and
Gaudenzio Ferrari (1485–1549) were also influenced by Leonardo. Ferrari's chief pupils were:

[2] See Malvasia, *Felsina Pittrice*, Bologna, 1678.

Bernardino Lanini (*c.* 1508–*c.* 1578) and Giov. Paolo Lomazzo, the Milanese art historian, whose *Trattato della Pintura* was published in 1584. Ambrogio Figino was an able scholar of Lomazzo, together with Cristoforo Ciocca.
Ercole Procaccini, 1520–90.
Bernardino Campi, 1522–90.
Camillo Procaccini, 1546–1626.
Giov. Batt. Crespi, 1557–1633.
A number of inferior Milanese painters lived in the 16th century.[3]

(xv.) *Rome.*

Raphael Sanzio, 1483–1520, who in his early youth belonged first to the Perugian and then to the Florentine school, was the founder of the so-called Roman school, which at first consisted almost wholly of his pupils.
Giov. Fran. Penni (Il Fattore), 1488–1528.
Innocenzo da Imola, 1490–1549.
Polidoro da Caravaggio, 1495–1543.
Giulio Pippi de' Giannuzzi (Romano), 1498–1546.
Perino del Vaga, 1500–47.
Federigo Barocci, 1528–1612.
Cesare d'Arpino, 1567–1640.
Bartolomeo Schedone 1580–1615.
Giov. Lanfranco, 1581–1647.
Bart. Manfredi, 1581–1617.
Pietro da Cortona, 1596–1669.
Andrea Sacchi, 1598–1661.
Gianbattista Salvi (Sassoferrato), 1605–85.
Carlo Maratta, 1625–1713.
Paolo Pannini, 1691–1764.

(xvi.) *Naples.*

The names of Simone Napoletano, Colantonio, and other native painters who were supposed to have worked in the 14th and 15th centuries appear to be those of wholly mythical personages.
Michelangelo da Caravaggio, 1569–1609.
Giuseppe Ribera (Lo Spagnaletto), 1588–? 1656.
Aniello Falcone, 1594–1665.
Salvator Rosa, 1615–73.
Luca Giordano, 1632–1705.

2. *German School.*

Wilhelm of Herle or William of Cologne, fl. 1358, d. *c.* 1378.
Stephen Lochner, fl. 1442, d. 1451.
Master of Liesborn, fl. 1465.
Michael Wohlgemuth, 1434–1519.
Master of the Lyversberg Passion, fl. 1463–80.
Israel von Meckenen, *c.* 1440–1503.
Martin Schongauer, 1450[4]–88.
Matthias Grünewald, *c.* 1460 to after 1529.
Master Christophorus, fl. 1500–10.
Master of the Death of the Virgin, fl. 1515, d. 1556.
Hans Holbein the elder, *c.* 1460–1523, and his brother Sigmund Holbein, *c.* 1465 to after 1540.
Albrecht Dürer, 1471–1528.
Lucas Cranach, 1472–1553.
Hans Burckmair, 1473–1531.
Hans Fuss (Von Kulmbach), pupil of A. Dürer, d. *c.* 1522.
Albrecht Altdorfer, b. before 1480–1538.
Hans Leonhard Schaufelin, 1490–1540.
Hans Holbein the younger, 1497–1543.
Hans Sebald Beham, 1500–50, and his brother Barthel Beham, 1502–*c.* 1540.
Heinrich Aldegrever, 1502–58.
Virgil Solis, 1514–62.
Lucas Cranach the younger, 1515–86.
Jost. Amman, 1531–91.
Heinrich Golzius, 1558–1617.

[3] See Lanzi, *Hist. of Painting*, Bohn's ed., ii. p. 499 *sq.*

[4] Not 1420, as is usually supposed. Schongauer is mentioned by A. Dürer as being a young apprentice in 1470.

Johann Rottenhammer, 1564–1623.
Adam Elshaimer, 1574–1620.
Joachim von Sandrart, 1606–88.
Balthasar Denner, 1685–1747.
Christ. Will. Ernst Dietrich, 1712–74.
Anton Raphael Mengs, 1728–78.
Peter von Cornelius, 1783–1867.
Johann Fried. Overbeck, 1789–1869.
Fried. Wil. von Schadow, 1789–1862.
Julius Schnorr, 1794–1872.
Wilhelm von Kaulbach, 1805–74.
Karl Fried. Lessing, 1808–80.

3. *Flemish School.*

Melchior Broederlam, fl. 1382–*c.* 1400.
Hubert van Eyck, b. *c.* 1366–d. after 1426.
Jan van Eyck, younger brother of Hubert. d. after 1440.
Margaret van Eyck, a younger sister of the above, died soon after Hubert.
Petrus Christus, a pupil of the Van Eycks, fl. 1447–71.
Dierick Bouts, *c.* 1391–1475.
Roger van der Weyden the elder, *c.* 1400–64.
Gerard van der Meire, *c.* 1410 to after 1474.
Hans Memling, *c.* 1430, d. before 1495.
Roger van der Weyden the younger, *c.* 1450–1529.
Hugo van der Goes, fl. 1467, d. 1482.
Justus of Ghent, fl. 1451–70.
Gheerardt David, *c.* 1455–1523.
Quintin Matsys, 1466–1531.
Jan Gossart de Mabuse, 1470–1532.
Bernard van Orley, 1470–1541.
Jan Mostert, 1474–1556.
Henri de Bles, 1480–*c.* 1550.
Joachim da Patinir, b. between 1485 and 1490, d. 1524.
Jan van Schoreel, 1495–1562.
Michiel Coxcie, 1499–1592.
Lambert Lombard (Sustermann), 1506 to after 1566.
Marinus van Romerswale, fl. 1535 to after 1567.
Pieter Pourbus, 1510–83.
Antonij Mor (Antonio Moro), 1512–77.
Pieter Breughel, *c.* 1520–69.
Paul Bril, 1556–1626.
Pieter Breughel, 1564–1637.
Peter Paul Rubens, 1577–1640.
Frans Snyders, 1579–1657.
Kasper de Crayer, 1582–1669.
David Teniers,[5] 1582–1649.
Jan (called "Velvet") Breughel, *c* 1589–*c.* 1642.
Jacob Jordaens, 1593–1678.
Lucas van Uden, 1595–1672.
Anton Vandyck, 1599–1641.
Adriaan van Utrecht, 1599–1652.
Philippe de Champaigne, 1602–74.
Jan van Essen, 1606–65.
Jan Fyt, 1609–61.
David Teniers the younger, 1610–94.
Jacobus van Artois, 1613 to after 1684.
Gonzales Coques, 1614–84.
Pieter van der Faes (Sir Peter Lely), 1618–80.
Abraham Teniers, 1629–71.
Gerard de Lairesse, 1641–1711.
Jean François Millet, 1642–80.
Cornelis Huysmans, 1648–1727.
Jan van Bloemen, 1662–1740.
A large number of Flemish painters, many of them pupils of Rubens, lived in the 17th century, but they are of little importance.

4. *Dutch School.*

Albert van Ouwater, early part of 15th century.
Gerard of Haarlem, end of 15th century.
Hieronymus van Aeken, *c.* 1460–1518.
Lucas (Jacobsz) van Leyden, 1494–1533.

[5] The Teniers, though Flemish by birth and education, belong more closely to the Dutch school.

Jan van Schoreel, 1495–1562.
Marten van Heemskerck (1498–1574), Cornelis van Haarlem (1562–1638), Cornelis van Poelenburg (1586–1667) and Gerard van Honthorst (1592–? 1666), though Dutch by birth, were feeble imitators of Italian schools.
Frans Hals, 1584–1666.
Thomas de Keyser, *c.*1595–*c.*1660.
Cornelis Janssen, *c.* 1596–1665.
Jan van Goyen, 1596–1656.
Jan de Heem, 1603–50.
Albert Cuyp, 1605–91.
Rembrandt van Rijn or Ryn, 1606–69.
Emanuel de Witte, 1607–92.
Jan Wynants, d. after 1674.
Gerhard Terburg, 1608–81.
Salomon Koning, 1609–68.
Jan Both, *c.* 1610–56, and his younger brother Andries Both.
Adrian van Ostade, 1610–85.
Ferdinand Bol, 1611–81.
Bart. van der Helst, 1613–70.
Gerhard Dou, 1613–75.
Aart van der Neer, *c.* 1619 to after 1691.
Philip de Koninck, 1619–89.
Philip Wouwerman, 1619–68.
Jan Battista Weenix, 1621–60.
Isaac van Ostade, 1621–49.
Gerbrandt van der Eckhout, 1621–74.
Nicholas Berchem, 1624–83.
Paul Potter, 1625–54.
Jacob Ruysdael, 1625–81.
Jan Steen, 1626–79.
Karel Dujardin, 1630–78.
Gabriel Metsu, 1630 to after 1667.
Ludolf Backhuizen, 1631–1709.
Nicholas Maes, 1632–93.
Picter de Hooch, 1632–81.
Jan van der Meer, 1632–95.
Willem Vandevelde the younger, 1633–1707.
Jan Vandez Capelle, *c.* 1635 to after 1680.
Frans van Mieris the elder, 1635–81. His sons Jan and Willem were both painters.
Melchior de Hondecoeter, 1636–95.
Jan Hackaert, *c.* 1636–1708.
Jan van der Heyden, 1637–1712.
Meindert Hobbema, 1638–1709.
Adrian Vandevelde, 1639–72.
Gaspard Netscher, 1639–84.
Daniel Mytens the younger, *c.* 1644–*c.* 1688.
Jan Weenix, 1644–1719.
Jan van Huchtenburg, 1646–1733.
Van der Plaas, 1647–1704.
Wil. van Mieris, 1662–1744.
Jan van Huysum, 1682–1749.
Frans van Mieris the younger, 1689–1763.
Jan van Os, 1744–1808.
A large number of mostly third-rate painters existed in the 16th and 17th centuries.

5. *Spanish School.*

Antonio del Rincon, 1446–1500.
Alonso Beruguete, 1480–1561
Luis de Vargas, 1502–68.
Juan de Juanes (Vicente Joanes), 1506–79. His chief pupil was Borras.
Luis de Morales, *c.* 1510–86.
Alonso Sanchez Coello, *c.* 1512–90.
Gasper Becerra, 1520–70.
Francisco de Ribalta, *c.* 1550–1628.
Juan de las Roelas, 1558–1625.
Francisco Pacheco, 1571–1654.
Francisco de Herrera the elder, b. 1576, and his son known as Francisco "El Mozo."
Eugenio Caxes, 1577–1642.
Juan de Ribalta, 1597–1628.
Francisco Zurbaran, 1598–1662.
Diego Velazquez de Silva, 1599–1660.
Francisco Collantes, 1599–1656.
Espinosa, 1600–80.
Alonso Cano, 1601–67.
Juan Carreño de Miranda, 1614–85.
Bartolome Esteban Murillo, 1618–82.
Juan de Valdes, 1630–91.
Claudio Coello, 1635–93.
Francisco Goya, 1746–1828.
Mariano Fortuny, 1838–74.

6. *French School.*

René, king of Anjou, 1408–80, learned painting in Italy, and is said to have practiced the art in France.
Jean Fouquet, b. between 1415 and 1420, belongs also to the Italian school.
Jean Clouet of Tours, fl.1480; his son Jean Clouet the younger, *c.*1485–1545, and grandson François Clouet (Janet).
Jean de Gourmont, fl. 1557.
Jean Cousin, *c.*1500–*c.*1589.
Ambroise Dubois, 1543–1615.
Antoine le Nain, and his brother Louis, fl.1629–77.
Simon Vouet, 1590–1649.
François Perrier, 1590–1656.
Nicolas Poussin, 1594–1665.
Jacques Stella, 1596–1657.
Jacques Blanchard, 1600–38.
Valentin de Boullongne, 1600–34.
Claude Gelée (Lorrain), 1600–82.
Charles Antoine Dufresnoy, 1611–65.
Pierre Mignard (Le Romain), 1612–95.
Gaspar Dughet (called Poussin after his brother-in-law Nicolas), 1613–75.
Eustache le Sueur, 1616–55.
Sébastien Bourdon, 1616–71.
Charles le Brun, 1619–90.
Jacques Courtois (Le Bourguignon), 1621–76.
Jean Jouvenet, 1644–1717.
Jean Baptiste Santerre, 1651–1717.
Inferior French painters who worked in the 17th and 18th centuries were the Boullongne (father and two sons), Nicolas de Largillière, Hyacinthe Rigaud, Nicolas Lancert, Pierre Subleyras, Carl van Loo, Claude Vernet, and Madame le Brun.
Antoine Watteau, 1684–1721.
Jean Baptiste Pater, 1699–1736.
François Boucher, 1704–70.
Jean Baptiste Greuze, 1725–1805.
Jean Honoré Fragonard, 1732–1806.
Jacques Louis David, 1748–1825. He carried to its highest point the dull pseudo-classic style inaugurated by Joseph-Marie Vien, 1716–1809.
Many other painters of fourth-rate talent worked and obtained much popularity throughout the 18th century.
Pierre Paul Prud'hon, 1758–1823.
François Marius Granet, 1775–1849.
Jean Augustin Ingres, 1780–1867.
Horace Vernet, 1789–1863.
Théodore Gérieault, 1791–1824.
Léopold Robert. 1794–1835.
Ary Scheffer, 1795–1858.
Paul Delaroche, 1797–1856.
Eugène Delacroix, 1799–1863.
Alexandre Gabriel Decamps, 1803–60.
Théodore Rousseau, 1812–67.
Jean François Millet, 1814–75.
Henri Regnault, 1843–71.

7. *British School.*

Nicholas Hilliard, 1547–1619 (miniaturist).
Isaac Oliver, 1555–1617 (miniaturist).
George Jamesone, 1586–1644, pupil of Rubens (portraits).
Peter Oliver, 1601–60 (miniaturist).
Robert Walker, d.*c.*1660 (portraits).
Samuel Cooper, 1609–72 (portraits).
John Hoskins, d.1664 (portraits).
William Dobson, 1610–46, follower of Vandyck.
Isaac Fuller, d.1672 (portraits).
Henry Stone, 1616–53 (portraits).
Robert Streater, 1624–80 (portraits).
Henry Anderton, 1630 to after 1665 (portraits).
John Riley, 1646–91 (portraits).
Sir Peter Lely, came to England in 1641.
Sir Godfrey Kneller, 1646–1723 (portraits).
John Greenhill, 1649–76 (portraits).
John Michael Wright, *c.*1655–1700.
Jonathan Richardson, 1665–1745 (portraits).
Charles Jervas, 1675–1739 (portraits).
Sir James Thornhill, 1676–1734 (wall decoration).
William Aikman, 1682–1731.
William Hogarth, 1697–1764 (satirist).
S. Scott, d.1772.
Francesco Zuccarelli, 1701–88 (landscape).
Thomas Hudson, 1701–79, Reynolds's master.
James Wootton, d.1765 (animals).
Three brothers Smith of Chichester, 1707–66 (landscape).
Francis Hayman, 1708–66
Allan Ramsay, 1709–84.
Richard Wilson, 1713–82, founder of the English school of landscape.
Sir Joshua Reynolds, 1723–92 (portraits).
George Stubbs, 1724–1806 (animals).
Francesco Bartolozzi, 1725–1815 (engraver)
Francis Cotes, 1725–70.
Paul Sandby, 1725–1809 (water-color).
Thomas Gainsborough, 1727–88 (portraits and landscape).
Nathaniel Hone, 1730–84 (miniatures).
Nathaniel Dance, second half of 18th century.
Joseph Wright of Derby, 1734–97 (night scenes).
George Romney, 1734–1802 (portraits).
Johann Zoffany, 1735–1810.
John Singleton Copley, 1737–1815.
Benjamin West, 1738–1820.
Richard Cosway, 1740–1821 (miniatures).
Angelica Kaufmann, 1741–1807 (portraits).
Hackert, 1741–1800 (water-color).
James Barry, 1741–1806.
Henry Fuseli, 1741–1825.
Mary Moser, 1744–1819 (flower painter).
David Allan, 1744–96.
James Northcote, 1746–1831.
F. Wheatley, 1747–1801 (water-color).
John Smith, 1750–1812 (water-color).
Robert Smirke, 1752–1845.
John Webber, 1752–93 (water-color).
John Cozens, 1752–99 (water-color).
Thomas Bewick, 1753–1828 (wood-engraver).
Sir George Beaumont, 1753–1827 (portraits).
Sir William Beechey, 1753–1839.
Henry Bone, 1755–1834 (miniatures on enamel).
Gilbert Stuart, 1755–1828.
Thomas Stothard, 1755–1834.
Sir Henry Raeburn, 1756–1823 (portraits).
James Gillray, 1757–1815 (caricaturist).
William Blake, 1757–1828 (poetry).
T. Rowlandson, 1757–1827 (caricaturist).
John Hoppner, 1759–1810.
John Opie, 1761–1807.
Edward Bird, 1762–1819.
Samuel Woodforde, 1763–1817.
George Morland, 1764–1804 (animals).
N. Pococke, 1765–1821.
John (Old) Crome, 1769–1821, founder of the Norwich school of landscape.
Sir Thomas Lawrence, 1769–1830 (portraits).
H. Howard, 1769–1847.
James Ward, 1769–1859 (landscape).
Thomas Phillips, 1770–1845.
Sir Martin Shee, 1770–1850.
George Clint, 1770–1854.
H. W. Williams, 1773–1829 (classical buildings).
Henry Thomson, 1773–1843.
Thomas Girtin, 1773–1802 (landscape).
Thomas Hargreaves, 1775–1846 (miniatures).
Joseph Mallord William Turner, 1775–1851.
John Constable, 1776–1837 (landscape).
John Varley, 1777–1842 (water-color).
John James Chalon, 1777–1854 (landscape).
John Christian Schetky, 1778–1874 (marine).
John Jackson, 1778–1831 (landscape).
William Paine, fl.1786–90 (water-color).
John Thomson, 1778–1840.
James Laurent Agasse of Geneva, *c.*1779–1846.
Sir Augustus Callcott, 1779–1844.
Andrew Wilson, 1780–1848.
Alfred Chalon, 1780–1860 (water-color).
J. S. Cotman, 1780–1843 (water-color).
John Simpson, 1782–1847.
Sir William Allan, 1782–1850 (portraits).
C. Wild, 1782–1835 (water-color).
Thomas Uwins, 1782–1857.
De Wint, 1783–1849 (water-color).
Samuel Prout, 1783–1852 (water-color).
Sir David Wilkie, 1785–1841.
W. Hilton, 1786–1839.
B. R. Haydon, 1786–1846.
Will. Mulready, 1786–1863.
A. Fraser, 1786–1865.
George Jones, 1786–1869.
William Etty, 1787–1849.
Copley Fielding, 1787–1855 (landscape).
Sir J. Watson Gordon, 1788–1864.
W. Collins, 1788–1847.
John Martin, 1789–1854 (imaginative landscape).
Sir John Gordon, 1790–1865.
H. P. Briggs, 1792–1844.
John Linnel, b.1792.
Francis Danby, 1793–1861.
David Cox (senior), 1793–1858 (water-color).
Sir Charles Eastlake, 1793–1865.
G. S. Newton, 1794–1835.
C. R. Leslie, 1794–1859.
J. F. Herring, 1795–1865.
David Roberts, 1796–1864. (architecture and landscape).
Clarkson Stanfield, 1798–1867 (landscape).
James Holland, 1800–70.
George Cattermole, 1800–68 (water-color).
William Simson, 1800–47 (water-color).
R. P. Bonington, 1801–28.
Sir Edwin Landseer, 1802–73 (animals).
George Lance, 1802–64 (still life).
Sir Francis Grant, 1803–78.
Horatio Macculloch, 1805–67 (landscape).
Sir Daniel Macnee, 1806–82.
William Dyce, 1806–64.
Sir George Harvey, 1806–76.
John Fred. Lewis, 1806–76 (Oriental scenes).
Thomas Duncan, 1807–45.
Joseph Nash, 1807–78 (architecture).
Aaron Penley, 1807–70 (water-color).
Thomas Creswick, 1811–69 (landscape).
Edw. Will. Cooke, 1811–80 (marine).
Daniel Maclise, 1811–70.
Will. James Muller, 1812–45 (water-color).
William Brodie, 1815–81.
James Drummond, 1816–77.
A. L. Egg, 1816–63.
John Phillip, 1817–67.
Thos. Seddon, 1821–56 (Pre-Raphaelite).
Samuel Bough, 1822–78 (landscape).
Thos. Leeson Rowbotham, 1823–75 (water-color).
Dante Gabriel Rossetti, 1828–82 (Pre-Raphaelite).
John Samuel Raven, 1829–77 (landscape).

Picture Galleries of Europe.

The following list gives some indication of the manner in which the existing pictures of various schools are distributed among the chief galleries of Europe.

National Gallery, London.

The National Gallery, London, contains for its size a very large number of highly important pictures of the Italian schools, many of them signed and dated; in fact, as a representative collection, embracing as it does well-chosen specimens of every school and including many paintings of very rare masters, it is hardly surpassed by any gallery in the world. Though weak in paintings of Giotto and his school, it possesses many early Sienese pictures of great interest and exceptional importance (see Fig. 1), and a collection unrivalled out of Italy of the works of the best Florentine painters of the 15th century, as Paolo Uccello, Lippo Lippi, Pollaiuolo, Signorelli, Botticelli, Lorenzo di Credi, and others (see Fig. 6). Of the very few existing easel pictures by Pisanello[1] the National Gallery contains one (signed), St. George and St. Anthony. The portrait by Andrea del Sarto is one of his finest works—full of life and expression and rich in tone. In addition to a large painting on canvas of the school of Michelangelo—Leda and the Swan[2]—the National Gallery possesses two unfinished pictures, a Madonna and Angels and an Entombment of Christ, both of which, in spite of many adverse criticisms, appear to be genuine works of Michelangelo, the former in his early, the latter in his later manner—a very remarkable possession of one gallery, seeing that the only other genuine easel painting by him is the circular panel of the Madonna in the tribune of the Uffizi (Florence). No four pictures could better represent Raphael's highly varied manners than the miniature Knight's Dream, the Ansidei Madonna, the St. Catherine, and the Garvagh Madonna, which, in the dates of their execution, cover nearly the whole of his short working life. In the Venetian school the National Gallery is almost unrivalled: it contains a large number of fine examples of Crivelli (see Fig. 14),—Venice not possessing one; two rare panels by Marziale, both signed and dated (1500 and 1507); the finest specimens of Giovanni Bellini (see Fig. 15) and his school which exist out of Venice; one of Titian's noblest works,—the Ariadne and Bacchus, finished in 1523 for the duke of Ferrara, together with two other fine pictures of earlier date; and the masterpiece of Sebastiano del Piombo, his Raising of Lazarus, partly designed by Michelangelo. The smaller schools of Ferrara and Cremona are well represented by examples of nearly all their chief painters. Of the Umbrian school the gallery possesses two or rather three important, though much injured, panels by Piero della Francesca (see Fig. 10), a fine picture by Fiorenzo di Lorenzo, as well as one of Perugino's best works, the triptych from the Certosa near Pavia (see Fig. 12), and other paintings by him. Correggio is represented by three fine pictures, classical and religious, specimens of unusual excellence (see Fig. 21). Of the Bolognese school there are three works by Francia, one signed (see Fig. 19), and specimens of the painters of the later school,—Annibale Caracci, Guido (see Fig. 20), and others. Paul Veronese's Dream of St. Helena and the group of portraits of the Pisani family, arranged as the scene of the family of Darius before Alexander, are among his finest works. The three pictures by Lotto are excellent examples of his supreme talents in portraiture; and no collection outside Brescia and Bergamo is so rich in the noble portrait pictures of Moretto and his pupil Moroni. Leonardo da Vinci (the rarest of the great masters) is represented by a very beautiful picture[3] which appears to have been partly finished by a pupil; with slight alterations it is the same in design as the Vierge aux Rochers in the Louvre (see Fig. 23). Leonardo's use of almost monochromatic coloring differs strongly from the style of his pupils and imitators Luini, Andrea da Solario (see Fig. 24), and Beltraffio, all of whom are represented by excellent and characteristic examples. Of the earlier Milanese school the gallery contains two magnificent examples by Ambrogio Borgognone,—the marriage of St. Catherine especially being a work of the highest importance and beauty (see Fig. 22). The gallery possesses rare examples of the early German masters (see Fig. 25, by William of Cologne), though it is weak in the works of the later Germans, as Albert Dürer, who is represented only by one portrait, which is signed (see Fig. 26), and Hans Holbein the younger, who is totally absent except for the noble portrait lent by the duke of Norfolk.[4] The collection is, however, unusually rich in fine examples of early Flemish art,—of the Van Eycks and their school (see Fig. 28). The portrait of Jean Arnolfini and his wife (signed and dated) is one of Jan van Eyck's noblest works on a small scale,—only surpassed, perhaps, by the Madonna and Worshipper in the Louvre. The Entombment of Christ by Van der Weyden the elder (see Fig. 29), the three or more examples of Nemling, the Exhumation of St. Hubert by Dierick Bonts, the Reading Magdalene by Van der Weyden the younger (see Fig. 30), and the Saints and Donor by Gheerardt David are all unrivalled examples of these great painters. The delicate little panel of the Madonna by Margaret van Eyck is a work of much interest. The later Flemish and Dutch schools are equally well represented, especially by a number of noble portraits by Rembrandt (see Fig. 33), Rubens, and Vandyck; a portrait of an old woman, the "Chapeau de Poil," and the portrait of Van der Geest (wrongly called Gevartius) are among the finest works of these three masters (see Figs. 31 and 32). Hobbema, Ruysdael, De Hooge, Wouwerman, and others of their school are very richly represented (see Figs. 34 and 35). Of the Spanish school the National Gallery contains an excellent portrait head of Philip IV. (see Fig. 37) by Velazquez, a full-length of the same king, not wholly his hand, and also two pictures of sacred subjects and a curious boar-hunting scene of much interest, but of inferior beauty. The examples of Murillo, like most out of Seville, are but third-rate specimens of his power. The Kneeling Friar as an example of Zurbaran's work is unrivalled either in Spain or out of it (see Fig. 36). Among the pictures of the French school a number of fine landscapes by Claude Lorrain and a very masterly Bacchanalian Scene by Nicolas Poussin are the most notable (see Figs. 38 and 39). The English school is hardly represented in a manner worthy of the chief national collection, but it is supplemented by a large number of fine paintings in the South Kensington Museum. The chief treasures in this branch possessed by the National Gallery are Hogarth's series of "Marriage à la Mode," some noble portraits by Reynolds and Gainsborough, and an unrivalled collection of Turner's works of all periods (see Figs. 40, 41, and 43).

Hampton Court.

The royal gallery at Hampton Court (London), among a large number of inferior paintings, contains some of great value, especially the Baptism of Christ, an early work of Francia, a most magnificent portrait of Andrea Odoni by Lor. Lotto, both signed, and a portrait of a youth attributed to Raphael. The chief treasure of the palace is the grand series of decorative paintings (nine in number) executed in tempera on canvas by Andrea Mantegna in 1485–92 for the duke of Mantua, but much injured by repainting. The equally celebrated cartoons designed by Raphael for tapestry to decorate the Sistine Chapel are now moved to the South Kensington Museum. The gallery also possesses several fine examples of Tintoretto, many good Flemish and Dutch pictures, some small but fine examples of Holbein and his school, and a number of historically interesting works by English painters of the 17th century. The portrait of a Jewish Rabbi by Rembrandt is one of his finest works,—a perfect masterpiece of portraiture.

Other English galleries.

The Dulwich gallery is especially rich in works of the Dutch school, and contains some noble portraits by Gainsborough and Reynolds, as well as an interesting early work by Raphael,—the *predella* with seven small subjects painted in 1504 as part of the large altarpiece for the monastery of St. Anthony in Perugia; the main part of this large retable, which is the property of the heirs of the duke of Ripalda, has been for many years deposited but not exhibited in the National Gallery. The National Portrait Gallery[5] at Kensington contains many paintings of different schools which are valuable both as works of art and from their interest as portraits. The Royal Academy has placed in the attics of Burlington House its valuable collection of diploma pictures, and in an adjoining room a few treasures of earlier art, among them a large cartoon of the Madonna and St. Anne by Leonardo da Vinci,—similar in subject to, but different in design from, an unfinished picture by him in the Louvre, and a copy of the *Cenacolo* at Milan by his

[1] Some small panels attributed to Pisanello in Rome and elsewhere are of very doubtful genuineness.

[2] Not exhibited; it is probably a pupil's copy of the marble group of the same subject designed by Michelangelo.

[3] In addition to the strong internal evidence in favor of this picture being at least in part a genuine work of Da Vinci, it is expressly mentioned as being by him in the *Trattato della Pittura* (ii. 17 and iv. 1), written by the Milanese Lomazzo before 1584. The painting was then in the church of S. Francesco at Milan, where it remained till 1796.

[4] England generally is, however, very rich in the works of Holbein,—chiefly portraits.

[5] Now temporarily moved to Bethnal Green.

pupil Marco d'Oggiono, of priceless value now that the original is an utter wreck. In the same room is a very beautiful but unfinished piece of sculpture by Michelangelo, a circular relief of the Madonna.

Other British collections.

England is especially rich in collections of drawings by the old masters. The chief are those in the British Museum, in the Taylor Buildings at Oxford, and in the possession of the Queen and of Mr. Malcolm of Poltalloch. Among the collection in Windsor Castle are eighty-seven portraits in red chalk by Holbein, all of wonderful beauty. The celebrated "Liber Veritatis," a collection of original drawings by Claude Lorrain, is in the possession of the duke of Devonshire at Chatsworth. In Buckingham Palace is a fine collection of paintings of the Flemish and Dutch schools. An almost incredibly large number of fine paintings of all schools are scattered throughout the private galleries of Britain; an account of the chief of these is given by Dr. Waagen, *Treasures of Art in Britain*, London, 1854. But many of the collections described by Dr. Waagen have since been moved or dispersed; the Peel and Wynn Ellis pictures have been purchased by the National Gallery, which has also acquired important pictures from the sales of the Eastlake, Barker, Novar, Hamilton, and Blenheim collections. The largest private galleries which still exist in England are those of the duke of Westminster (Grosvenor House), the duke of Sutherland (Stafford House), the earl of Ellesmere (Bridgewater House), and the marquis of Exeter (Burghley House). The public gallery at Liverpool contains some very important Italian pictures, as does also the growing collection in Dublin. The Edinburgh National Gallery possesses a few specimens of early masters, among them part of the great altarpiece by the unknown "Master of Liesborn," a picture of St. Hubert by the "Master of Lyversberg," some fine Dutch pictures, and Gainsborough's masterpiece, the portrait of the Hon. Mrs. Graham, together with many examples of the excellent portraits by David Allan and Sir Henry Raeburn. In the palace of Holyrood is preserved a very beautiful altarpiece, with portraits of James III. and his queen and other figures. It is supposed to have been painted about 1480 by Van der Goes of the school of the Van Eycks. England is especially rich in the finest examples of Nicolas Poussin and Claude Lorrain; the paintings by the latter in Grosvenor House, the National Gallery, and elsewhere in the country are unrivalled by those of any foreign gallery.

Louvre.

The Louvre is rich in works of nearly all schools, and especially in fine examples of Signorelli, Mantegna, Raphael, Titian, Paul Veronese, Correggio, and the later Bolognese painters. Its chief glory is the possession of some of the very rare works of Da Vinci,—La Vierge aux Rochers, the Virgin and St. Anne, and the wonderful portraits of Mona Lisa and La belle Ferronnière. It is chiefly weak in examples of the earlier Venetian painters, not possessing a single genuine work by Giovanni Bellini. It contains some very beautiful frescos by Botticelli and by Luini, and the finest work of Murillo which exists out of Seville,—the Virgin in Glory. The later Flemish and Dutch schools are well represented: the small painting of the Virgin with a kneeling Worshipper by Jan van Eyck is one of the loveliest pictures in the world; but the Louvre is otherwise deficient in paintings of his school. The portraits by Holbein, Rubens, and Vandyck are of great importance. In the French school the Louvre is of course unrivalled: the paintings of Nicolas Poussin and Claude Lorrain are the best among them; but the general average of merit is very low. The Louvre also possesses a magnificent collection of drawings by the old masters.

German galleries.

The Berlin gallery, now rapidly being added to, contains a large number of very important Italian pictures; among them is Signorelli's finest easel picture (see Fig. 8),—a classical scene with Pan and other nude figures playing on pipes, a masterpiece of powerful drawing. The gallery is more especially rich in works of the German, Flemish, and Dutch schools, including six panels from the large altarpiece of the Adoration of the Lamb at Ghent by Hubert and Jan van Eyck. The Dresden gallery is mainly rich in paintings of the Flemish and Dutch schools, but also contains some fine Italian pictures. Raphael's Madonna di San Sisto is the chief glory of the collection, together with many fine examples of Giorgione, Palma Vecchio, Titian, Paul Veronese, and Correggio, and a number of works of the later Bolognese school. The gallery is especially remarkable for its genuine examples of that very rare master Giorgione. The Pinakothek at Munich possesses some good Italian pictures, among them four by Raphael and a number of fine Titians. It contains a large collection of German, Dutch, and Flemish paintings, with a number of fine portraits by Albert Dürer and Vandyck. It is especially rich in works of Lucas Cranach the elder, of Memling, of Roger van der Weyden, of Wohlgemuth, and of Rembrandt.[1] The Cassel gallery is mainly rich in Flemish and Dutch paintings. The small Wallraf-Richartz Museum at Cologne contains a few paintings of great interest to the student of early German art.

Austria.

The Belvedere Gallery at Vienna is exceptionally rich in works of the Venetian school, especially of Palma Vecchio, Titian, and Paul Veronese. Holbein, Rubens, Vandyck, and other masters of the Flemish and Dutch schools are richly represented. Vienna also contains some large private galleries, chiefly rich in Flemish and Dutch pictures, and a magnificent collection of drawings by old masters. The Budapest gallery (Eszterhazy collection) contains many fine Venetian and some Florentine pictures, with a large number of Flemish and Dutch works.

St. Petersburg.

The Gallery of the Hermitage at St. Petersburg is one of the largest and most important in Europe; though weak in pictures of the early Italian schools, it contains fine examples of Luini, Raphael, Titian, Paul Veronese, and the Bolognese school, and is extraordinarily rich in paintings by Murillo, Rembrandt, Rubens, Vandyck, and the later Flemish and Dutch schools generally.

Belgium and Holland.

The many galleries of Belgium and Holland are mostly rich in the works of local schools. Antwerp possesses the masterpieces of Rubens and many fine examples of his pupil Vandyck. The church of St. Bavon, at Ghent, contains the masterpiece of the Van Eycks, the main part of a large altarpiece in many panels with the Adoration of the Lamb as the central subject; this is only rivalled in point of size and beauty by the Fountain of Salvation painted by Jan van Eyck about 1432, and now in the museum of the Santissima Trinidad, at Madrid. Among the many fine Flemish and Dutch pictures in the museum at The Hague is a half-length of an unknown lady by Holbein, which is one of the most beautiful portraits in the world (see Fig. 27).

Spain.

The gallery of Madrid is in some respects unrivalled both from its widely representative character—at least as regards the later schools—and from the number of exceptional masterpieces which it contains; it possesses, however, very few specimens of Italian art earlier than 1500. In the works of the later Italian masters it is very rich, possessing four important works by Raphael,—the Madonna called La Perla (once at Hampton Court in the collection of Charles I.), the Virgin of the Fish, the Virgin of the Rose, and Christ on His way to Calvary (*Lo Spasimo*). No other gallery contains so many fine specimens of Titian's paintings; it includes a scene of Bacchus at Naxos, with a nude sleeping figure of Ariadne in the foreground, the companion to the magnificent Ariadne in the English National Gallery, but surpassing it in beauty and perfection of preservation. The third picture of the trio painted for the duke of Ferrara is also at Madrid; it is known as the Sacrifice to Fecundity, and consists of a large group of nude infants sporting or sleeping, a perfect miracle for its wealth of color and unrivalled flesh painting. In addition to these wonderful pictures there are some splendid portraits by Titian, and many of his later works, showing a sad decadence in his old age. The gallery also contains many important works of Paul Veronese and others of the Venetian school, and a very fine collection of Flemish and Dutch pictures, including a number of noble portraits by Antonio Moro, Rubens, and Vandyck, together with some of Claude Lorrain's best landscapes. In the Spanish schools the Madrid gallery is unrivalled; it contains a number of poor but interesting paintings by Juan de Juanes, the best collection of the works of Ribera (Spagnoletto), and the chief masterpieces of Velazquez. It is in Madrid alone that the greatness of Velazquez can be fully realized, just as the marvellous talents of Murillo are apparent only in Seville. Among the many wonderful paintings by Velazquez in this gallery the chief are the Crucifixion, the Tapestry Weavers (*Las Hilanderas*), the Surrender of Breda (*Las Lanzas*), the Drinking Peasants (*Los Borrachos*), the portrait group known as *Las Meniñas*, and many magnificent portraits. The gallery also contains a number of Zurbaran's works, and many by Murillo, none of which are among his finest paintings. The best picture by Murillo, at Madrid, is the scene of St. Elizabeth of Hungary tending the Lepers, preserved in the Academia de San Fernando. Seville alone contains the real masterpieces of Murillo, a very unequal painter, who produced a large number of third-rate works, such as are to be seen in many of the chief galleries of Europe, but who at his best deserves to rank with the

[1] A most valuable catalogue of the Munich pictures, well illustrated with photographs, has recently been published.

greatest painters of the world. It is impossible to describe the wonderful rich tone, the intense pathos, and the touching religious feeling of such pictures as the Crucified Christ embracing St. Francis, or the apparition of the Infant Saviour to St. Anthony of Padua, in the Seville gallery, and the larger composition of the latter scene in the cathedral. Other very noble works by Murillo exist in the monastic church of La Caridad. The Seville gallery also contains several of Zurbaran's chief pictures, and some by other painters of the Spanish school. The other chief gallery of Spain, that at Valencia, contains a number of weak but historically interesting pictures of early Spanish artists,—feeble imitations of the style of Francia and other Italian painters. It possesses also many pictures by Ribalta and other later and unimportant masters of the Valencian school.

Rome. The Vatican Gallery, though not large, contains a very large proportion of important pictures, such as a portrait group in fresco by Melozzo da Forli, the unfinished monochromatic painting of St. Jerome by Da Vinci, the finest of Raphael's early works—the Coronation of the Virgin, the Madonna di Foligno, and the Transfiguration. The coronation of the Virgin by Pinturicchio is one of his best panel pictures, and a portrait of a Doge by Titian a masterpiece of portraiture. The Last Communion of St. Jerome by Domenichino is his finest work. The chapel of San Lorenzo, painted by Fra Angelico (see FIESOLE), the Appartamenti Borgia by Pinturicchio, the stanze by Raphael, and the Sistine Chapel by Michelangelo are described in the articles on these painters. The Capitol contains but few works of much merit; the chief are a very beautiful series of frescos of Apollo and the Muses in separate panels, life-size, by some painter of the school of Perugino, probably Lo Spagna; they are remarkable for grace of drawing and extreme delicacy of color. The Rape of Europa, by Paul Veronese, is a fine replica of that in the doge's palace at Venice. The gallery also contains some of the chief works of Guercino and Guido and a very noble portrait by Velazquez. The Borghese Gallery is perhaps the most important private collection in the world. It is rich in Florentine pictures of the 15th century, and possesses the celebrated Entombment by Raphael. A small panel of St. Stephen by Francia (signed) is of unusual beauty and interest,—very highly finished and magnificent in color; it seems to show the influence of Jan van Eyck; it is one of Francia's earliest works, and is very far superior to those of his later style. The great glory of the gallery is the (so-called) Sacred and Profane Love by Titian (see Fig. 16), one of the most beautiful pictures in the world both for design and color, and a marvel for its rich warm rendering of flesh; it appears to be a portrait of the same lady repeated twice,—nude and draped. It belongs to a somewhat earlier period than the bacchanal trio in Madrid and London. This gallery contains also one of Vandyck's finest portraits, that of Catherine de' Medici, and other excellent portraits of the Venetian school. The Danae by Correggio is an interesting example, very weak in drawing, but remarkable for the fine pearly tones of the flesh. The Corsini Gallery, now the property of the municipality of Rome, contains some good panels by Fra Angelico, but is mainly strong only in the later Bolognese paintings. It also possesses a rich collection of early Italian engravings. The Doria Gallery is large, but contains only a small proportion of valuable pictures. Some paintings by Niccolo Rondinelli are of much interest; they show him to have been an able pupil and close imitator of Giovanni Bellini, to whom many paintings in various galleries are attributed which are really the work of pupils. A beautiful Madonna in the Doria Palace by Rondinelli has a *cartellino* inscribed with Bellini's name. The chief treasures of this collection are the portraits of two Venetians attributed to Raphael, and that of Pope Innocent X. by Velazquez,—the latter a marvel of dashing and almost too skilful execution. There is also a fine portrait of Andrea Doria by Sebastiano del Piombo, well modelled, but rathing wanting in color. The Sciarra-Colonna Palace contains a few good pictures, among them a very fine portrait of a violin-player by Raphael, and a graceful painting of Modesty and Vanity by Luini, attributed to Da Vinci, as is often the case with Luini's pictures. The Colonna, Barberini, and other private galleries of Rome contain but little that is noteworthy. The church of S. Maria sopra Minerva contains some splendid frescos by Lippo Lippi; some of Pinturicchio's chief frescos are in the churches of S. Maria del Popolo and S. Maria in Ara Cœli; and the monastery of S. Onofrio possesses a very lovely fresco of the Madonna and a kneeling Donor, attributed to Da Vinci,—probably a pupil's work.

Florence. The Florentine Accademia delle Belle Arti contains a most valuable collection of early Florentine and other 15th-century pictures, including the finest panel picture by Gentile da Fabriano,—the Adoration of the Magi,—a rare example of Verrocchio, partly painted by his pupil Da Vinci, some magnificent examples of Botticelli, good specimens of Fra Angelico, Ghirlandaio, Signorelli, Lippo Lippi, Fra Bartolomeo, and a group of saints by Andrea del Sarto, one of his best works. The magnificent galleries in the Uffizi and Pitti Palaces contain an unrivalled collection of the great Florentine painters of all dates. In the Uffizi are several fine paintings by Raphael,—the Madonna del Cardellino, a portrait of Julius II., and an exquisitely finished head of an unknown lady. Among the many fine examples by Titian is his portrait of a nude lady reclining (Danae),—a most wonderful work. In the same room (La Tribuna) is the circular panel of the Madonna and St. Joseph, an early work by Michelangelo, showing the influence of Signorelli. Many of Botticelli's finest works are in this gallery, and the Uffizi also possesses an almost unrivalled collection of drawings by Italian painters of all dates. The Pitti Palace contains some of the chief works of Raphael,—the early Madonna del Gran Duca, and portraits of Angelo Doni and his wife, the portraits of Cardinal Bibiena and Leo X. (in his later manner), the Madonna della Seggiola, and the miniature Vision of Ezekiel. The portrait of a nun, attributed to Da Vinci, but probably the work of a pupil, is a work of extraordinary finish and refinement. The Magdalen and the lady's portrait (La Bella) by Titian are among his best works. Both these collections contain some good Flemish and Dutch pictures. In the church of Santa Croce are the chief works of Giotto, in S. Maria Novella the best pictures of Orcagna and Ghirlandaio, and in the monastery of S. Marco the principal frescos of Fra Angelico. Some of the chief frescos of Spinello Aretino, much repainted, exist in the sacristy of S. Miniato, and the most important frescos of Andrea del Sarto are in the church of S. Annunziata.

Smaller Italian galleries. The small galleries at Perugia and Siena are of great interest for their collections of rare works by painters of the local schools. The small collection at Pisa also possesses some curious early panels by local painters; in the church of S. Caterina is a magnificent altarpiece by Fran. Traini, Orcagna's chief pupil. At Prato are the finest frescos of Lippo Lippi. The gallery at Bologna contains some of Francia's chief works, the St. Cecilia of Raphael, and a number of examples of the Caracci and others of the later Bolognese school. Parma is specially rich in the works of Correggio and Parmigiano; unhappily the great frescos by the former in the cathedral have almost wholly perished. The small collection at Ferrara possesses interesting examples of paintings of the local school. Brescia and Bergamo are very rich in fine works of Moretto and Moroni, and also possess a number of fine Venetian paintings of various dates. Padua has but a small and unimportant gallery, but the town is rich in frescos by Giotto, Altichiero, and Jacopo Avanzi, and most noble frescos by Andrea Mantegna. Mantua also contains some grand frescos by Mantegna in the Castello di Corti, and a large quantity of showy and cleverly executed wall and ceiling paintings by Giulio Romano in the Palazzo del Tè. The Verona gallery contains some few good examples of the local school. The church of S. Zenone possesses a magnificent altarpiece by Mantegna; and in S. Anastasia is the wreck of a fine fresco of St. George and the Dragon by Pisanello. The Vicenza collection contains little of value except some good examples of Bart. Montagna. The Turin gallery possesses a few good pictures, especially some fine panels by Botticelli and splendid portraits by Vandyck. Many of Vandyck's finest works exist in the various palaces of Genoa. The large gallery at Naples contains an unusual proportion of bad pictures; there are, however, some fine works of Titian and some interesting examples of the early Flemish school which have been in Naples ever since the 15th century. The only painting of much importance in the gallery at Palermo is a very beautiful triptych of the school of Van Eyck.

Venice. Venice is extraordinarily rich in the works of its own school, with the exception of those of Crivelli, who is completely absent. The works in Venice of the Bellini family, of Carpaccio and others of Gian. Bellini's pupils, of Titian, Tintoretto, and Paul Veronese, are among the chief glories of the world. The Grimani breviary, in the doge's library, contains a very beautiful series of miniature pictures of the school of Memling.

Milan. The Brera Gallery at Milan contains a large number of masterpieces, especially of the Lombard and Venetian schools, among them the chief work of Gentile Bellini, St. Mark at Alexandria, some unrivalled portraits by Lorenzo Lotto, and very important examples of Moretto's religious paintings. One of its greatest treasures is the altarpiece painted for the duke of Montefeltro by Piero della Francesca, and wrongly attributed to his pupil Fra Carnovale. The celebrated Sposalizio is the most im-

portant work of Raphael, executed wholly under the influence of Perugino. The gallery is especially rich in works of the pupils and imitators of Leonardo and other Milanese painters. The Biblioteca Ambrogiana contains some priceless drawings by Leonardo da Vinci and a large number of his autograph MSS., selections from which have been published by Dr. Richter, London, 1883. Another important MS. of Da Vinci from the same library, the *Codice Atlantico*, is now (1886) in course of publication in Rome in its entirety.

This very scanty sketch of the contents of the chief galleries of Europe will give some notion of the places where the works of special schools and masters can best be studied. In some cases there is but little choice; the greatness of Giotto can only be fully realized in Florence and Padua, of Carpaccio and Tintoretto in Venice, of Signorelli of Cortona, at Orvieto and Monte Oliveto, of Fra Angelico in Florence, of Correggio in Parma, of Velazquez in Madrid, and of Murillo in Seville.

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[1] For further lists of authorities see the various articles on the separate painters.

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(J. H. M.)

SCHOPENHAUER, ARTHUR (1788–1860), was born in Dantzic (117 Heiligen-Geist Strasse) on 22d February, 1788. Doomed for the first thirty years of his career to find his works ignored with galling silence, he came, from the year 1845 onwards, to be looked up to by a scanty but devoted following as, what he himself claimed to be, the founder of the first true philosophy. Historical criticism has done much to dispel his pretensions to originality, and logical examination has demonstrated the incongruities lurking in his system. But the fact of his dominant influence on contemporary thought remains undiminished after every such disparaging analysis. He consoled himself for the neglect of his own generation by the assurance that his would be the philosophy of the future. His ideas, recommended by the mastery of language and brilliance of illustration which entitle him to a first class in literature, have become the burden of much of our current speculation, and have leavened to an unusual extent the view of life and of the universe which animates the average educated world and finds expression in literary art.

His father, Heinrich Floris Schopenhauer, the youngest of a family to which the mother had brought the germs of mental malady, was a man of strong will and originality, vehement and resolute in the extreme, and so proud of the independence of his native town that when Dantzic in 1793 surrendered to the Prussians he and his whole establishment withdrew to Hamburg. The mother of the future philosopher was Johanna Henriette Trosiener. Both parents belonged to the mercantile aristocracy, the bankers and traders, of Dantzic. Johanna, who at the age of twenty accepted a husband of forty, was as yet undeveloped in character; and perhaps he hoped that her want of love, which she did not conceal, might be compensated by the community of tastes and interests which, under his guidance, would grow up between them. But the radical rift in the wedded heart could not be stopped up by a merely intellectual cement. The two children of the marriage, Arthur, born in 1788, and Adele, in 1796, bore (according to the theory of the former)[1] the penalty of their parents' incompatibilities. While they inherited from their mother a high degree of intelligence and literary style, they were burdened by an abnormal urgency of desire and capacity for suffering, which no doubt took different phases in the man and the woman, but linked them together in a common susceptibility to ideal pain.

In the summer of 1787, a year after the marriage, the elder Schopenhauer, whom commercial experiences had made a cosmopolitan in heart, took his young wife on a tour to western Europe. It had been his plan that the expected child should see the light in England, but the intention was frustrated by the state of his wife's health, and they had to beat a hasty retreat homewards in early winter. The name of Arthur, given to the child in St. Mary's, at Dantzic was chosen because it remains the same in English, French, and German. The first five years of his life Arthur spent under the care of his mother, chiefly in their country house at Oliva, about four miles west of Dantzic. There, at the foot of the prettily wooded sand-hills which look out upon the dim Baltic, the young mother enjoyed a life of leisure, dissipating the long solitary hours with her horses, the gondola on the pond, the fountains, and the lambs, or with the French novels her husband put amply at her disposal. It was only on Saturday and Sunday that he would quit his office in town and come down, generally in company with a friend or two, to get a glimpse of his wife and son. The latter was often taken on a visit for weeks to the manor-house, between Dantzic and the sea-coast, where his maternal grandparents lived. After 1793 the father never set foot in his old home; but Johanna was allowed every four years to revisit the scenes of her youth.

Hamburg period.

During the twelve years they had their home at Hamburg (1793–1805) the Schopenhauers made frequent excursions. The year after his sister's birth Arthur was taken by his father to France, and left for two years (1797–99) as a boarder with M. Gregoire, a merchant of Havre, and friend of the Hamburg house. The boy formed a fast friendship with his host's son, Anthime, and grew so familiar with French that by the end of his sojourn he had almost forgotten his mother-tongue. The youthful friends lost sight of each other for long years; and when the Frenchman sought to renew their correspondence in the evening of life they found that they had drifted far asunder; and unworthy suspicions led Schopenhauer to dismiss his old comrade in abrupt silence. Arthur returned alone by sea to Hamburg, and for the next four years had but indifferent training. When he reached the age of fifteen the scholarly and literary instincts began to awaken, and he became anxious to be initiated into the fraternity of the liberal arts and sciences. But his father, steeped in that old pride of caste which looks down upon the artist and the writer of books as mere means or instruments to decorate and diversify the life of business, was unwilling a son of his should worship knowledge and truth as ends in themselves. Accordingly he offered his son the choice between the classical school and an excursion to England. A boy of fifteen could scarcely hesitate. In 1803 the Schopenhauers and their son set out on a lengthened tour, of which Johanna has given an account, to Holland, England, France, and Austria. Six months were spent in England, and Arthur, while

[1] *Die Welt als Wille*, ii. c. 43.

his parents proceeded as far as Scotland, was left for a few weeks as a boarder with a Rev. Mr. Lancaster, at Wimbledon. He found English ways dull and precise, and the religious observances exacting; and his mother had—not for the last time—to talk seriously with him on his unsocial and wilful character. Perhaps the part of the tour which gave him most pleasure was the last,—a solitary pedestrian stroll along the ridge of the Riesengebirge, just before he joined his mother at Dantzic, September, 1804, where he was confirmed.

At Hamburg in the beginning of 1805 he was placed in the office of a merchant called Jenisch. He had only been there for three months when his father, who had shown symptoms of mental alienation, fell or threw himself from an elevated opening of his warehouse into the canal. After his death the young widow (still under forty) got affairs wound up, and, leaving Arthur at Hamburg, proceeded with her daughter Adele in the middle of 1806 to Weimar, where she arrived only a fortnight before the tribulation which followed the victory of Napoleon at Jena. At Weimar her talents, hitherto held in check, found an atmosphere to stimulate and foster them; her æsthetic and literary tastes formed themselves under the influence of Goethe and his circle, and her little salon gained a certain celebrity. Arthur, meanwhile, was left at his desk in Hamburg, cursing his prosaic lot, and smuggling literature under the ledger; the hot blood of youth was turning his thoughts to morbid cynicism, and his easy-minded mother, alarmed at his discontent, adopted the advice of her friend Fernow, and offered him a release from the loathed task-work. He hastened to make up lost ground, and at the age of nineteen began to decline *mensa* with Doering at Gotha. But the wantonness and restiveness which he had grown familiar within the lax schooling of the world would not let him alone: he allowed his satirical pen to play on one of the teachers of the grammar-school, and professional etiquette required Doering to dismiss his pupil. After a plain but gentle rebuke for his folly, his mother settled him at Weimar—not in her own house, for, as she told him, she was content to know that he was well and could dispense with his company—but with the Greek scholar Passow, who superintended his classical studies. This time he made so much progress that in the course of two years he became a tolerable scholar, and read Greek and Latin with fluency and interest.

University career.

In 1809 his mother handed over to him (aged twenty-one) the third part of the paternal estate, a sum of 19,000 thalers [$13,813], which, being invested in good securities, yielded him from the first a yearly income of more than 1000 thalers = £150 [$729]. Possessed of this fair patrimony, Schopenhauer in October, 1809, entered the university of Göttingen, with a clear plan of acquiring all that machinery of knowledge which schools can give. The direction of his philosophical reading was fixed by the advice of Professor G. E. Schulze to study, especially, Plato and Kant. For the former he soon found himself full of reverence, and from the latter he acquired the standpoint of modern philosophy. The names of "Plato the divine and the marvellous Kant" are conjunctly invoked at the beginning of his earliest work. But neither the formal exercises of the class-room nor the social and hygienic recreations which he did not fail to combine with them filled his hours to the exclusion of the ideas which began to formulate themselves in him. Contempt for the superficiality of human life settled itself more and more deeply in his heart, with the sense of a bitterness tainting the very source of being, and the perception that the egoism of individuals seeks for nothing better than to push on the load of misery from one to another, instead of making an effort to reduce the burden. These pessimistic reflections (which his mother found eminently unsocial) were naturally concomitant with groundless nervous terrors; sudden panics would dash over his mind, and even in those days he had begun to keep loaded weapons always ready at his bedside. As a philosopher has said, "the sort of philosophy we choose depends on the sort of people we are; for a philosophical system is not a dead bit of furniture: it draws its life from the soul of the man who has it." He was a man of few acquaintances, amongst the few being Bunsen, the subsequent scholar-diplomatist, and Bunsen's pupil, W. B. Astor, the son of Washington Irving's millionaire hero. Even then he found his trustiest mate in a poodle, and its bearskin was an institution in his lodging. Yet, precisely because he met the world so seldom in easy dialogue, he was unnecessarily dogmatic in controversy; and many a bottle of wine went to pay for lost wagers. But he had made up his mind to be not an actor but an onlooker and critic in the battle of life; and, when Wieland, whom he met on one of his excursions, suggested doubts as to the wisdom of his choice, Schopenhauer replied, "Life is a ticklish business; I have resolved to spend it in reflecting upon it."

After two years at Göttingen, he took two years at Berlin, where the university had been founded only four years before. Here also he dipped into divers stores of learning, notably classics under Wolf. In philosophy he heard Fichte and Schleiermacher. Between 1811 and 1813 the lectures of Fichte (subsequently published from his notes in his *Nachgelassene Werke*) dealt with what he called the "facts of consciousness" and the "theory of science," and struggled to present his final conception of philosophy. These lectures Schopenhauer attended,—at first, it is allowed, with interest, but afterwards with a spirit of opposition which is said to have degenerated into contempt, and which in after years never permitted him to refer to Fichte without contumely. Yet the words Schopenhauer then listened to, often with baffled curiosity, certainly helped to give direction to the current of his speculation.

Schopenhauer did not find the city of intellect at all to his mind, and was lonely and unhappy. One of his interests was to visit the hospital La Charité and study the evidence it afforded of the interdependence of the moral and the physical in man. In the early days of 1813 sympathy with the national enthusiasm against the French carried him so far as to buy a set of arms; but he stopped short of volunteering for active service, reflecting that Napoleon gave after all only concentrated and untrammelled utterance to that self-assertion and lust for more life which weaker mortals feel but must perforce disguise. Leaving the nation and its statesmen to fight out their freedom, he hurried away to Weimar, and thence to the quiet Thuringian town of Rudolstadt, where in the inn *Zum Ritter*, out of sight of soldier and sound of drum, he wrote, helped by books from the Weimar library, his essay for the degree of doctor in philosophy. On the 2d of October, 1813, he received his diploma from Jena and in the same year from the press at Rudolstadt there was published—without winning notice or readers—his first book, under the title *Ueber die vierfache Wurzel des Satzes vom zureichenden Grunde*, in 148 pages, 8vo.

Satz vom zureichenden Grunde.

Schopenhauer's monograph *On the Fourfold Root of the Principle of Sufficient Reason* urged that, in discussing the principle of necessary connection, philosophers had failed to distinguish between reason as ground of belief and reason as cause of a fact. The principle gives expression to the law that nothing singular and unconnected can be an object for us but only as forming part in a system. This law has four main roots, according to the four classes of objects, in each of which a special form of connection prevails. These objects are—(1) real objects of perception, where the relation of cause and effect requires each state to be dependent on its antecedent; (2) propositions, which are tied together as premises and conclusions; (3) the formal conditions of perception, viz., space and time, where each part is intuitively seen to be in reciprocal dependence on every other; (4) voluntary agents, where the law of motivation prescribes the dependence of action upon the idea of an object pre-

sented to the character of the agent.[1] Modifying the Kantian theory, that things are mental projections, he emphasizes the intellectual operation which elevates sensation to perception. The feeling of alteration in an organ is taken by the intellect, whose one category is causality, to refer to a real, *i.e.*, material object which generates the change in our body. But the reference is an intuitive interpretation of a felt modification in the organism. Hence the important place assigned to the human body; it is the first of objects, the "immediate object," the means by which all other objects come within consciousness. As a perpetual correlative of external perceptions, the body further serves as an instrument for separating phantasm from fact. To detect and scare away hallucination we have only to realize the presence of our bodies. In dealing with motives Schopenhauer touches upon the relation between volition and cognition. The ego—which is the subject that knows—is a mere correlative to the known object: object perceived and subject perceiving are not two things, but one, perpetually dividing itself into two poles; and what are called the several faculties of the ego are only an inference or a reflex from the several classes of mental object. The "I" in "I know" is already the implication of virtual presence of knowledge. But the "I will" is a new fact,—the revelation of another aspect of the world, the first fact of inner and real existence. In this perception there is given us the unity of the volitional self with the knowing subject; and this identity of the "I" who "will" with the "I" who "know" is in Schopenhauer's words the miracle *par excellence* (*das Wunder κατ' ἐξοχήν*, § 43).

In November, 1813, Schopenhauer returned to Weimar, and for a few months boarded with his mother. But the strain of daily association was too much for their antagonistic natures. The mother felt herself *gênée* in the presence of a disputatious and gloomy son; she missed the ease of her emancipated life; and her friends found their movements watched by a suspicious eye, which was ready to surmise evil in the open and light-hearted style of housekeeping. In short, his splenetic temper and her volatility culminated in an open rupture in May, 1814. From that time till her death in 1838 Schopenhauer never saw his mother again. It was during these few months at Weimar, however, that he made some acquaintances destined to influence the subsequent course of his thought. Conversations with the Orientalist F. Mayer directed his studies to the philosophical speculations of ancient India. In 1808 Friedrich Schlegel had in his *Language and Wisdom of the Old Hindus* brought Brahmanical philosophy within the range of European literature. Still more instructive for Schopenhauer was the imperfect and obscure Latin translation of the *Upanishads* which in 1801–2 Anquetil Duperron had published from a Persian version of the Sanskrit original. Another friendship of the same period had more palpable immediate effect but not so permanent. This was with Goethe, who succeeded in securing his interest for those investigations on colors on which he was himself engaged. Schopenhauer took up the subject in earnest, and the result of his reflections (and a few elementary observations) soon after appeared (Easter, 1816) as a monograph, *Ueber das Sehen und die Farben*. The essay, which must be treated as an episode or digression from the direct path of Schopenhauer's development, due to the potent deflecting force of Goethe, was written at Dresden, to which he had transferred his abode after the rupture with his mother. It had been sent in MS. to Goethe in the autumn of 1815, who, finding in it a transformation rather than an expansion of his own ideas, inclined to regard the author as an opponent rather than an adherent.

Rupture with his mother.

The pamphlet begins by re-stating with reference to sight the general theory that perception of an objective world rests upon an instinctive causal postulation, which even when it misleads still remains to haunt us (instead of being, like errors of reason, open to extirpation by evidence), and proceeds to deal with physiological color, *i.e.*, with colors as felt (not perceived) modifications of the action of the retina. First of all, the distinction of white and black, with their mean point in gray, is referred to the activity or inactivity of the total retina in the graduated presence or absence of full light. Further, the eye is endowed with polarity, by which its activity is divided into two parts qualitatively distinct. It is this circumstance which gives rise to the phenomenon of color. All colors are complementary, or go in pairs: each pair makes up the whole activity of the retina, and so is equivalent to white; and the two partial activities are so connected that when the first is exhausted the other spontaneously succeeds. Such pairs of color may be regarded as infinite in number; but there are three pairs which stand out prominently, and admit of easy expression for the ratio in which each contributes to the total action. These are red and green (each $= \frac{1}{2}$), orange and blue (2 : 1), and yellow and violet (3 : 1).[2] This theory of complementary colors as due to the polarity in the qualitative action of the retina is followed by some criticism of Newton and the seven colors, by an attempt to explain some facts noted by Goethe, and by some reference to the external stimuli which cause color.

Essay on Sight and Colors.

The grand interest of his life at Dresden was the composition of a work which should give expression in all its aspects to the idea of man's nature and destiny which had been gradually forming within him. Without cutting himself altogether either from social pleasures or from art, he read and took notes with regularity. More and more he learned from Cabanis and Helvetius to see in the will and the passions the determinants of intellectual life, and in the character and the temper the source of theories and beliefs. The conviction was borne in upon him that scientific explanation could never do more than systematize and classify the mass of appearances which to our habit-blinded eyes seem to be the reality. To get at this reality and thus to reach a standpoint higher than that of ætiology was the problem of his as of all philosophy. It is only by such a tower of speculation that an escape is possible from the spectre of materialism, theoretical and practical; and so, says Schopenhauer, "the just and good must all have this creed: I believe in a metaphysic." The mere reasonings of theoretical science leave no room for art, and practical prudence usurps the place of morality. The higher life of æsthetic and ethical activity—the beautiful and the good—can only be based upon an intuition which penetrates the heart of reality. Towards the spring of 1818 the work was nearing its end, and Brockhaus of Leipsic had agreed to publish it and pay the author one ducat [$2.28] for every sheet of printed matter. But, as the press loitered, Schopenhauer, suspecting treachery, wrote so rudely and haughtily to the publisher that the latter broke off correspondence with his client. In the end of 1818, however, the book appeared (with the date 1819), in 725 pages 8vo., with the title *Die Welt als Wille und Vorstellung*, in four books, with an appendix containing a criticism of the Kantian philosophy.

Welt als Wille und Vorstellung.

The first book of *The World as Will and Idea* resumes the argument of the earlier work, that all objects are constituted by intellectual relations, describable as forms of the causal principle. As so apprehending a world of objects, man is said to possess intelligence (*Verstand*), the perception of individual sequences and coëxistences. It is a faculty he shares with the animals, and by its means the world presents itself as an endless number of objects in space and time bound together by necessary laws of causality. But man has also the power of reasoning (*Vernunft*), by which he generalizes, the vehicle of this generalization being language. By means of language and reasoning he rises out of the animal immersion in the present and is able to anticipate the future. He forms general ideas and thus can preserve and communicate abstract knowledge. But reason, though its "laws of thought" have a formal truth of their own, has no independent value either as theoretical or as practical.

Book i.

[1] This classification Schopenhauer subsequently modified,—substituting for the first and fourth a graduated scale rising from cause proper (in inorganic nature) to stimulus (in vegetative life) and motive (in the animal world), the last again being either intuitive motive, as in the lower animals, or rational motive, as in man.

[2] In this doctrine, so far as the facts go, Schopenhauer is indebted to a paper by R. Waring Darwin in vol. lxxvi. of the *Transactions of the Philosophical Society*.

In the former aspect it gives rise to scientific knowledge—the knowledge of facts and sequences not in their single occurrences but as instances of a general law. By means of the general truths thus arrived at we can deduce or prove. But a proof is, after all, only a means of showing the disputatious that something which they deny is inseparably bound up with something they admit. It is a mistake, therefore, to substitute for the ocular demonstration of which geometry is susceptible a syllogistic reasoning which may compel assent but cannot inspire insight. Singular experiences are the true workers which support the luxury of general ideas, and reasoning cannot claim to be more than a re-arrangement of products from other fields.

Reason is equally important and equally limited as a factor in conduct. It enables us, as it were, to lead a second life, guided by general principles and not by single appetitions. Such a life is what is called a life according to reason, typified in the ideal of the Stoic sage. The wise man carries out the items of conduct according to a general plan and is superior to the impulses of the moment. But here too the general rests upon the particular; a systematic happiness takes the place of single and conflicting pleasures, but still can only justify itself by procuring pleasure. Thus, unless there be a new perception of life's meaning, reasoning cannot make a man virtuous; it can only make him prudent; it tells him how to reckon with his natural character, but it cannot show him how to amend it.

Book ii. is an attempt to name that residual reality which is pre-supposed but not explained in every scientific explanation, whether ætiological or morphological. The key is found in the consciousness of ourselves as exerting will. What to the inner consciousness is volition is to the outer perception a bodily movement. And as each act of volition is perceived in a bodily motion, so will as a whole is by us perceived as body. This consciousness that my body is my will objectified—my will translated into terms of scientific apprehension—is the "philosophical truth" of truths. And, generalizing this truth, we conclude that, as our corporeal frame is the visibility of our mode of will, so everything is some grade in the objectification of the will. While the ætiology of science accounts for the familiar complex by a simpler and more abstract phase, philosophy uses the clearer and more conspicuous instance to explain the more rudimentary. The law of motivation is taken as a key to open the incomprehensibility of mere causation, and in the stone we presume a feeble analogue of what *we* know as will. The will as such, apart from its objectification in animals, knows nothing of motives, which, though they explain the special circumstances, presuppose the underlying and originative force. No doubt a false idea of simplicity has often led theorists to reduce all sciences in the last resort to applied mathematics, in which the mysterious something called force was eliminated and only the forms of space and time and motion left. But, though it is doubtless possible to reduce the list of original forces, we cannot get rid of an inexplicable activity. Hence the original force or will is beyond the range of causality; every cause is only an "occasional cause," and but states the temporal conditions of operation of the eternal energy. While each several act has an aim, the collective will has none.

Book ii.

The numerical differences of objects do not touch the underlying activity. It is felt in one oak as much as in a million, for time and space are only semblance for (animal) intelligence. And therefore, instead of wondering at the uniformity pervading the instances of any objectification of will, we should remember that the will-force operating in all is the same, and reveals its inner identity in the common law. For the same reason the adaptations of the parts of an organic body or of one organic body to another are only the consequences of the unity of will. Just as the series of actions throughout a life are only the utterances of one original character, and so intrinsically interdependent, so the grades of objectification in nature are the expression of one identical will, which forms the conditions of existence as well as the living creatures accommodating themselves to them. Will, which appears in its lowest grade of objectification as the physical forces of inorganic nature, rises in the vegetative world to a peculiar sympathetic response to the stimulation by external circumstances, and in the animal world produces for itself a special organ, the brain, which possesses the power of presenting under the form of sense and intellect that objective manifestation of will which we call the world of our experience. With the existence of the animal brain, the world emerged into time and space. It was a step necessitated by the growing complexity of type in the will-products, which could neither exist nor preserve their kind without this new instrument which substituted conscious adaptation for unconscious teleology. In this strange mythology by which Schopenhauer replaces the mystery of creation we see the magic world of will, weaving ever higher complexities of material existence, brought at length by stress of circumstances to forge a material organ which shows the sense-world as the objectification of the will. In this one material organ the will has come to see itself expanded into a complicated order of time and place. But at first the brain and its function, knowledge, are solely employed in the service of the will.

Book iii. shows how the intellect is emancipated from this bondage to the will. When we contemplate an object simply for its own sake, forgetting everything and ourselves even in the vision, then what we have before us is no longer one thing among many but a type, not one of a class but an ultimate individuality, not a particular but an adequate embodiment of the universal. Instead of the general concept or class-notion we have the Platonic "idea"—one image into which all the essential life of the object has been concentrated. To realize this individual which has not entered into the bonds of individuation, this universal, which is not a mere genus but the eternal truth of the individual, is the province of genius. The man of genius, neglecting the search for relationships between things—unpractical and to practical judgment sometimes seeming to have a touch of madness—instead of seeking to classify a thing or find out what it is for, looks at it for its own sake and sees the one type or ideal which is seeking for expression in its various and contingent manifestations. Such genius begets art. Yet so much at least of genius is in all men that they can follow where the artist leads and see through his eyes. Everything as thus contemplated disinterestedly for its own sake and in its permanent significance is beautiful. Yet one thing is more beautiful than another. For there are objects which more than others facilitate the quiescence of desire and present to us their permanent character without suggesting or stimulating appetite. The sense of sight is more independent than others of associations of desire, the past and distant purer from self-interest than the present. Those objects are specially beautiful where the significant idea is most clearly presented in the individual form. Indeed, when a certain effort is required to keep out of sight the general bearing of the object on the will, then the object, where the perception of genius still sees the perfect type in the single form, is called sublime.

Book iii.

The several arts fall naturally into an order which rises from the passive enjoyment in the contemplation of inorganic forces to the active perception of will in its most complex types. Architecture seeks in works dedicated to human use to give expression to the fundamental features of physical force, *e.g.*, cohesion, weight, etc., and to that end it intensifies the appearance of strain by refusing the forces an easy and immediate lapse into their natural tendency. In short, it seeks to show resistance visible. Sculpture presents the beauty and grace of the human form, *i.e.*, the "idea" of that form as a whole and in the single movements. Here the "idea" is not derived by comparison and abstraction of observed forms; but we, as ourselves the will seeking manifestation, anticipate by our ideal the meaning of the imperfect phases and lay down an *a priori* canon of beauty. While sculpture gives expression to the more generic type in figure and motion, painting aims at representing action. But even historical pictures seek in a given scene to present not the historical importance of the action but its permanent meaning. Poetry, which uses an arrangement of general concepts to convey an "idea," or moulds reality out of abstractions, gives us the central and abiding truth which history usually dissipates in a host of particulars and relations. In lyric poetry the individual subject of will presents himself as the subject of artistic perception: his own experience is displayed as typical and universal. In tragedy the truth shown is the inner conflict at the very root of the will. The hero is exhibited as brought to see the aimlessness of all will; and by suffering he learns resignation. Music, unlike the other arts, is an image of the movement of will not yet objectified; and in its elements and harmonies we have a parallel to the stages and complexities of the actual world. Hence the explanation of music would be a philosophy of the world.

But art, though it affords an interval of rest from the drudgery of will-service, cannot claim to be more than a transient consolation. Book iv. indicates a surer way of release. It reminds us that our life is the phenomenon of the will,—a phenomenon which begins at birth and ends at death, and of which every instant is a partial birth and a partial death. But the cessation of the individual life is not an annihilation of the will; our essential being is indestructible. The manifestation of the will in human life is spread out and

Book iv.

disposed in an endless multitude of actions. Experience sums up these in a single formula,—the maxim of our empirical character; and that result itself is the type or idea which reveals the one unalterable utterance of will, which is the intelligible character.[1] It is this immemorial act which fixes our empirical character, which gives the consistency and regularity of our acts. *Velle non discitur.* Character is given (by an ante-phenomenal act); it is not acquired. If in one sense we can speak of an "acquired character," we mean thereby that we now understand what manner of men we are, that we have learned the best and worst of ourselves. But, though the character is given once for all in the beginning, knowledge is not useless. We can learn to adopt new means though the end of will remains unaltered. It is this new knowledge which causes repentance, when we see we have adopted undue methods to attain our aim. The survey of the phenomena of life in the light of their principle shows that all life is a ceaseless battle for existence between individuals, that happiness is only negative, viz., a relief from pain, that life is a tragedy. But the natural man, immersed in the sense of life, plays the egoist as if he were the centre of existence and the will to life spoke in him alone. In such a spirit he not merely acts as if affirming his own will to life, but as if he denied that of others. He commits injustice. The sense of wrong-doing, he may feel, is the witness of consciousness to the identity between himself and others; it is the appearance of moral law and gives rise to that sense of right which is the beginning of ethics. But for the most part practical reflections note only the evils caused by egoism, and induce the sufferers to form a law to produce by repression the same results as morality attains by stimulation. Thus penal law, as opposed to moral law, aims only at checking intrusions upon the rights of others, and the whole political organization is only an instrument for checking egoism by egoism, for making each seek the welfare of all because it includes his own. Its justice is temporal; it adds an additional pain by legislative machinery, with a view to the welfare of the greater number.

But there is another and an eternal justice. Here there is no separation of time and place between the wrongdoer and the sufferer. This eternal justice reveals itself to him who, having seen through "the veil of Maya," has found that in the world of truth the divisions between individuals fall away, and that he who does wrong to another has done the wrong to his own self. The persuasion of this doctrine of eternal justice is so ingrained in human nature that we welcome the punishment that overtakes the victorious evildoer. Similar lessons are hidden in the myths of transmigration of souls. The secret sense that the pains of others are in reality not alien constitutes the torments of remorse which visit the wicked. The good man, on the contrary, who has been brought to see through the veil of individuality into the unity of all being, will not merely practice justice,—he will be animated by a universal benevolence. Instead of ἔρως or the blind lust of life (seen at its strongest in sexual appetite), he has learned, by means of self-knowledge, that ἀγαπη which is pitying love, or *caritas generis humani*.

Such benevolence only alleviates the misery of others. It culminates in self-sacrifice, which is carried out by voluntary and complete chastity, by utter poverty, by mortification, by fasting, and last of all by death. Such a course of life, however, is seldom taught by instruction alone, and the broken will generally comes only where a mighty shock of grief reveals the inevitable pain of existence and brings a quietive to the lust of life. Yet the victory over the will to life is not attained once for all; the supremacy must be retained by a career of asceticism. Such ascetics, in whom the will to life was deadened and the body remained as a mere empty semblance, were the saints and mystical devotees of all ages. They had crucified the flesh with its affections and lusts. Their will had been emancipated from the bondage to which in life it was subject, had been released from the objectification in corporeity and restored to its original infinity. In such saints alone has the essential freedom of the will appeared on the temporal scene, but appeared only to destroy the old Adam and bring in the new birth. By the lively knowledge of the truth of things the will has denied itself, has passed into a stage where the objective world is as if it were not,—the stage which was when will as yet had not gone forth to objectify itself in a world and when knowledge had not yet mirrored the reality in an idea, when, in short, nothing was.

Long before the work had come to the hands of the public Schopenhauer had rushed off to Italy and exchanged the labors of giving the gospel of renunciation a metaphysical basis for the gayety of southern life and the influences of classic art.

Visit to Italy.

At Venice, where he first lingered for a while, he found himself a fellow-denizen with Lord Byron; but, except for a solitary chance when his jealousy was stirred by the outspoken admiration of his fair Venetian companion for the handsome Briton who rode past them on the Lido, the two insurgent apostles of the *Weltschmerz* never came across each other's path. At Rome, where he passed the depth of winter, he saw the first copies of his book. It found him in assiduous attendance on the art galleries, the opera and theatre,—turning from the uncongenial companionship of his romantic countrymen and gladly seizing every chance of conversing in English with Englishmen. In March, 1819, he had gone as far as Naples and Pæstum. On his way homewards he was startled by receiving at Milan a letter from his sister announcing that in consequence of the failure of the Dantzic house a large part of his own and his mother's and nearly the whole of his sister's fortune were endangered. This change of circumstances was a heavy blow to the ladies, and he himself was almost induced by the mischance to qualify himself to teach in the university at Heidelberg in July, 1819. But he sternly refused the compromise of seventy per cent. offered by the insolvent firm, and was so angrily suspicious with his sister who accepted it that he ceased to correspond with her for about fourteen years. Fortunately his determined and skilful assertion of his rights was crowned, after a long dispute, with success. He recovered the whole debt, receiving in principal and interest the sum of 9400 thalers [$6833.80].

Appointment at Berlin.

After some stay at Dresden, hesitating between fixing himself as university teacher at Göttingen, Heidelberg, or Berlin, he finally chose the last-mentioned. In his examination before the faculty (*disputatio pro venia legendi*) he enjoyed what he reckoned the satisfaction of catching up Hegel (who had just been appointed professor) in a lax use of a technical term ("animal" for "organic" functions). And in his first and only course of lectures he had the further satisfaction of selecting as his hours the same times (12 to 1 on Monday, Wednesday and Friday) as Hegel had taken for his principal class. This course on the first principles of philosophy or knowledge in general, given in the summer of 1820, was not a success,—indeed did not reach its natural end, and, though the notice of lecture was repeated during his stay in Berlin up to 1831, the lecture-room knew him no more. Brilliant as he was in powers of luminous illustration and characteristic as is his style, he was wanting in the patient exposition of a subject for its own sake and not as the field for exemplifying a favorite thesis. The result of his experiences in 1820–21, which he attributed to Hegelian intrigues, was to intensify his suspicions of his colleagues, one of whom, F. E. Beneke (another alleged victim to Hegel's jealousies), he accused of garbled quotations in his review of *The World as Will and Idea*. Except for some attention to physiology, the first two years at Berlin were wasted. In May, 1822, he set out by way of Switzerland for Italy. After spending the winter at Florence and Rome, he left in the spring of 1823 for Munich, where he stayed for nearly a year, the prey of illness and isolation. When at the end of this wretched time he left for Gastein, in May, 1824, he had almost entirely lost the hearing of his right ear. Dresden, which he reached in August, no longer presented the same hospitable aspect as of old, and he was reluctantly drawn onwards to Berlin in May, 1825.

The place had unpleasant associations of many kinds, but one disagreeable incident of his former stay now returned to him in a judicial award of pains and penalties. One day, about a year after his first settlement in Berlin, on 12th August, 1821, on return-

[1] The terms are borrowed from Kant.

ing to his lodging he found three women standing in the passage in front of his room door. The event had annoyed him before, and his landlady had promised it should not occur again. On this occasion accordingly Schopenhauer ordered them out of what he held to be his own "stair-head," walked into his room, and emerged in a few minutes with hat and stick as he had entered. One of the women was still on the spot, —a sempstress, forty-seven years old, a friend of the landlady, and occupant of a small chamber adjacent to that of Schopenhauer. This person he ejected; and when she returned to pick up a piece of cloth (there stood a chest of drawers belonging to her in the passage) he put her forcibly out again, upon which she fell with a shriek that alarmed the house. Next day she lodged an action against him for personal injuries; and, after a variety of opposing decisions, the final issue was in 1826 to award the complainant compensation (with five-sixths of costs and a small sum for medical expenses) to the amount of a quarterly aliment of fifteen thalers [$10.90], which sum she received till her death, fifteen years afterwards.

The six years (1825–31) at Berlin were a dismal period in the life of Schopenhauer. In vain did he watch for any signs of recognition of his philosophic genius. Hegelianism reigned in the schools and in literature and basked in the sunshine of authority. It was a bad time for an independent thinker who ignored the state and the yearlong alliance between philosophy and theology. Thus driven back upon himself, Schopenhauer fell into morbid meditations, and the world which he saw, if it was stripped naked of its disguises, lost its proportions in the distorting light. The sexual passion had a strong attraction for him at all times, and, according to his biographers, the notes he set down in English, when he was turned thirty, on marriage and kindred topics are unfit for publication. He had in opening manhood been so fascinated by a Weimar actress that he declared he would take her to his home though he found her breaking stones on the roadside. Later years had nipped the freshness of his enthusiasm, and casual experiences generated an overweening misogyny, which, while allowing *woman* her place in the natural economy, regarded the *lady* as the invention of a false civilization. Yet in the loneliness of life at Berlin the idea of a wife as the comfort of gathering age sometimes rose before his mind,—only to be driven away by cautious hesitations as to the capacity of his means, and by the shrinking from the loss of familiar liberties. He continued his bachelordom, and found consolation in less onerous associations. At home he tuned his flute; he dined, and it might be conversed, with his fellow-guests at the Hotel de Russie; he read for hours at the royal library, and gave his evenings to the theatres. But he wrote nothing material. In 1828 he made inquiries about a chair at Heidelberg; and in 1830 he got a shortened Latin version of his physiological theory of colors inserted in the third volume of the *Scriptores Ophthalmologici Minores* (edited by Radius).

Another pathway to reputation was suggested by some remarks he saw in the seventh number of the *Foreign Review*, in an article on Damiron's *French Philosophy in the 19th Century*. With reference to some statements in the article on the importance of Kant, he sent in very fair English a letter to the writer, offering to translate Kant's principal works into English. He named his wages and enclosed a specimen of his work. His correspondent, Francis Haywood, made a counter-proposal which so disgusted Schopenhauer that he addressed his next letter to the publishers of the review. When they again referred him to Haywood, he applied to Thomas Campbell, then chairman of a company formed for buying up the copyright of meritorious but rejected works. Nothing came of this application.[1] A translation of selections from the works of Balthazar Gracian, which was published by Frauenstädt in 1862, seems to have been made about this time.[2]

In the summer of 1831 cholera raged at Berlin, and Schopenhauer fled to Frankfort. About a year later he adjourned to Mannheim. But after eleven months' experience of the latter he decided, from a carefully weighed list of comparative advantages, in favor of Frankfort. And there, accordingly, for the rest of his life he remained. He resumed correspondence with his sister, who was living with her mother in straitened circumstances at Bonn. At first the good people of Frankfort knew him, not as the celebrated philosopher, but as the son of the famous Johanna Schopenhauer,[3] and as the companion of a familiar poodle. The day had not yet risen when, as he had prophesied to his mother (who joked at his book on "fourfold root" as smelling of the apothecary), his works would be read of all, and hers only be used by the grocer to wrap his goods in. The sense of unappreciated work, aggravated by ill health and by pecuniary worry about his Dantzic property, sank deep into a heart that was yearning for outward recognition. He seemed to see around him none but enemies, a world mainly filled with knaves and fools, where a true man was rarer than an honest woman, and where the very touch of society was so perilous that irony and reserve were imposed on every one who retained his self-respect. In solitude he devoured his own soul. At the hotel table a stranger might occasionally be drawn into listening to his vigorous monologue; but it was seldom he was thus encouraged to discourse. Groundless fears of hidden dangers made him see himself and every other independent genius the aim of a conspiracy of vulgar charlatans. He would never entrust his neck to the barber's hand; and he succeeded in secreting his valuables so thoroughly that some of them were after his death recovered only after much search.

Settlement at Frankfort.

Ever since the publication of *The World as Will and Idea* he had silently waited for some response to his message. He had uttered the word he felt himself charged to utter. As the years passed he noted down every confirmation he found of his own opinions in the writings of others, and every instance in which his views appeared to be illustrated by new researches. Full of the conviction of his idea, he saw everything in the light of it, and gave each *aperçu* a place in his alphabetically arranged note-book. Everything he published in later life may be called a commentary, an excursus, or a scholium to his main book; and many of them are decidedly of the nature of commonplace books or collectanea of notes. But along with the accumulation of his illustrative and corroborative materials grew the bitterness of heart which found its utterances neglected and other names the oracles of the reading world. The gathered ill-humor of many years, aggravated by the confident assurance of the Hegelians, found vent at length in the introduction to his next book, where Hegel's works are described as three-quarters utter absurdity and one-quarter mere paradox,—a specimen of the language in which during his subsequent career he used to advert to his three predecessors Fichte, Schelling, but above all Hegel. This work, with its wild outcry against the philosophy of the professoriate, was entitled *Ueber den Willen in der Natur*, and was published in 1836.

[1] It was not till 1841 that a translation of Kant's *Kritik* in English appeared.

[2] He also projected a translation of Hume's *Essays* and wrote a preface for it.

[3] Johanna Schopenhauer (1766-1838) was in her day an authoress of some reputation. Besides editing the memoirs of Fernow, she published *Notes on Travels in England, Scotland, and Southern France* (1813-17); *Johann van Eyck and his Successors* (1823); three romances, *Gabriele* (1819–20), *Die Tante* (1823), and *Sidonia* (1828), besides some shorter tales. These novels teach the moral of renunciation (*Entsagung*). Her daughter Adele (1796-1849) seems to have had a brave, tender, and unsatisfied heart, and lavished on her brother an affection he sorely tried. She also was an authoress, publishing in 1844 a volume of *Haus-, Wald-, und Feldmärchen*, full of quaint poetical conceits, and in 1845 *Anna*, a novel, in two vols.

Will in Nature.

The eight essays which go under the title of *The Will in Nature* seek to show that his theory has the unique distinction of finding in physical science testimony to its metaphysical doctrines that will is the primary basis of all nature and intellect a derivative phenomenon. Often a trivial similarity of phrases serves to establish in his judgment an agreement of radical view. In the second essay he argues for the origin of animal organization from will, pointing out how in growing creatures the tendency to use an organ appears before the organ itself is formed, and maintaining that, instead of seeking the protoplasm of the animal kingdom in a mere lump of vitalized matter, to be moulded by external conditions, we should look for it in the immemorial act of will which is the timeless origin of living beings. The third essay represents the intellect—or "the world as idea"—as having its origin in the narrow partition which in men and animals is interposed between the stimulation of a cause and the reaction which supervenes. From this realistic standpoint intellect seems an interloper in nature, an accident associated with the fortunes of man, and made victorious in the genius which can behold the world "in maiden meditation, fancy free." The fourth essay traces the grades of disproportion between cause and effect from inorganic to organic nature. Where there is causality there is will; but for us the more obviously the one shows itself the less is the other remarked. Another paper seeks to connect animal magnetism (mesmerism, hypnotism) and magic with the doctrine that in each of us the whole undivided will retains its miraculous potency.

In 1837 Schopenhauer sent to the committee entrusted with the execution of the proposed monument to Goethe at Frankfort a long and deliberate expression of his views, in general and particular, on the best mode of carrying out the design. But his fellow-citizens passed by the remarks of the mere writer of books. More weight was naturally attached to the opinion he had advocated in his early criticism of Kant as to the importance, if not the superiority, of the first edition of the *Kritik;* in the collected issue of Kant's works by Rosenkranz and Schubert in 1838 that edition was put as the substantive text, with supplementary exhibition of the differences of the second.

Two Main Problems of Ethics.

In 1841 he published under the title *Die beiden Grundprobleme der Ethik* two essays which he had sent in 1838–39 in competition for prizes offered. The first was in answer to the question "Whether man's free will can be proved from self-consciousness," proposed by the Norwegian Academy of Sciences at Drontheim. His essay was awarded the prize, and the author elected a member of the society. But proportionate to his exultation in this first recognition of his merit was the depth of his mortification and the height of his indignation at the result of the second competition. He had sent to the Danish Academy at Copenhagen in 1839 an essay "On the Foundations of Morality" in answer to a vaguely worded subject of discussion to which they had invited candidates. His essay, though it was the only one in competition, was refused the prize on the grounds that he had failed to examine the chief problem (*i.e.*, whether the basis of morality was to be sought in an intuitive idea of right), that his explanation was inadequate, and that he had been wanting in due respect to the *summi philosophi* of the age that was just passing. This last reason, while probably most effective with the judges, only stirred up more furiously the fury in Schopenhauer's breast, and his preface is one long fulmination against the ineptitudes and the charlatanry of his *bête noire*, Hegel.

In the essay on the freedom of the will Schopenhauer shows that the deliverance of self-consciousness, "I can do what I will," is a mere statement of our physical freedom, or the sequence of outward act upon inner resolve, in the absence of physical restraint. "The statement of self-consciousness concerns the will merely *a parte post*, the question of freedom, on the contrary, *a parte ante*." Self-consciousness throws no light on the relation of volition to its antecedents. If, on the other hand, we turn to the objects of the outer senses, we find that it is part and parcel of their very nature to be not free but necessitated, governed, in short, by the principle of causation. But in the ascending scale of causation cause and effect become more and more heterogeneous, their connection more unintelligible. This is seen in motivation, especially where the motives are not immediate perceptions but general abstract ideas. It is in the possibility of a conflict of motives that man's freedom of choice consists. But, because we can by a feat of abstraction keep an image of one course of action before us and neglect the other concrete conditions of behavior, there grows up an illusion that the mere initial solicitation or velleity might, if we pleased, become actual will. Hence the delusion that we are free to will and not to will. Still the necessitating cause or motive is only the rule under which the real force or radical will operates. In this radical will consists our being, and on it action is consequent: *operari sequitur esse.* By our original character acting in certain circumstances of motive our actions are inevitably determined. But the sense of responsibility for our conduct is not altogether a delusion. It is really a responsibility for our character, which we have gradually learned experimentally to know, and which so known serves as a court of appeal against single actions, or, in other words, becomes a conscience. That character is the supra-temporal action of that will which we and all things are. Thus this question of the freedom of the will, which is "a touchstone for distinguishing the profound from the superficial thinker," is solved by the Kantian distinction of empirical and transcendental world. In the words of Malebranche, "La liberté est un mystère."

The essay on the foundation of morality is an attempt to present the fundamental fact of the moral consciousness and to show its metaphysical bearings. It includes a lengthy criticism of Kant's system of ethics as only the old theological morality under a disguise of logical formulæ. Kant, according to his critic, though he struck a severe blow at eudæmonism, made the mistake of founding ethics on ideas of obligation and respect, which are meaningless apart from a positive sanction. His categorical imperative is attributed to reason,—a power which we only know as human, but which Kant regards as more than human and borrows from the "rational psychology," which itself had received it from theology. The moral spring should be a reality and a fact of nature, whereas Kant seeks it in the subtilties of general ideas, forgetting that reasoning is one thing and virtue another. And, when Kant has to illustrate the application of his rule for discovering the categorical imperative, he is forced to have recourse to considerations of self-interest.

After this examination, Schopenhauer preludes his exposition by the skeptical survey of so-called virtuous actions as due in the vast majority of instances to other than moral motives, and by a disintegration of the average conscience into equal parts of fear of man, superstition, prejudice, vanity, and custom. The mainspring of human action (as of animal) is egoism, supplemented by the hatred or the malice which arises through egoistic conflicts. But, though these are the predominant springs of conduct, there are cases of unselfish kindness. It is in sympathy, or in our as it were substituting ourselves for another who is in pain, that we find the impulse which gives an action a truly moral value. The influence of sympathy has two degrees: either it keeps me back from doing wrong to others, and in this sense leads to justice as a *moral* virtue (whereas civil justice prevents from suffering wrong); or sympathy may carry me on to positive kindness, to philanthropy or love of the human kind. It is on sympathy—the feeling of one identical nature under all the appearance of multiplicity—that the two cardinal virtues of benevolence are based. Schopenhauer notes especially that his principle extends to the relation between man and animals, and that a mistaken conception of human dignity has been allowed to hide the fundamental community of animal nature.

Dawning recognition of his genius.

In 1844 appeared the second edition of *The World as Will and Idea*, in two volumes. The first volume was a slightly altered reprint of the earlier issue; the second consisted of a series of chapters forming a commentary parallel to those into which the original work was now first divided. The longest of these new chapters deal with the primacy of the will, with death, and with the metaphysics of sexual love. But, though only a small edition was struck off (500 copies of vol. i. and 750 of vol. ii.), the report of sales which Brockhaus rendered in 1846 was unfavorable, and the price had afterwards to be reduced. Yet there were faint indications of coming fame, and the eagerness with which each new tribute from critic and admirer was welcomed is both touching and amusing. From 1843 onwards a jurist named F. Dorguth had trumpeted abroad Schopenhauer's name. In 1844 a letter from a Darmstadt

lawyer, Joh. August Becker, asking for explanation of some difficulties, began an intimate correspondence which went on for some time (and which was published by Becker's son in 1883). But the chief evangelist (so Schopenhauer styled his literary followers as distinct from the apostles who published not) was Frauenstädt, who made his personal acquaintance in 1846. It was Frauenstädt who succeeded in finding a publisher for the *Parerga und Paralipomena*, which appeared at Berlin in 1851 (2 vols., pp. 465, 531). Yet for this bulky collection of essays, philosophical and others, Schopenhauer received as honorarium only ten free copies of the work. Soon afterwards, Dr. E. O. Lindner, assistant editor of the *Vossische Zeitung*, began a series of Schopenhauerite articles. Amongst them may be reckoned a translation by Mrs. Lindner of an article by John Oxenford which appeared in the *Westminster Review* for April, 1853, entitled "Iconoclasm in German Philosophy," being an outline of Schopenhauer's system. In 1854 Frauenstädt's *Letters on the Schopenhauerean Philosophy* showed that the new doctrines were become a subject of discussion,—a state of things made still more obvious by the university of Leipsic offering a prize for the best exposition and examination of the principles of Schopenhauer's system. Besides this, the response his ideas gave to popular needs and feelings was evinced by the numerous correspondents who sought his advice in their difficulties. And for the same reason new editions of his works were called for,—a second edition of his degree dissertation in 1847, of his *Essay on Colors* and of *The Will in Nature* in 1854, a third edition of *The World as Will and Idea* in 1859, and in 1860 a second edition of *The Main Problems of Ethics*.

Conventional eudæmonism and his pessimistic asceticism.

In these later years Schopenhauer had at length realized that peace which can be given in the world; he had become comparatively master of himself. His passions had slackened their strain, and he was no longer the victim of unavailing regrets. As a youth he had known none of those ties which give the individual an *esprit de corps*, a sense of community which he never quite loses. Wandering about from place to place throughout Europe, with no permanent home sweetened by the different phases of family affection, with no reminiscences of comradeship in schoolboy days, with no sentiment of the dues of nationality, Schopenhauer is the fitter interpreter of that modern cosmopolitanism which disdains the more special ties of common life and mutual obligation as being obstacles to free development. In exaggerated self-consciousness, he looks down upon the common herd who live the life of convention and compromise, and puts the supreme value on that higher intellectual life which leisure and means permit him to enjoy. A subtler egoism, which emancipates itself from the lusts and the duties of the world, takes the place of the vulgar self-seeking of the multitude and of the self-devotion of the patriot or philanthrophist. To such a mind the friction of professional duties seems irksome: the bonds of matrimony and the duties incumbent on social membership are so many checks on freedom of thought and resolution. The individualist recognizes none of those minor morals and parochial or provincial duties which appropriate three-fourths of our conduct. In the wide universe he sees himself and others, none more akin to him than another, beings not bound by external ties, and united only in the fundamental sameness of their inner nature. To ordinary mortals, absorbed in "the trivial round, the common task," the links that bind individuals are forged by the petty ordinances and observances of society. But to those whom temper and circumstances have denied local and partial associationship, the craving for totality is so keen that it makes them seek their higher country in that far-off world (strangely called "intelligible") where their personality disappears in the one being of the universe. Thus wide is the antagonism between the eudæmonism of civilization, with aspirations towards perfecting our homes and bodies, so that in all things comfort may be established, and the pessimistic asceticism of Schopenhauer, which sees the perfection of life not in the abundance of those things which we eat and drink and wherewith we are clothed but in a deadening of passion, a negation of the would-live-and-enjoy, and an existence in a calm ecstasy of beatific vision, of knowledge not abstract but lively intuition. It is this protest of Schopenhauer against the vanity of the aims prescribed by conventional civilization and enlightenment which has gained him some of those ardent followers who find in his doctrine that religion of which they stand in need.

His religion.

It is a religion which owns no connection with theism or pantheism. Unlike Spinoza and Hegel and the other leaders of modern speculation, Schopenhauer disdains the shelter of the old theology. His religion is cosmic and secular; it finds its saints in Buddhist and Christian monasticism, in Indian devotees and 19th-century "beautiful souls," and holds the one to be no nearer or more impressive as an example than the other. Of Judaism he has no good to say: its influence on Christianity has been pernicious. The new faith is a ministry of art and of high thinking, which may be rendered by all those who by plain living and unselfish absorption in the great meaning and typal forms of the world have slain the root of bitterness that constantly seeks to spring up within them. It is far from being a worship of the blind force which lies at the back of phenomena: it is a "re-implication" of the individual into the absolute from which life has separated him. Each seeker after this reunion is himself (when he has learnt wisdom by experience and self-restraint) the very being who has become all things; and if the "cosmic will" may be termed God (an impossible identification) then he knows God more intimately than he knows anything else. And here if anywhere it may be said "He serveth best who loveth best all things both great and small." Yet love in this creed is second to knowledge; the *odi profanum vulgus* of the misanthrope is heard from the solitary's shrine, and instead of the service of humanity we have the contemplation of the eternal forms, and the elevation to that world where self ceases to be separated from other selves, and where, in the ultimate ecstasy of knowledge, all things positive and definite disappear and there is a being which the sensuous soul of man fails to distinguish from non-being.

Relation of the philosopher to his system.

It is often said that a philosophic system cannot be rightly understood without reference to the character and circumstances of the philosopher. The remark finds ample application in the case of Schopenhauer. The conditions of his training, which brought him in contact with the realities of life before he learned the phrases of scholastic language, give to his words the stamp of self-seen truth and the clearness of original conviction. They explain at the same time the naïveté which set a high price on the products his own energies had turned out, and could not see that what was so original to himself might seem less unique to other judges. Pre-occupied with his own ideas, he chafed under the indifference of thinkers who had grown *blasé* in speculation and fancied himself persecuted by a conspiracy of professors of philosophy. It is not so easy to demonstrate the connection between a man's life and doctrine. But it is at least plain that in the case of any philosopher, what makes him such is the faculty he has, more than other men, to get a clear idea of what he himself is and does. More than others he leads a second life in the spirit or intellect alongside of his life in the flesh,—the life of knowledge beside the life of will. It is inevitable that he should be especially struck by the points in which the sensible and temporal life comes

in conflict with the intellectual and eternal. It was thus that Schopenhauer by his own experience saw in the primacy of the will the fundamental fact of his philosophy, and found in the engrossing interests of the selfish ἔρως the perennial hindrances of the higher life. For his absolute individualism, which recognizes in the state, the church, the family only so many superficial and incidental provisions of human craft, the means of relief was absorption in the intellectual and purely ideal aims which prepare the way for the cessation of temporal individuality altogether. But theory is one thing and practice another; and he will often lay most stress on the theory who is most conscious of defects in the practice. It need not therefore surprise us that the man who formulated the sum of virtue in justice and benevolence was unable to be just to his own kinsfolk and reserved his compassion largely for the brutes, and that the delineator of asceticism was more than moderately sensible of the comforts and enjoyments of life.

Habits of life.

Having renounced what he would call the superstitions of duty to country, to kindred, and to associates, except in so far as these duties were founded on contract (and that, according to him, all duties imply), it was natural that he should take steps to minimize that friction which he so easily excited, and which had induced his voluntary exile from the arena. His regular habits of life and careful regard to his own health remind us of the conduct of the bachelor Kant. He would rise between seven and eight both summer and winter, sponge himself, bathing his eyes carefully, sit down to coffee prepared by his own hands, and soon get to work. He was a slow reader. The classics were old friends, always revisited with pleasure. He only read original works—the classics of pure literature—avoiding all books about books, and especially eschewed the more modern philosophers. Hume in English and Helvétius and Chamfort in French he found to his mind in their skeptical estimates of ordinary virtue. Mystical and ascetic writings, from Buddhism and the *Upanishads* to Eckhart and the *Deutsche Theologie*, commended themselves by their insistence on the reality of the higher life. Their example of will-force drew his favorable notice to the phenomena of mesmerism, just as his sympathy with the lower brethren of man made him an interested observer of a young orang-outang shown at Frankfort in 1834. He was familiar with several literatures, English certainly not the least. The names of Shakespeare, Scott, Byron, Calderon, Petrarch, Dante, are frequent in his pages. What he read he tried to read in the original,—or anywhere but in a German translation. Even the Old Testament he found more impressive in the Septuagint version than in Luther's rendering. The hour of noon brought cessation from his contemplations, and for half an hour he solaced himself on the flute. At one o'clock he sat down to dinner in his inn, and after dinner came home for an hour's siesta. After some light reading he went out for a stroll, alone, if possible countrywards, with cane in hand, cigar lit, and poodle following. Occasionally he would stop abruptly, turn round or look back, mutter something to himself, so as to leave on the passer-by the impression that he was either crack-brained or angry. Like Kant, he kept his lips closed on principle. His walk over, he retired to the reading-room and studied the *Times*,—for he had been always somewhat of an Anglo-maniac, and had learnt this habit of English life from his father. In winter he would sometimes attend the opera. Between eight and nine he took supper, with a half-bottle of light wine (he avoided his country's beer), at a table by himself.

With his low estimate of the average human being, his sympathies were aristocratic. He left the bulk of his fortune to an institution at Berlin for the benefit of those who had suffered on the side of order during the revolutionary struggles of 1848–49. But in so doing it was not his sympathy with kings but his recognition of the merits of public security which gave the motive to his actions. With all his eulogy of voluntary poverty, he did not agree to being deprived of his property by the malice or cupidity of others, and fears of the loss of his means haunted him not less keenly than other imaginary terrors,—the fancied evils distracting him no less perhaps than would have done those domestic and civil obligations from which he endeavored to hold himself free. The Nemesis of his social *lâcheté* fell upon him; and, like all solitaries, he gave an exaggerated importance to trifles, which the sweep of business and customary duty clear away from the ordinary man's memory.

Personal details.

It was not till he was fifty years of age that he set up rooms and furniture of his own. These abodes he changed at Frankfort about four times, living latterly on the street which runs along the Main. On the mat in his chamber lay his poodle,—latterly a brown dog, which had succeeded the original white one, named Atma (the World-Soul), of which he had been especially fond. These dogs had more than once brought him into trouble with his landlord. In a corner of the room was placed a gilt statuette of Buddha, and on a table not far off lay Duperron's Latin translation of the *Upanishads*, which served as the prayer-book from which Schopenhauer read his devotions. On the desk stood a bust of Kant, and a few portraits hung on the walls. The philosopher's person was under middle size, strongly built and broad-chested, with small hands. His voice was loud and clear; his eyes blue and somewhat wide apart; the mouth full and sensuous, latterly becoming broad as his teeth gave way. The high brow and heavy under-jaw were the evidence of his contrasted nature of ample intellect and vigorous impulses. In youth he had light curly hair, whereas his beard in manhood was of a slightly reddish tint. He always dressed carefully as a gentleman, in black dress-coat and white necktie, and wore shoes. In his later years his portrait was taken more than once, and by several artists, and his bust was modelled somewhat to his own mind in 1859. Reproductions of these likenesses have made familiar his characteristic but unamiable features.

In 1854 Richard Wagner sent him a copy of the *Ring of the Nibelung*, with some words of thanks for a theory of music which had fallen in with his own conceptions. Three years later he received a visit from his old college friend Bunsen, who was then staying in Heidelberg. On his seventieth birthday congratulations flowed in from many quarters. In April, 1860, he began to be affected by occasional difficulty in breathing and by palpitation of the heart. Another attack came on in autumn (9th September), and again a week later. On the evening of the 18th his friend and subsequent biographer, Dr. Gwinner, sat with him and conversed. On the morning of the 21st September he rose and sat down alone to breakfast; shortly afterwards his doctor called and found him dead in his chair. By his will, made in 1852, with a codicil dated February, 1859, his property, with the exception of some small bequests, was devised to the above-mentioned institution at Berlin. Gwinner was named executor, and Frauenstädt was entrusted with the care of his manuscripts and other literary remains.

Philosophy from Kant to Schopenhauer.

The philosophy of Schopenhauer, like almost every system of the 19th century, can hardly be understood without reference to the ideas of Kant. Anterior to Kant the gradual advance of idealism had been the most conspicuous feature in philosophic speculation. That the direct objects of knowledge, the realities of experience, were after all only our ideas or perceptions was the lesson of every thinker from Descartes to Hume. And this doctrine was generally understood to mean that human thought, limited as it was by its own weakness and acquired habits, could hardly hope to cope successfully with the problem of apprehending the real things. The idealist position Kant seemed at first sight to retain with an even

stronger force than ever. But it is darkest just before the dawn; and Kant, the Copernicus of philosophy, had really altered the aspects of the doctrine of ideas. It was his purpose to show that the forms of thought (which he sought to isolate from the peculiarities incident to the organic body) were not merely customary means for licking into convenient shape the data of perception, but entered as underlying elements into the constitutiou of objects, making experience possible and determining the fundamental structure of nature. In other words, the forms of knowledge were the main factor in making objects. By Kant, however, these forms are generally treated psychologically as the action of the several faculties of the mind. Behind thinking there is the thinker. But in his successors, from Fichte to Hegel, this axiom of the plain man is set aside as antiquated. Thought or conception without a subject-agent appears as the principle,—thought or thinking in its universality without any individual substrata in which it is embodied; τὸ νοεῖν or νόησις is to be substituted for νοῦς. This is the step of advance which is required alike by Fichte when he asks his reader to rise from the empirical ego to the ego which is subject-object (*i.e.*, neither and both), and by Hegel when he tries to substitute the *Begriff* or notion for the *Vorstellung* or pictorial conception. As spiritism asks us to accept such suspension of ordinary mechanics as permits human bodies to float through the air and part without injury to their members, so the new philosophy of Kant's immediate successors requires from the postulate for initiation willingness to reverse his customary beliefs in quasi-material subjects of thought.

But, besides removing the psychological slag which clung to Kant's ideas from their matrix and presenting reason as the active principle in the formation of a universe, his successors carried out with far more detail, and far more enthusiasm and historical scope, his principle that in reason lay the *a priori* or the anticipation of the world, moral and physical. Not content with the barren assertion that the understanding makes nature, and that we can construct science only on the hypothesis that there is reason in the world, they proceeded to show how the thing was actually done. But to do so they had first to brush away a stone of stumbling which Kant had left in the way. This was the thing as it is by itself and apart from our knowledge of it,—the something which we know, when and as we know it not. This somewhat is what Kant calls a limit-concept. It marks only that we feel our knowledge to be inadequate, and for the reason that there may be another species of sensation than ours, that other beings may not be tied by the special laws of our constitution, and may apprehend, as Plato says, by the soul itself apart from the senses. But this limitation, say the successors of Kant, rests upon a misconception. The sense of inadequacy is only a condition of growing knowledge in a being subject to the laws of space and time; and the very feeling is a proof of its implicit removal. Look at reason not in its single temporal manifestations but in its eternal operation, and then this universal thought, which may be called God, as the sense-conditioned reason is called man, becomes the very breath and structure of the world. Thus in the true idea of things there is no irreducible residuum of matter: mind is the Alpha and Omega, at once the initial postulate and the final truth of reality.

In various ways a reaction arose against this absorption of everything in reason. In Fichte himself the source of being is primeval activity, the groundless and incomprehensible deed-action (*That-Handlung*) of the absolute ego. The innermost character of that ego is an infinitude in act and effort. "The will is the living principle of reason," he says again. "In the last resort," says Schelling (1809), in his *Inquiries into the Nature of Human Freedom*, "there is no other being but will. *Wollen ist Ursein* (will is primal being); and to this alone apply the predicates fathomless, eternal, independent of time, self-affirming." It is unnecessary to multiply instances to prove that idealism was never without a protest that there is a heart of existence, life, will, action, which is presupposed by all knowledge and is not itself amenable to explanation. We may, if we like, call this element, which is assumed as the basis of all scientific method, irrational,—will instead of reason, feeling rather than knowledge.

It is under the banner of this protest against rationalizing idealism that Schopenhauer advances. But what marks out his armament is its pronounced realism. He fights with the weapons of physical doctrine and on the basis of the material earth. He knows no reason but the human, no intelligence save what is exhibited by the animals. He knows that both animals and men have come into existence within assignable limits of time, and that there was an anterior age when no eye or ear gathered the life of the universe into perceptions. Knowledge, therefore, with its vehicle, the intellect, is dependent upon the existence of certain nerve-organs located in an animal system; and its function is originally only to present an image of the interconnections of the manifestations external to the individual organism, and so to give to the individual in a partial and reflected form that feeling with other things, or innate sympathy, which it loses as organization becomes more complex and characteristic. Knowledge or intellect, therefore, is only the surrogate of that more intimate unity of feeling or will which is the underlying reality—the principle of all existence, the essence of all manifestations, inorganic and organic. And the perfection of reason is attained when man has transcended those limits of individuation in which his knowledge at first presents him to himself, when by art he has risen from single objects to universal types, and by suffering and sacrifice has penetrated to that innermost sanctuary where the euthanasia of consciousness is reached,—the blessedness of eternal repose.

Schopenhauer and Herbert Spencer.

In substantials the theory of Schopenhauer may be compared with a more prosaic statement of Mr. Herbert Spencer (modernizing Hume). All psychical states may, according to him, be treated as incidents of the correspondence between the organism and its environment. In this adjustment the lowest stage is taken by reflex action and instinct, where the change of the organs is purely automatic. As the external complexity increases, this automatic regularity fails; there is only an incipient excitation of the nerves. This feeble echo of the full response to stimulus is an idea, which is thus only another word for imperfect organization or adjustment. But gradually this imperfect correspondence is improved, and the idea passes over again into the state of unconscious or organic memory. Intellect, in short, is only the consequence of insufficient response between stimulus and action. Where action is entirely automatic, feeling does not exist. It is when the excitation is partial only, when it does not inevitably and immediately appear as action, that we have the appearance of intellect in the gap. The chief and fundamental difference between Schopenhauer and Mr. Spencer lies in the refusal of the latter to give this "adjustment" or "automatic action" the name of will. Will according to Mr. Spencer is only another aspect of what is reason, memory, or feeling,—the difference lying in the fact that as will the nascent excitation (ideal motion) is conceived as passing into complete or full motion. But he agrees with Schopenhauer in basing consciousness, in all its forms of reason, feeling, or will, upon "automatic movement,—psychical change," from which consciousness emerges and in which it disappears.

Main tendencies of his system.

What Schopenhauer professed, therefore, is to have dispelled the claims of reason to priority and to demonstrate the relativity and limitation of science. Science, he reminds us, is based on final inexplicabilities; and its attempts by theories of evolution to find an historical origin for humanity in rudimentary matter show a misconception of the problem. In the successions of material states there can nowhere be an absolute first. The true origin of man, as of all else, is to be sought in an action which is everlasting and which is ever present: *nec te quæsiveris extra*. There is a source of knowledge within us by which we know, and more intimately than we can ever know anything external, that we will and feel. That is the first and the highest knowledge, the only knowledge that can strictly be called immediate; and to ourselves we as the subject of will are truly the "immediate object." It is in this sense of will—of will without motives, but not without consciousness of some sort—that reality is revealed. Analogy and experience make us assume it to be omnipresent. It is a mistake to say will means for Schopenhauer only force. It means a great deal more; and it is his contention that what the scientist calls force is really will. In so doing he is only following the line predicted by Kant[1] and anticipated by Leibnitz. If we wish, said Kant, to give a real existence to the thing in itself or the noumenon we can only do so by investing it with the attributes found in our own internal sense, viz., with thinking or something analogous thereto. It is thus that Fechner in his "day-view" of things sees in plants and planets the same fundamental "soul" as in us—that is, "one simple being which appears to none but itself, in us as elsewhere wherever it occurs self-luminous, dark for every other eye, at the least connecting sensations in itself, upon which, as the grade of soul mounts higher and higher, there is constructed the consciousness of higher and still higher relations."[2] It is

1 *Kritik* (Trans. Anal.), bk. ii., Appendix.
2 *Ueber die Seelenfrage*, p. 9, Leipsic, 1861.

thus that Lotze declares[1] that "behind the tranquil surface of matter, behind its rigid and regular habits of behavior, we are forced to seek the glow of a hidden spiritual activity." So Schopenhauer, but in a way all his own, finds the truth of things in a will which is indeed unaffected by conscious motives and yet cannot be separated from some faint analogue of non-intellectual consciousness.

In two ways Schopenhauer has influenced the world. He has shown with unusual lucidity of expression how feeble is the spontaneity of that intellect which is so highly lauded, and how overpowering the sway of original will in all our action. He thus reasserted realism, whose gospel reads, "In the beginning was appetite, passion, will," and has discredited the doctrinaire belief that ideas have original force of their own. This creed of naturalism is dangerous, and it may be true that the pessimism it implies often degenerates into cynicism and a cold-blooded denial that there is any virtue and any truth. But in the crash of established creeds and the spread of political indifferentism and social disintegration it is probably wise, if not always agreeable, to lay bare the wounds under which humanity suffers, though pride would prompt their concealment. But Schopenhauer's theory has another side. If it is daringly realistic, it is no less audacious in its idealism. The second aspect of his influence is the doctrine of redemption of the soul from its sensual bonds, first by the medium of art and second by the path of renunciation and ascetic life. It may be difficult in each case to draw the line between social duty and individual perfection. But Schopenhauer reminds us that the welfare of society is a temporal and subordinate aim, never to be allowed to dwarf the full realization of our ideal being. Man's duty is undoubtedly to join in the common service of sentient beings; but his final goal is to rise above the toils and comforts of the visible creature into the vast bosom of a peaceful Nirvana.

Bibliography.—The works of Schopenhauer were published after his death by J. Frauenstädt in 6 volumes (Leipsic, 1874). Besides these, several papers and aphorisms appeared in 1834, *Aus Schopenhauer's handschriftlichem Nachlass*, by the same editor. The best biography of Schopenhauer is that by Gwinner; second and much enlarged edition in 1878. See also Frauenstädt and Lindner, *Arthur Schopenhauer; von ihm; über ihn* (1863); O. Busch, *A. Schopenhauer* (1878); K. Peters, *Schopenhauer als Philosoph* (1880), and *Willenswelt und Weltwille* (1883); and Koeber, *Schopenhauer's Erlösungslehre* (1881). A list of works on Schopenhauer is given by Balan, *Schopenhauer-Literatur* (1880). See also PESSIMISM.

(W. W.)

SCHRÖTER, JOHANN HIERONYMUS (1745–1816), amateur astronomer, principally known by his physical observations of the moon and planets (see OBSERVATORY, under *Lilienthal*).

SCHUBERT, FRANZ PETER (1797–1828), composer of vocal and instrumental music, was born at Vienna, 31st January, 1797. For the foundation of his general education he was indebted to his father, a schoolmaster in the Leopoldstadt; but the beauty of his voice attracted so much attention that in 1808 he was received into the choir of the imperial chapel, and during the five years which followed he was taught to sing and to play the violin in the choristers' school called the "Convict." No attempt seems to have been made to teach him composition, but, through the kind intervention of an older chorister, he was supplied with music-paper, and thenceforward he wrote incessantly, as his fancy dictated, without any help whatever, always carefully signing and dating his MSS., which extend back as far as 1810. When his voice broke in 1813 Schubert left the "Convict," and, to avoid the conscription, taught for three years in his father's school. This, however, in nowise damped his zeal for composition. Even at this early period his invention was inexhaustible and the rapidity of his pen almost incredible. In 1815 he composed 2 symphonies, 5 operas, and no less than 137 songs (67 of which have been published), besides a multitude of other important pieces. Yet so little was his genius appreciated that when in 1816 he applied for an appointment at a Government music school, with a salary equal to about twenty guineas a year, he was rejected as "imperfectly qualified."

In 1818 Count Johann Eszterhazy secured the services of Schubert as resident teacher of music to his daughters, for one of whom the young composer has been supposed—on very insufficient authority—to have entertained a romantic, and of course utterly hopeless, affection. The appointment was of great importance to him, for he was poor, almost to starvation; yet it led to no permanent improvement in his prospects: in fact his life was one long bitter disappointment from beginning to end. He wrote on, year after year, producing music of indescribable beauty in such enormous quantities that but for the dated MSS. we should refuse to believe the accounts transmitted to us by his biographers. He wrote because, when his genius inspired him with an idea, he could not refrain. Yet he scarcely ever looked at his compositions after they were finished, and very rarely heard any of them performed. Very little of his dramatic music was given to the world. Two little operettas—*Die Zwillingsbrüder* and *Die Zauberharfe*—barely escaped failure in 1820; and the beautiful incidental music to Madame von Chezy's *Rosamunde* survived but two representations in 1823. Of his greater operas not one was placed upon the stage during his lifetime. With his songs he was more fortunate. Many of them were published, and their fresh bright melodies were irresistible. They were produced by hundreds, and with a rapidity bordering upon the miraculous. Among the MSS. seven or eight may be found dated on the same day; yet even in these he never repeated himself: every one was the result of a new inspiration, committed to paper at the moment of conception, laid aside immediately afterwards, and so completely forgotten that he has been known to ask who was the composer of one of his own *Lieder* not very long after he had composed it. And this wonderful facility of production led to no unworthy form of treatment. The original MS. of *Hark, Hark, the Lark*, was written at a "beer garden," on the back of a bill of fare, the moment after the composer had read the words for the first time; and there are strong reasons for believing that *Who is Sylvia?*—one of the most perfectly finished songs on record—and *Come, thou Monarch of the Vine*, were produced on the same occasion. But the success of the songs did not make Schubert a prosperous man. All his life long he suffered from grinding poverty. Though he received an actual commission to write his greatest dramatic work, *Fierabras*, for the court theatre at Vienna, it was rejected in 1824 for the weakness of its *libretto*. Once, and once only, a chance seemed open to him. He was accepted in 1826 as a candidate for the vacant post of conductor to the court theatre, and requested to compose some music as a test of his powers. At the rehearsal the part he had designed for the prima donna was found too trying for her voice, and he was requested to alter it. "I will alter nothing," said Schubert; and his refusal to listen to reason cost him the coveted appointment.

Of Schubert's ten symphonies not one made its mark during his lifetime; yet the stamp of genius is upon these as plainly as upon his songs. It is true that in works of large dimensions genius loses half its power if unsupported by learning; and Schubert was not learned enough to turn his inspirations to the best account. His ideas came so quickly that the knowledge he possessed was not sufficient to enable him to arrange them in that perfect order which forms the chief charm of the symphonies of Mozart and Beethoven. And the same element of weakness is discernible in his sonatas and other long pieces of chamber music. But these are all true works of genius, precious and imperishable.

It was not to be wondered at that under his heavy trials Schubert's health failed rapidly. After recovering from more than one serious attack of illness, he was seized with a sudden access of delirium while at supper on 13th October, 1828; and on 19th November he died, leaving behind him a few clothes and other possessions, which were officially valued at sixty-three Vienna florins (= £2, 10s.) [$12.15]. His grave at Ortsfriedhof, bought by the scanty savings of his

[1] *Mikrokosmus*, vol. i. p. 408 (2d ed.).

brother Ferdinand, lies within a few feet of that of Beethoven.

Schubert's works, now (1886) in course of publication in a complete series by Messrs. Breitkopf and Härtel, of Leipsic, include 18 dramatic pieces, 8 sacred compositions, 10 symphonies, 24 pianoforte sonatas, a vast collection of songs, of which 457 are already published, and a multitude of other works which are too numerous to mention.

SCHULTENS. Three Dutch Orientalists of this name have an honorable place among the scholars of the 18th century. The first and most important, Albert Schultens (1686–1750), was born at Groningen in 1686. He studied for the church at Groningen and Leyden, applying himself specially to Hebrew and the cognate tongues. His dissertation on *The use of Arabic in the Interpretation of Scripture* (1706) indicates the point of view which prevailed with the school of Arabists of which he was founder, and which differentiates his aims from those of Reiske (*q.v.*). After a visit to Reland in Utrecht, he returned to Groningen (1708); then, having taken his degree in theology (1709), he again went to Leyden and devoted himself to the study of the MS. collections there till in 1711 he became pastor at Wassenaer. Parochial work was little to his taste, and in 1713 he took the Hebrew chair at Franeker, which he held till 1729, when he was transferred to Leyden as rector of the *collegium theologicum*, or seminary for poor students. From 1732 till his death (at Leyden on 26th January, 1750) he was professor of Oriental languages at Leyden. Schultens was the chief Arabic teacher of his time, and in some sense a restorer of Arabic studies, but he differed from Reiske and De Sacy in mainly regarding Arabic as a handmaid to Hebrew. His chief work was to vindicate the value of comparative study of the Semitic tongues against those who, like Gousset, regarded Hebrew as a sacred tongue with which comparative philology has nothing to do. Schultens, on the other hand, certainly went much too far in his appeals to Arabic for the interpretation of the Old Testament; the laws of comparative Semitic philology were not yet known, so that the comparison of roots was often guess-work, and the value of the exegetical tradition in Hebrew was not accurately determined. Hence he did not leave so much of permanent value for Hebrew grammar and lexicography as might have been expected from his learning; but the systematic illustration of phrases and modes of thought from Arabic literature, *e.g.* in his *Liber Jobi*, has a higher value, which has been too much overlooked in the reaction against the extravagances of the school he founded.[1]

Albert's son, John James Schultens (1716–1778), became professor at Herborn in 1742, and afterwards succeeded to his father's chair. He was in turn succeeded by his son Henry Albert Schultens (1749–1793), a man of great parts, who, however, left comparatively little behind him, having succumbed to excessive work while preparing an edition of Meidani, of which only a part appeared posthumously (1795).

SCHULTZE, Max Johann Siegmund (1825–1874), German microscopic anatomist, was born at Freiburg in Breisgau (Baden) on 25th March, 1825. He studied at Greifswald and Berlin, and was appointed extraordinary professor at Halle in 1854 and five years later ordinary professor of anatomy and histology at Bonn. He died at Bonn 16th January, 1874. His contributions to biology were numerous and varied. He founded and edited the important *Archiv für mikroskopische Anatomie*, to which he contributed many papers, and advanced the subject generally, by refining on its technical methods. He also contributed to the knowledge of the *Protozoa* (see Foraminifera, Protozoa). He will be longest remembered, however, by his reform of the cell theory. Uniting Dujardin's conception of animal sarcode with Von Mohl's of vegetable protoplasma, he pointed out clearly their identity and included them under the common name of protoplasm. He thus reorganized the theory as established by Schwann, diminished the importance of the cell-wall and nucleus, and laid down the modern definition of the cell as "a nucleated mass of protoplasm with or without a cell-wall" (see Protoplasm and Schwann). An obituary notice of Schultze is given in *Arch. mikr. Anat.*, 1875.

SCHUMACHER, Heinrich Christian (1780–1850), astronomer, born at Bramstedt in Holstein, 3d September, 1780, was director of the Mannheim observatory from 1813 to 1815, and then became professor of astronomy in Copenhagen. From 1817 he directed the triangulation of Holstein, to which a few years later was added a complete geodetic survey of Denmark; the latter was left incomplete by Schumacher, but was finished after his death. For the sake of the survey an observatory was established at Altona (see Observatory) and Schumacher resided there permanently, chiefly occupied with the publication of *Ephemerides* (11 parts, 1822–32) and of the journal *Astronomische Nachrichten*, of which he lived to edit thirty-one volumes, and which still continues to be the principal astronomical journal. Schumacher died at Altona on 28th December, 1850.

SCHUMANN, Robert (1810–1856), musical critic and composer, was born at Zwickau, Saxony, on 8th June, 1810. In deference to his mother's wish, he made a pretence of studying for the law, until he had completed his twentieth year; but in reality he took so little pains to acquaint himself with the mysteries of jurisprudence and so much to master the technical difficulties of the pianoforte that when the day of examination drew near it was evident that he could not hope to pass with credit. His mother therefore wisely gave up her cherished project, and in the summer of 1830 permitted him to settle for a time in Leipsic that he might receive regular instruction from Friedrich Wieck, the most accomplished and successful teacher of the pianoforte then living in North Germany. Under Wieck's superintendence Schumann would doubtless have become a pianist of the highest order, had he not endeavored to strengthen the third finger of his right hand by some mechanical contrivance the secret of which he never clearly explained. But the process failed most signally, and the hand became so hopelessly crippled that the young artist was compelled to give up all thought of success as a performer and to devote himself thenceforward to the study of composition, which he cultivated diligently under the guidance of Heinrich Dorn.

This change of purpose led him to direct his attention to subjects connected with the higher branches of art which he had previously very much neglected. Moreover, it gave him time and opportunity for the development of a peculiar talent which he soon succeeded in turning to excellent account,—the talent for musical criticism. His first essays in this direction appeared in the form of contributions to the *Allgemeine musikalische Zeitung*; but in 1834 he started a journal of his own, entitled *Die Neue Zeitschrift für Musik*, and to this from time to time he contributed critiques of the most profound character, sometimes openly written under his own name, sometimes ostensibly emanating from an imaginary brotherhood called the *Davidsbund*, the members of which were living men and women, Schumann's most intimate friends, though the society itself existed only in his own fertile imagination. His time was now fully occupied. He composed with inexhaustible ardor, and by the exercise of his extraordinary critical faculty struck out for himself new paths, which he fearlessly trod without a thought of the reception his works were likely to

[1] A. Schultens's chief works are *Origines Hebrææ* (2 vols., 1724, 1738), 2d ed., 1761, with the *De defectibus linguæ Hebrææ* (1st ed., 1731); *Com. on Job*, 1737; *Com. on Proverbs*, 1748; Hebrew grammar (*Institutiones*), 1737; *Vetus et regia via Hebraizandi*, 1738; *Monumenta vetustiora Arabum* (1740—extracts from Nowairi Mas'udi, etc.); ed. of Beha-ed-din's *Life of Saladin*; his *Opera Minora* (1769) and a *Sylloge Dissertationum* (1772, 1775) appeared posthumously.

meet with from the public. The habit of passing a just judgment upon the works of others led him to judge his own productions with relentless severity; and it may be safely said that he was harder upon himself than upon any candidate for public favor whose attempts he was called upon to criticise.

Schumann's first great orchestral work was his *Symphony in B♭*, produced in 1841,—the year of his marriage with Clara Wieck, now so well known to the world as Madame Clara Schumann, the accomplished pianiste, to whose faultless interpretation of her husband's works we are indebted for our fullest appreciation of their inherent beauty. Another symphony, in D minor, and an orchestral overture, scherzo, and finale, appeared in the same year; and from this time forward works on an equally grand scale appeared in rapid succession, culminating with his first and only opera, *Genoveva*, which, though completed in 1848, was not produced until 1850. In 1843 Schumann was appointed professor of composition in Mendelssohn's newly-founded conservatory of music at Leipsic. Two years after Mendelssohn's death he endeavored to obtain the appointment of director of the Gewandhaus concerts, but was rejected in favor of J. Rietz. In 1850 he was invited to Düsseldorf as musical director, a post in which Mendelssohn had greatly distinguished himself many years previously. Schumann retained this until 1853, when his mental powers began to decline rapidly through a disease of the brain from which he had long suffered, and of which he died at Endenich, near Bonn, 29th July, 1856.

Schumann's position in the history of German music is very important and marks the last stage but one of its progress towards its present condition. His style was very advanced and strikingly original. His published works include one opera, four symphonies, five overtures, a series of scenes from *Faust*, and other choral and orchestral works written on a very extensive scale, and a large quantity of songs, pianoforte pieces, and other smaller works of the highest excellence and beauty.

SCHWABE, Samuel Heinrich (1789–1875), German amateur astronomer, was born on 25th October, 1789, at Dessau, where he died on 11th April, 1875; he observed the sun-spots regularly from 1826 and pointed out (in 1843) the periodicity in the number of these objects.

SCHWALBACH, or Lagenschwalbach, a favorite German health resort, in the Prussian province of Hesse-Nassau, is pleasantly situated in the deep valley of the Münzenbach near its junction with the Aar, 12 miles northwest from Wiesbaden, with which it has regular communication by diligence. Besides a large kursaal, the town has four churches, a synagogue, a real school, and a higher school for girls. The three principal springs, which are largely impregnated in varying proportions with iron and carbonic acid (compare Mineral Waters), are connected by promenades. The permanent population of the town was 2811 in 1880, and the number of visitors reaches about 5000 annually.

About 4½ miles to the south of Schwalbach is Schlangenbad (360 inhabitants), the thermal springs of which are efficacious in nervous complaints and attract about 2000 visitors (chiefly ladies) every year. The water is used externally only.

SCHWANN, Theodor (1810–1882), author of the cell theory in physiology, was born at Neuss in Rhenish Prussia on 7th December, 1810. His father was a man of great mechanical talents; at first a goldsmith, he afterwards founded an important printing establishment. Schwann inherited his father's mechanical tastes, and the leisure of his boyhood was largely spent in constructing little machines of all kinds. He studied at the Jesuits' college in Cologne and afterwards at Bonn, where he met Johannes Müller, in whose physiological experiments he soon came to assist. He next went to Würzburg to continue his medical studies, and thence to Berlin to graduate in 1834. Here he again met Müller, who had been meanwhile translated to Berlin, and who finally persuaded him to enter on a scientific career and appointed him assistant at the anatomical museum. Schwann in 1838 was called to the chair of anatomy at the Roman Catholic university of Louvain, where he remained nine years. He then went as professor to Liége, where, in spite of brilliant offers from many German universities, he led a very quiet uneventful life, broken only by the international commemoration of the fortieth anniversary both of his professoriate and the publication of his *magnum opus*, till his death on 11th January, 1882. He was of a peculiarly gentle and amiable character and remained a devout Catholic throughout his life.

It was during the four years spent under the influence of Müller at Berlin that all Schwann's really valuable work was done. Müller was at this time preparing his great book on physiology, and Schwann assisted him in the experimental work required. His attention being thus directed to the nervous and muscular tissues, besides making such histological discoveries as that of the envelope of the nerve-fibres which now bears his name, he initiated those researches in muscular contractility since so elaborately worked out by Du Bois Reymond and others. He was thus the first of Müller's pupils who broke with the traditional vitalism and worked towards a physico-chemical explanation of life. Müller also directed his attention to the process of digestion, which Schwann showed to depend essentially on the presence of a ferment called by him pepsin, thus not only practically bringing the subject up to its modern state but preparing for the subsequent advances in medical treatment made by Roberts. Schwann also examined the question of spontaneous generation, which he aided greatly to disprove, and in the course of his experiments discovered the organic nature of yeast. His theory of fermentation was bitterly attacked and ridiculed by Liebig, but has been, after the lapse of a quarter of a century, triumphantly confirmed. In fact, the whole germ theory of Pasteur, as well as the antiseptic application of Lister, is thus traceable to the influence of Schwann. Once when dining with Schleiden, in 1837, the conversation turned on the nuclei of vegetable cells. Schwann remembered having seen similar structures in the cells of the notochord (as had been shown by Müller) and instantly seized the importance of connecting the two phenomena. The resemblance was confirmed without delay by both observers, and the results soon appeared in the famous *Microscopic Investigations on the Accordance in the Structure and Growth of Plants and Animals* (Berlin, 1839; trans. Sydenham Society, 1847), and the cell theory (see Morphology) was thus definitely constituted. In the course of his verifications of the cell theory, in which he traversed the whole field of histology, he proved the cellular origin and development of the most highly differentiated tissues, nails, feathers, enamels, etc. Although mistaken in his view of the origin of new cells, his generalization at once became the foundation of all modern histology, and in the hands of Virchow (whose cellular pathology is an inevitable deduction from Schwann) has afforded the means of placing modern pathology on a truly scientific basis.

An excellent account of Schwann's life and work is that by Léon Frédéricq (Liége, 1884).

SCHWANTHALER, Ludwig Michael (1802–1848), German sculptor, was born in Munich on 26th August, 1802. His family had been known in Tyrol by its sculptors for three centuries; young Ludwig received his earliest lessons from his father, and the father had been instructed by the grandfather. The last to bear the name was Xaver, who worked in his cousin Ludwig's studio and survived till 1854. For successive generations the family lived by the carving of busts and sepulchral monuments, and from the condition of mechanics rose to that of artists.

From the Munich gymnasium Schwanthaler passed as a student to the Munich academy; at first he purposed to be a painter, but afterwards reverted to the plastic arts of his ancestors. His talents received timely encouragement by a commission for an elaborate silver service for the king's table. Cornelius also befriended him; the great painter was occupied on designs for the decoration in fresco of the newly erected Glyp-

tothek, and at his suggestion Schwanthaler was employed on the sculpture within the halls. Thus arose between painting, sculpture, and architecture that union and mutual support which characterized the revival of the arts in Bavaria. Schwanthaler in 1826 went to Italy as a pensioner of King Louis, and on a second visit in 1832 Thorwaldsen gave him kindly help. His skill was so developed that on his return he was able to meet the extraordinary demand for sculpture consequent on King Louis's passion for building new palaces, churches, galleries, and museums, and he became the fellow-worker of the architects Klenze, Gärtner, and Ohlmüller, and of the painters Cornelius, Schnorr, and Hess. Owing to the magnitude and multitude of the plastic products they turned out, over-pressure and haste in design and workmanship brought down the quality of the art. The works of Schwanthaler in Munich are so many and miscellaneous that they can only be briefly indicated. The new palace is peopled with his statues; the throne-room has twelve imposing gilt bronze figures 10 feet high; the same palace is also enriched with a frieze and with sundry other decorations modelled and painted from his drawings. The sculptor, like his contemporary painters, received help from trained pupils. The same prolific artist also furnished the old Pinakothek with twenty-five marbles, commemorative of as many great painters; likewise he supplied a composition for the pediment of the exhibition building facing the Glyptothek, and executed sundry figures for the public library and the hall of the marshals. Sacred art lay outside his ordinary routine, yet in the churches of St. Ludwig and St. Mariahilf he gave proof of the widest versatility. The Ruhmeshalle afforded further gauge of unexampled power of production; here alone is work which, if adequately studied, might have occupied a lifetime; ninety-two metopes, and, conspicuously, the giant figure of Bavaria, 60 feet high, rank among the boldest feats of physical force. A short life of forty-six years did not permit serious undertakings beyond the Bavarian capital, yet time was found for the groups within the north pediment of the Walhalla, Ratisbon, and also for numerous portrait statues, including those of Mozart, Jean Paul Richter, Goethe, and Shakespeare. Schwanthaler died at Munich in 1848, and left by will to the Munich academy all his models and studies, which now form the Schwanthaler Museum. The sculptor's style may be designated as romantic-classic or modern-antique, and its conventional ideal stands far removed from the schools of naturalism and of realism.

SCHWARZ, or SCHWARTZ, CHRISTIAN FRIEDRICH (1726–1798), Protestant missionary to India, was born on 8th October, 1726, at Sonnenburg, in the electorate of Brandenburg, Prussia. After attending the grammar school of his native town and an academy at Küstrin, he in 1746 entered the university of Halle. Having learned Tamil to assist in a translation of the Bible into that language, he was led to form the intention of becoming a missionary to India. He received ordination at Copenhagen on the 8th August, 1749, and after spending some time in England to acquire the English language, embarked early in 1750 for India, and arrived at Trichinopoly on the 30th July. Tranquebar was for some time his headquarters, but he paid frequent visits to Tanjore and Trichinopoly, and in 1766 removed to the latter place. Here he acted as chaplain to the garrison, who erected a church for his general use. In 1769 he secured the friendship of the rajah of Tanjore, who, although he never embraced Christianity, afforded him every countenance in his missionary labors. Shortly before his death he committed to Schwarz the education of his adopted son and successor. In 1779 Schwarz undertook, at the request of the Madras Government, a private embassy to Hyder Ali, the chief of Mysore. When Hyder invaded the Carnatic, Schwarz was allowed to pass through the enemy's encampment without molestation. After twelve years in Trichinopoly he removed to Tanjore, where he spent the remainder of his life. He died on 13th February, 1798. Schwarz's direct success in making converts exceeded[1] that of any other Protestant missionary in India, in addition to which he succeeded in winning the esteem of Mohammedans and Hindus. The rajah of Tanjore erected a monument, executed by Flaxman, in the mission church, in which he is represented as grasping the hand of the dying missionary and receiving his benediction. A splendid monument to Schwarz by Bacon was placed by the East India Company in St. Mary's church at Madras.

See *Remains* of Schwarz, with a sketch of his life, 1826; *Memoirs of Life and Correspondence*, by H. N. Pearson, 1834, 3d ed. 1839; *Life*, by H. N. Pearson, 1855.

SCHWARZBURG-RUDOLSTADT, a small Thuringian principality and an independent member of the German empire, shares with Schwarzburg-Sondershausen the possessions of the old house of Schwarzburg, consisting of the upper barony (Oberherrschaft) in Thuringia, on the Gera, Ilm, and Saale, and the lower barony (Unterherrschaft), an isolated district on the Wipper and Helbe, about 25 miles to the north, surrounded by the Prussian province of Saxony. See plate V. As the dignity of prince is held in virtue of the Oberherrschaft alone, a share of both baronies was given to each sub-line of the main house. The total area of Schwarzburg-Rudolstadt is 363 square miles, of which 283 are in the upper and 80 in the lower barony; the chief towns in the former district are Rudolstadt (8747 inhabitants), the capital, and Blankenburg (1889), and in the latter Frankenhausen (4985). Both baronies are hilly, but no great height is anywhere attained. The scenery of the Thuringian portion of Schwarzburg-Rudolstadt attracts many visitors annually, the most beautiful spots being the gorge of Schwarza and the lovely circular valley in which the village of Schwarzburg nestles at the foot of a curiously isolated hill, crowned by the ancient castle of the princely line. Cattle rearing and fruit growing flourish in the lower barony, while the upper barony is finely wooded. Of the whole country 44 per cent. is under forest (mainly coniferous trees), and 41 per cent. is devoted to agriculture. The chief grain crops are rye, oats, and barley, but in 1883 thrice as much ground was occupied by potatoes as by all these three together. The live-stock returns in 1883 showed 19,831 cattle, 39,024 sheep, 19,544 pigs, 14,420 goats, and 2813 horses. Agriculture and forestry support about 35 per cent. of the population, and mining and cognate industries about 10 per cent. Trade and manufactures are insignificant; iron, lignite, cobalt, alum, and vitriol are among the mineral productions. In 1880 the population was 80,296 (an increase of 1779 since 1875), or about 221 to the square mile. Of these 79,832 were Protestants.

Schwarzburg-Rudolstadt is a limited hereditary sovereignty, its constitution resting on laws of 1854 and 1870, though a diet has met at intervals since 1816. The present diet consists of sixteen members elected for six years, four chosen by the highest taxpayers, the others by general election. The diet must be summoned every three years. The budget for 1885-87 estimated revenue and expenditure each at £101,210 [$491,880.60]; £57,670 [$280,276.20] was the estimated income from the public lands and forests. The public debt was £230,350 [$1,119,501]. The troops of Schwarzburg-Rudolstadt have been incorporated with the Prussian army since the convention of 1867. The principality has one vote in the Reichstag and one in the federal council.

Schwarzburg-Rudolstadt is the cadet branch of the family. In 1710 the count was made a prince, in spite of the remonstrances of the elector of Saxony, although he was prevented from taking his seat in the imperial college until 1754. The principality entered the Confederation of the Rhine in 1807 and the German League in 1815. In 1819 it redeemed the Prussian claims of superiority by surrendering portions of its territory.

SCHWARZBURG-SONDERSHAUSEN, a small Thuringian principality and an independent member of the German empire, shares the old Schwarzburg

[1] [Jno. E. Clough, a Baptist missionary from New York to the Telugus, surpassed him, having in 1880 over 13,000 converts in his church at Ongole.—AM. ED.]

lands with Schwarzburg-Rudolstadt, as explained in the preceding article. Its total area is 333 square miles, of which 133 are in the upper and 200 in the lower barony. The chief towns are Arnstadt (10,516 inhabitants), which at one time gave name to a line of counts, in the latter district, and Sondershausen (6110), the capital, in the former. The general description of the nature and resources of Schwarzburg-Rudolstadt applies also to this principality, except that 58 per cent. of the whole is devoted to agriculture and 30 per cent. to forests, only about two-fifths of which are coniferous trees. The chief crops are oats, barley, wheat, and rye; but here also by far the most land is planted with potatoes. In 1883 the principality contained 21,205 cattle, 54,276 sheep, 22,884 pigs, 11,372 goats, and 4283 horses. About 39 per cent. of the population are supported by agriculture and forestry, and about 5 per cent. by mining. In 1880 the population was 71,107 (an increase of 3627 since 1875), or about 213 to the square mile. Of these 70,450 were Protestants.

Schwarzburg-Sondershausen is a limited hereditary sovereignty, its constitution resting on a law of 1857. The diet consists of five representatives elected by the highest taxpayers, five by general election, and not more than five nominated for life by the prince. The first ten members are elected for four years, which is also the financial period. There is a ministry with five departments—for the prince's household, domestic affairs, finance, churches and schools, and justice. The budget for each year in the period 1884-87 estimated the income at £112,475 ($546,628.50) and the expenditure at £1000 ($4860) less. The public debt in 1885 was £199,625 ($970,177.50). The troops of Schwarzburg-Sondershausen have been incorporated with the Prussian army by convention since 1867. The principality has one vote in the Reichstag and one in the federal council.

The house of Schwarzburg is one of the oldest and noblest in Germany; and tradition traces its descent from Witikind and the kings of the Franks. Its historical ancestors were the counts of Käfernburg, from whom the counts of Schwarzburg sprang about the beginning of the 13th century. The name Günther became the distinctive name for the members of this house (corresponding to Heinrich in the Reuss family), the various Günthers being at first distinguished by numbers and afterwards by prefixed names. Various subdivisions and collateral lines were formed, but by 1599 all were extinct but the present two. Count Günther XL., who died in 1552, was the last common ancestor of both lines. Schwarzburg-Sondershausen is the senior line, although its possessions are the smaller. In 1697 the count was raised to the dignity of imperial prince by the emperor Leopold I. The prince had to pay 7000 thalers [$5089] to the elector of Saxony and 3500 [$2544.50] to the duke of Saxe-Weimar, and numerous disputes arose in connection with the superiorities thus indicated. In 1807 Schwarzburg-Sondershausen entered the Confederation of the Rhine and became a sovereign state. In 1816 it joined the German League, and redeemed with portions of its territory all rights of superiority claimed by Prussia. Its domestic government has gradually, though not very quickly, improved since that time,—the oppressive game-laws in particular having been abolished. A treaty of mutual succession was made between the two families in 1713.

SCHWARZENBERG, Karl Philipp, Prince of (1771–1820), Austrian field-marshal, was born on 15th April, 1771, at Vienna. He fought in 1789 under Lacy with distinction against the Turks and became major in 1792. In the French campaign of 1793 he held command of a portion of the advanced guard under the duke of Coburg, and in 1794 his impetuous charge at the head of a cavalry-regiment greatly contributed to the victory of Cateau-Cambrésis. After the battle of Würzburg in September, 1796, he was raised to the rank of major-general, and in 1799 to that of field-marshal in command of a division. At the defeat of Hohenlinden in 1800 his promptitude and courage saved those under his command from being surrounded and taken prisoners. In the war of 1805 he held command of a division under General Mack, and when Ulm capitulated to Napoleon in October he cut his way through the hostile lines with some cavalry regiments. At the special request of the emperor Alexander he undertook an embassy to St. Petersburg in 1808, but two days before the battle of Wagram he arrived in the camp and assumed command as general of the cavalry. After the peace of Vienna he was sent to Paris to negotiate a marriage between Napoleon and the duchess Maria Louisa. From this time he secured Napoleon's special confidence and esteem, and at his request took command of the Austrian auxiliary corps in the Russian campaign. In August he received the command of the seventh or Saxony army corps; after gaining some slight advantages over the Russians, he was compelled to retreat before superior forces to the duchy of Warsaw, where, according to instructions from Napoleon, he remained for some months inactive at Pultusk. In 1813 he was appointed commander-in-chief of the allied forces, and, after defeating Napoleon at Leipsic in October, carried the campaign to a successful issue by entering Paris in March, 1814. On the conclusion of the war he became president of the Aulic Council. He died from paralysis at Leipsic on 15th October, 1820.

See Prokesch-Osten, *Denkwürdigkeiten aus dem Leben des Feldmarschall's Fürsten Schwarzenberg*, Vienna, 1823; Berger, *Das Fürstenhaus Schwarzenberg*, Vienna, 1866.

SCHWEGLER, Albert (1819–1857), historical, philosophical, and theological writer, one of the first and most distinguished of the pupils of F. C. Baur and of the *dei minores* of the Tübingen school. He was born at Michelbach in Würtemberg on 10th February, 1819, the son of a country clergyman, and entered the university of Tübingen in 1836 as a student of theology, though with a predominant liking for classical philology. Under Baur's influence he devoted himself to the study of ecclesiastical history, and his first work was *Der Montanismus u. die christliche Kirche des 2ten Jahrhunderts* (1841), in which he was the first to point out that Montanism was much more than an isolated outbreak of eccentric fanaticism in the early church, though he introduced fresh misconceptions by connecting it with Ebionitism as he conceived the latter. This work, with other essays, brought Schwegler into conflict with the authorities of the church, in consequence of which he gave up theology as his professional study and chose that of philosophy. In 1843 he commenced in the Tübingen university the career of a teacher (*privat-docent*) of philosophy and classical philology, and in 1848 was made extraordinary professor of the latter subject and soon after ordinary professor of history. His death took place on 5th January, 1857.

His principal theological work was *Das nachapostolische Zeitalter* (2 vols., 1846). It was this book which first put before the world, with Schwegler's characteristic boldness and clearness, the results of the critical labors of the earlier Tübingen school in relation to the first development of Christianity. Carl Schwarz says of it, "This work—full though it was of youthful exaggerations and provocations, partisan as it was in its line of argument, untrue and abstract as its contrast of Paulinism and Petrinism was, and arbitrary as was its use of those party names—produced nevertheless by its masterly literary form (which reminds us of Strauss) and by its easy handling and presentation of all the important data, a powerful impression, and, although in many points of detail it is out of date, it may still be regarded as one of the 'standard works' of the school." Schwegler published also an edition of the *Clementine Homilies* (1847), and of Eusebius's *Ecclesiastical History* (1852). In the department of philosophy we have an edition of the *Metaphysics* of Aristotle, with a translation and commentary (4 vols., 1847–48), the well-known sketch of the *History of Philosophy* (1848), and a posthumous *Geschichte der Griech. Philosophie* (1859). In history he commenced a *Römische Geschichte* (vols. i.–iii., 1853–58, 2d ed., 1869), which he brought down only to the laws of Licinius.

SCHWEIDNITZ, a manufacturing and trading town of Lower Silesia in Prussia, is picturesquely situated on the left bank of the Weistritz, 28 miles southwest of Breslau. Well built, with wide streets, the town contains several old churches (one of which has a tower 338 feet high) and an ancient town-house with a tower

130 feet high. The surrounding country is fertile and highly cultivated, and the large quantities of flax and hemp there raised encourage an active weaving industry in the town. Beetroot for sugar, grain, and fruit are also grown. The manufacture of furniture, leather gloves, machinery and tools, carriages, nuts and screws, needles, and other hardware goods is carried on. The beer of Schweidnitz has long been famous under the name of "Schwarze Schöps," and in the 16th century it was exported as far as Italy. Schweidnitz is the chief grain market of the district. The population in 1885 was 23,775 (an increase of 6 per cent. since 1880; in 1816 it was 10,046.

Schweidnitz, dating from about the 11th century, received town rights in 1250. About 1278 it became the capital of a principality, with an area of 935 square miles, which belonged to Bohemia from 1353 till 1741, when it passed into the possession of Prussia. The "Pölerei of Schweidnitz" is the name given to the riotous revolt of the town, in 1520–22, against a royal edict depriving it of the right of coining its own money. The town was four times besieged and taken in the Seven Years' War; and in 1807 it was captured by the French, who demolished the fortifications. In 1816 new works were raised, but in 1864 they were converted into a public park.

SCHWEINFURT, a manufacturing town of Lower Franconia in Bavaria, is situated on the right bank of the Main, 22 miles northeast of Würzburg. The Renaissance town-house in the spacious market-place dates from 1570; it contains a library and a collection of antiquities. St. John's church is a Gothic edifice with a lofty tower; St. Salvator's was built about 1720. Schweinfurt is well furnished with benevolent and educational institutions, including a gymnasium founded by Gustavus Adolphus. The Main is here spanned by two bridges. The chief manufacture is paint ("Schweinfurt green" is a well-known brand in Germany), introduced in 1809; but beer, sugar, machinery, soap and other drysalteries, straw-paper, vinegar, etc., are also produced. Cotton-spinning and bell-founding are carried on; and the Main supplies water-power for numerous saw, flour, and other mills. Schweinfurt carries on an active trade in the grain, fruit, and wine produced in its neighborhood, and it is the seat of an important sheep and cattle market. Rückert the poet (d. 1866) was born here in 1788. The population in 1880 was 12,601, of whom one-fourth were Roman Catholics.

Schweinfurt is mentioned in 790, and in the 10th century was the seat of a margrave. It fell later to the counts of Henneberg; but, receiving town rights in the 13th century, it maintained its independence as a free imperial city with few interruptions until 1803, when it passed to Bavaria. Assigned to the grand-duke of Würzburg in 1801, it was restored to Bavaria in 1814. In the Thirty Years' War it was occupied by Gustavus Adolphus, who erected fortifications, remains of which are still extant.

SCHWELM, a town of Westphalia, in Prussia, is situated on the river of the same name, 22 miles east of Düsseldorf and 27 northeast of Cologne. Lying close to the Harkort iron and sulphur mines, within the populous and rich mineral district on the lower Rhine, it carries on iron-founding, wire-drawing, and the manufacture of machinery of various kinds, besides an active trade in iron, steel, and brass goods. Scarcely less important are its manufactures of ribbons, damask, cord, and paper. In the neighborhood are chalybeate springs, resorted to by invalids. The population in 1880 was 12,127, one-fourth of whom were Roman Catholics. Schwelm is said to have existed as early as 1085, though it did not receive town rights until 1590.

SCHWENKFELD, Caspar (1490–1561), of Ossing, as he called himself from his property at this place in the principality of Liegnitz in Silesia, one of the first and noblest representatives of Protestant mysticism in the 16th century, was born in 1490. He was of noble descent, and acquired at Cologne and other universities an education greatly superior to that possessed by most noblemen of his time. After leaving the university he served in various minor courts of Silesia, finally entering the service of the duke of Liegnitz, over whom his influence was great. Though he was educated as a strict Catholic, the writings of Tauler and Luther produced a profound impression upon him, so that in 1522 he visited Wittenberg, where he made the acquaintance of Carlstadt and Thomas Münzer, spirits destined to be more congenial to him than Luther himself. On his return to Liegnitz he joined in an active propagation of the principles of the Reformation in the principality and in Silesia. But very early Schwenkfeld uttered warnings against the abuse of the doctrine of justification by faith. The Protestant controversy as to the Eucharist (1524) revealed his disagreement with Luther on that critical point. He sought to establish a *via media* between the doctrines of Luther and Zwingli, and vainly hoped to obtain for it Luther's acceptance. He as vainly sought to secure Luther's adoption of a strict rule of church discipline, after the manner of the Moravian Brethren. Meanwhile the Anabaptists obtained a footing in Silesia, and suspicions of Schwenkfeld's sympathy with them were aroused. Letters and writings of his own (1527–28) proved him to hold strongly anti-Lutheran heresies, and both Catholics and Lutherans urged the duke of Liegnitz to dismiss him. He voluntarily left Liegnitz in 1529, and took up his abode at Strasburg for five years amongst the numerous Reformed clergy there. In 1533, in an important synod, he defended against Bucer the principles of religious freedom as well as his own doctrine and life. But the heads of the church carried the day, and, in consequence of the more stringent measures adopted against dissenters, Schwenkfeld left Strasburg for a time. While residing in various cities of south Germany he kept up a wide correspondence with the nobility particularly, and in Würtemberg propagated his views personally at their courts. In 1535 a sort of compromise was brought about between himself and the Reformers, he promising not to disturb the peace of the church and they not to treat him as a disturber. The compromise was of only short duration. His theology took a more distinctly heterodox form, and the publication (1539) of a book in proof of his most characteristic doctrine—the deification of the humanity of Christ—led to the active persecution of him by the Lutherans and his expulsion from the city of Ulm. The next year (1540) he published a refutation of the attacks upon his doctrine with a more elaborate exposition of it, under the title *Grosse Confession*. His book was very inconvenient to the Protestants, as it served to emphasize the differences between the Lutherans and Zwinglians as regarded the Eucharist at a moment when efforts were being made to reconcile them. An anathema was accordingly issued from Schmalkald against Schwenkfeld (together with Sebastian Franck); his books were placed on the Protestant "index"; and he himself was made a religious outlaw. From that time he was hunted from place to place, though his wide connections with the nobility and the esteem in which he was held by numerous followers and friends provided for him secure hiding-places and for his books a large circulation. An attempt in 1543 to approach Luther only increased the Reformer's hostility and rendered Schwenkfeld's situation still more precarious. He and his followers withdrew from the Lutheran Church, declined its sacraments, and formed small societies of kindred views. He and they were frequently condemned by Protestant ecclesiastical and political authorities, especially by the Government of Würtemberg. His personal safety was thereby more and more imperilled, and he was unable to stay in any place for more than a short time. At last, in his seventy-second year, he died at Ulm, on 10th December, 1561, surrounded by attached friends and declaring undiminished faith in his views.

Schwenkfeld left behind him a sect (who were called subsequently by others Schwenkfeldians, but who called themselves "Confessors of the Glory of Christ") and numerous writings to perpetuate his ideas. His writings were partially collected in four folio volumes, the first of which was published in the year 1564, containing his principal theological works. Erbkam states that his unprinted writings would make more than another four folios. His adherents were to be found at his death scattered throughout Germany. In Silesia they formed a distinct sect, which has lasted until our own times. In the 17th century they were associated with the followers of Jacob Böhme, and were undisturbed until 1708, when an inquiry was made as to their doctrines. In 1720 a commission of Jesuits was despatched to Silesia to convert them by force. Most of them fled from Silesia into Saxony, and thence to Holland, England, and North America. Frederick the Great of Prussia, when he seized Silesia, extended his protection to those who remained in that province. Those who had fled to Philadelphia, in Pennsylvania, formed a small community under the name of Schwenkfeldians; and Zinzendorf and Spangenberg, when they visited the United States, endeavored, but with little success, to convert them to their views. This community still exists in Pennsylvania, and according to information obtained from their ministers by Robert Barclay they consisted in 1875 of two congregations of 500 members, with three meeting-houses and six ministers. Their views appear to be substantially those of the English Society of Friends. See Robert Barclay's *Inner Life of the Religious Societies of the Commonwealth*, London, 1876, pp. 226–247.

Schwenkfeld's mysticism was the cause of his divergence from Protestant orthodoxy and the root of his peculiar religious and theological position. It led him to oppose the Lutheran view of the value of the outward means of grace, such as the ministry of the word, baptism, the Eucharist. He regarded as essential a direct and immediate participation in the grace of the glorified Christ, and looked on an observance of the sacraments and religious ordinances as immaterial. He distinguished between an outward word of God and an inward, the former being the Scriptures and perishable, the latter the divine spirit and eternal. In his Christology he departed from the Lutheran and Zwinglian doctrine of the two natures by insisting on what he called the *Vergottung des Fleisches Christi*, the deification or the glorification of the flesh of Christ. The doctrine was his protest against a separation of the human and the divine in Christ, and was intimately connected with his mystical view of the work of Christ. He held that, though Christ was God and man from His birth from the Virgin, He only obtained His complete deification and glorification by His ascension, and that it is in the state of His celestial *Vergottung* or glorification that He is the dispenser of His divine life to those who by faith become one with Him. This fellowship with the glorified Christ rather than a less spiritual trust in His death and atonement is with him the essential thing. His peculiar Christology was based upon profound theological and anthropological ideas, which contain the germs of some recent theological and Christological speculations.

See Arnoldt, *Kirchen- und Ketzer-Historie* (Frankfort, ed. 1700); Salig, *Historie der Augsburg. Confession;* Erbkam, *Gesch. der prot. Sekten* (1848); Dorner, *Gesch. d. prot. Theol.* (1867); also Erbkam's article in Herzog's *Realencyklopädie*, Robert Barclay's work quoted above, and Beard's *Hibbert Lectures* (1883).

SCHWERIN, the capital and one of the most attractive cities of the grand duchy of Mecklenburg-Schwerin, is prettily situated at the southwest corner of the Lake of Schwerin (14 miles long and 3½ miles broad), 110 miles northwest of Berlin. The town is closely surrounded and hemmed in by a number of lakelets, with high and in some cases well-wooded banks; and the hilly environs are occupied by meadows, woods, and pretty villas. The old and new towns of Schwerin were only united as one city in 1832; and since that date the suburb of St. Paul and another outer suburb, known as the Vorstadt, have grown up. Though Schwerin is the oldest town in Mecklenburg, its aspect is comparatively modern—a fact due to destructive fires, which have swept away most of the ancient houses. The most conspicuous of the many fine buildings is the ducal palace, a huge irregularly pentagonal structure with numerous towers (the highest 236 feet), built in 1844–57 in the French Renaissance style. It stands on a small round island between Castle Lake and the Lake of Schwerin, formerly the site of a Wendish fortress, and of a later mediæval castle, portions of which have been skilfully incorporated with the present building. The older and much simpler palace; the opera-house, rebuilt after a fire in 1882; the Government buildings, erected in 1825–34 and restored in 1865 after a fire; and the museum, in the Greek style, finished in 1882, all stand in the "old garden," an open space at the end of the bridge leading to the new palace. Among the other secular buildings are the palace of the heir-apparent (built in 1779 and restored in 1878), the large arsenal, the ducal stables, the gymnasium, the town-house, the artillery-barracks, the military hospital, etc. The cathedral was originally consecrated in 1248, though the present building—a brick structure in the Baltic Gothic style, with an unfinished tower—dates for the most part from the 15th century. Since 1837 Schwerin has been once more the residence of the grand duke, and the seat of government and of various high tribunals—a fact which has had considerable influence on the character of the town and the tone of its society. Neither the manufacturing industry nor the trade of Schwerin is important. In 1885 the population was 32,031—including about 700 Roman Catholics and 400 Jews—an increase of 6.4 per cent. since 1880.

Schwerin is mentioned as a Wendish stronghold in 1018, its name (Zwarin or Swarin) being a Slavonic word equivalent to "game-preserve." The Obotrite prince Niclot, whose statue is placed above the portal of the palace as the ancestor of the present reigning family, had his residence here. The town, founded in 1161, by Henry the Lion, in opposition to this pagan fortress, received town-rights in 1167. From 1170 to 1624 it gave name to a bishopric; and it was also the capital of the duchy of Schwerin, which forms the western part of the grand duchy of Mecklenburg-Schwerin. Destructive fires, the hardships of the Thirty Years' War, and the removal of the court to Ludwigslust in 1756, seriously depressed the town. It owes its revival and many of its chief buildings to the grand duke Paul Frederick (1837–42), to whom a statue by Rauch was erected in 1859.

SCHWIND, Moritz von (1804–1871), a painter of the romantic school, was born in Vienna in 1804. He received rudimentary training and led a joyous careless life in that gay capital; among his companions was the musician Schubert, whose songs he illustrated. In 1828 he removed to Munich, and had the advantage of the friendship of the painter Schnorr and the guidance of Cornelius, then director of the academy. In 1834 he received the commission to decorate King Louis's new palace with wall paintings illustrative of the poet Tieck. He also found in the same palace congenial sport for his fancy in a "Kinderfries;" his ready hand was likewise busy on almanacs, etc., and by his illustrations to Goethe and other writers he gained applause and much employment. In the revival of art in Germany Schwind held as his own the sphere of poetic fancy. To him was entrusted, in 1839, in the new Carlsruhe academy, the embodiment in fresco of ideas thrown out by Goethe; he decorated a villa at Leipsic with the story of Cupid and Psyche, and further justified his title of poet-painter by designs from the *Niebelungenlied* and Tasso's *Gerusalemme* for the walls of the castle of Hohenschwangau in Bavarian Tyrol. From the year 1844 dates his residence in Frankfort; to this period belong some of his best easel pictures, preëminently the Singers' Contest in the Wartburg (1846), also designs for the Goethe celebration, likewise numerous book illustrations. The conceptions for the most part are better than the execution. In 1847 Schwind returned to Munich on being appointed professor in the academy. Eight years later his fame was at its height on the completion in the castle of the Wartburg of wall pictures illustrative of the Singers' Contest and of the History of Elizabeth of Hungary. The compositions received universal praise, and at a grand musical festival to their honor Schwind himself played among the violins. In 1857 appeared his exceptionally mature "cyclus" of the Seven Ravens from Grimm's fairy stories. In the

same year he visited England to report officially to King Louis on the Manchester art treasures. And so diversified were his gifts that he turned his hand to church windows and joined his old friend Schnorr in designs for the painted glass in Glasgow cathedral. Towards the close of his career, with broken health and powers on the wane, he revisited Vienna. To this time belong the "cyclus" from the legend of Melusine and the designs commemorative of chief musicians which decorate the foyer of the new opera-house. Cornelius writes, "You have here translated the joyousness of music into pictorial art." Schwind's genius was lyrical; he drew inspiration from chivalry, folk-lore, and the songs of the people; his art was decorative, but lacked scholastic training and technical skill. Schwind died at Munich in 1871, and his body lies in the old Friedhof of the same town.

SCHWYZ, one of the forest cantons of Switzerland, ranking fifth in the confederation. It extends from the upper end of the Lake of Zurich on the north to the middle reach of the Lake of Lucerne on the south; on the west it touches at Küssnacht the northern arm of the latter lake, and at Arth the Lake of Zug, while on the east it stretches to the ridges at the head of the Muottathal, which divide it from Glarus. Its total area is 350.7 square miles, of which 254.9 are classed as "productive land" (193.3 of this being pasture or arable land) and 95.8 as "unproductive land" (glaciers and lakes occupying 21 square miles). The highest point is the Grieseltstock or Faulen (9200 feet); the summit of the Rigi (Rigi Kulm) is also within its limits. In 1880 the population (nearly equally divided between the two sexes) was 51,235, an increase of 3530 since 1870. The only towns of any size are Einsiedeln (population, 8401) and the capital, Schwyz (6543). German is the mother-tongue of 49,631 of the inhabitants, and there is an Italian colony of 1377. The Roman Catholics number 50,266, the Protestants but 954. Till 1814 the canton formed part of the diocese of Constance; since that time it is practically (though not formally) included in that of Chur. Besides a monastery of Capuchin friars and four nunneries, the canton boasts of the great Benedictine abbey of Einsiedeln, which grew up round the cell of the hermit St. Meinrad (d. 863); it received its first charter in 946 from Otho I., and contains a black statue of the Virgin, which attracts about 150,000 pilgrims annually. In Schwyz primary education is free and compulsory, the state also giving grants in aid of secondary instruction. The population are mainly engaged in pastoral occupations, the chief article of export (largely to north Italy) being a special breed of cattle, which enjoys a very high reputation in the confederation. The only railways in the canton are the portion of the St. Gotthard line between Küssnacht, Immensee, and Sisikon, and the line from Arth to the summit of the Rigi.

The valley of Schwyz first appeared in history in 970. Later a community of free men is found settled at the foot of the Mythen, possessing common lands and subject only to the count of the Zurich *gau*, as the representative of the emperor; from the Hapsburgs Steinen in 1269 and Arth (completely) in 1354 bought their freedom and became part of the free community of Schwyz. The early history of Schwyz consists mainly of struggles with the abbey of Einsiedeln about rights of pasture. In 1240 the inhabitants obtained from Frederick II. the "Reichsfreiheit," *i.e.*, direct dependence on the emperor, being thus freed from the Hapsburg counts of the Zurich *gau*. In 1273 the younger branch of the house of Hapsburg sold all its property and rights in the valley to the elder branch, which a few months later obtained the empire, and in April, 1291, bought the rights of the Alsatian Abbey of Murbach over Lucerne. Schwyz took the lead in making the famous league of 1st August, 1291, with the neighboring districts of Uri and Unterwalden, for which its position and the free spirit of its inhabitants specially fitted it. An attack by Schwyz on Einsiedeln was the excuse for the Austrian invasion which on the 15th November, 1315, was gloriously beaten back in Morgarten Pass. In the history of the league Schwyz was always to the front, so that its name in a dialectal form (Schweiz) was applied by foreigners from the 14th century onwards to the league as a whole, though it formed part of its formal style only from 1803. Soon after the victory of Sempach (1386) the men of Schwyz began to extend their borders. In 1394 they acquired the town of Einsiedeln (becoming in 1397, and finally in 1434, the "protectors" of the great abbey) and in 1402 Küssnacht, while in 1412–37 they won the "March," and in 1440 Wollerau and Pfäffikon,—all on or near the Lake of Zurich. All these districts were governed by the Schwyz as subjects, not as equals or allies, supreme power resting with the "Landsgemeinde" (or assembly of all citizens of full age) of Schwyz, which is first mentioned in 1294. Schwyz joined the other forest cantons, in opposing the Reformation, and took part in the battle of Cappel (1531), in which Zwingli fell. In 1586 it became a member of the Golden or Borromean League, formed to continue the work of Charles Borromeo in carrying out the counter-Reformation. In 1798 Schwyz, including Gersau (free since 1390), formed part of the "Tell gau" or "République Telliane," set up by the French, which a week later gave way to the "Helvetic republic," though the free men offered a valiant resistance under Aloys Reding. In 1799 it was the scene of the disastrous retreat from Altdorf to Glarus made over the Kinzigkulm and Pragel Passes by the Russians under Suwaroff in face of the French army. Schwyz steadily resisted all proposals for the revision of the federal constitution of 1815, joined the league of Sarnen in 1832, and, when religious disputes had further complicated matters, the "Sonderbund" (1843 and 1845), which was only put down by the war of November, 1847. The constitution of 1848 was revised in 1855, 1876 (when membership of one of the twenty-nine "Gemeinde" or communes became the political qualification), and 1884.

SCIACCA, a town of Italy, in the province of Girgenti, Sicily, 28 miles southeast of Castelvetrano (Selinus) and 37 northwest of Girgenti, lies on the south coast on a steep rocky decline, and with its walls and castles has from a distance an imposing appearance. The cathedral was founded in 1090 by Julia de Hauteville, daughter of Roger I., who had presented her with the lordship of Sciacca on her marriage with Perollo; and two other churches, S. Salvadore and S. Maria delle Giummare, date from the same period. In the cliffs are excavated granaries in which under the Spanish viceroys the grain used to be stored under Government control. To the east of the town, at the foot of Monte S. Calogero, are the hot wells (sulphurous and saline) of Sciacca; and the steam that breaks forth from the top of the hill seems to have been used (as it still is) for vapor baths from a remote (possibly Phœnician) period. The population was 21,451 (22,195 including Marina) in 1881.

Sciacca was the birthplace of Tommaso Fazello (1498–1570), the historian of Sicily. In the 15th century it was the scene of a terrible feud between the Perollos (lords of Sciacca) and the counts of Luna.

SCIATICA. See NEURALGIA, vol. xvii. p. 373.

SCILLY ISLES, a group of islands, about forty in number, in the county of Cornwall (see vol. vi. plate IX.), England, are situated about 25 miles west by south of Land's End and 40 west from Lizard Point, in 50° N. lat. and 6° W. long. They are composed wholly of granite,—outliers of the granite highlands of Cornwall. There are some metalliferous veins or lodes, but none that could ever have yielded much iron. On account of the mild climate the vegetation is remarkably luxuriant. The mean average temperature in winter is about 45° and in summer about 58°. Fuchsias, geraniums, and myrtles attain an immense size, and aloes, cactus, and the prickly pear grow in the open air. The inhabitants devote their attention principally to the cultivation of early potatoes for the London market. Asparagus and other early vegetables, as well as flowers, are also largely cultivated. Lobsters are caught and sent to London, but the fishing industry is of comparatively minor importance.

The total area of the islands is 3560 acres, with a population in 1871 of 2090, and in 1881 of 2320, including 276 persons on board vessels. The inhabited islands are St. Mary's (area about 1500 acres), Tresco (700), St. Martin's

(530), St. Agnes (350), and Bryher (300). The principal town, Hugh Town in St. Mary's, occupies a sandy peninsula crowned by the height called the Garrison, with Star Castle, erected in the time of Elizabeth. It possesses a harbor and pier with a roadstead affording anchorage for large vessels. The coast-line is wild and picturesque, with precipitous headlands and many extensive caves. On Tresco there are remains of an abbey; and St. Agnes has a lighthouse 72 feet in height. On the islands there are numerous rude pillars and circles of stones, similar to those in Cornwall.

The Scilly Isles are probably the *Cassiterides* or "Tin Islands" of the Greeks (see vol. xviii. p. 819). The islands were granted in 936 by Athelstan to the monks settled at Tresco, but on the endowment of the Abbey of Tavistock the greater portion of them were included amongst its possessions. In the reign of Elizabeth they were divided amongst several proprietors. During the Civil War Hugh Town held out for the king, and in 1645 afforded shelter for a time to Prince Charles until he escaped to Jersey. In 1649 they were taken possession of by Sir John Grenville, a Royalist, who made use of them as a convenient shelter, whence he issued to sweep the neighboring seas, until in 1651 he was forced to surrender to a fleet under Blake and Sir John Ayscue. In ancient times a frequent haunt of pirates, the islands were afterwards notorious for smuggling. On the suppression of smuggling Mr. Augustus J. Smith did much to introduce order and encourage habits of industry amongst the inhabitants.

SCINDE. See Sind.

SCIO, the Italian name of an island on the west coast of Asia Minor, called by the Greeks Chios (ἡ Χίος, ἡ τὴ Χίο) and by the Turks Saki Adasi; the soft pronunciation of χ before ι in Modern Greek, approximating to *sh*, caused Χίο to be Italianized as Scio. Scio, which is about 30 miles long from north to south, and varies in breadth from 8 to 15 miles, is divided into a larger northern part and a smaller southern part, called respectively *apanomeria* and *katomeria*. The island is rugged and well deserves the epithet "craggy" (παιπαλόεσσα) applied to it in the Homeric hymn. The southern part is less rocky than the northern, and the wealth of the island is concentrated there. The figs of Chios were noted in ancient times, but wine and gum mastic have always been its most important products. The climate is almost perfect, the atmosphere delightful and healthy; oranges, olives, and even palms grow freely. The finest wine was grown on the northwestern coast, in the district called by Strabo Ariusia, and was known in Italy as *vinum Arvisium*. The population of Chios has always been far greater than its resources could feed; the people have therefore been forced to import the necessaries of life in exchange for their wine and mastic and fruit, and alike in ancient and modern times they have been known as merchants and traders. Pottery of Chios and Thasos was exported to Illyria (Strab., p. 317) and doubtless elsewhere; it formed or contained the cargo of outward-bound trading ships. Thasian ware is familiar in museums, where the stamped handles of Thasian amphoræ have been collected in thousands; but no pottery has yet been identified as of Chian manufacture. An incidental proof of the importance of Chian handicrafts lies in the fact that early in the 7th century B.C. Glaucus of Chios discovered the process of soldering iron, and the iron stand of a large crater whose parts were all connected by this process was constructed by him, and preserved as one of the most interesting relics of antiquity at Delphi. The long line of Chian sculptors in marble, Bupalus and Athenis, sons of Archermus, son of Micciades, son of Melas, bears witness to the fame of Chian art in the period 660 to 540 B.C. The Winged Victory of Micciades and Archermus, which was dedicated at Delos, is still preserved,—the most important attested work extant of archaic Greek art. Marble quarries also were worked in the island. In literature the chief glory of Chios was the school of epic poets called Homeridæ, who carried on and gave an Ionic tone to the traditional art of the older Æolic bards. Cinæthus is said to have written the Homeric *Hymn to Apollo of Delos*, and is believed by some modern critics to have exercised great influence on the text of the *Iliad* and *Odyssey*. The Chian recension of these poems (Χία Ἔκδοσις) was in later times one of the standard texts. Ion the tragic poet, Theopompus the historian, and other writers maintained the position of Chios in literature during the classical period.

The chief city of Chios has always borne the same name as the island. It is situated near the middle of the eastern coast, and at the present day contains about 17,000 inhabitants. A theatre and a temple of Athena Poliuchus existed in the ancient city. About 6 miles north of the city there is a curious monument of antiquity, commonly called "the school of Homer"; it is a very ancient sanctuary of Cybele, with an altar and a figure of the goddess with her two lions, cut out of the native rock on the summit of a hill. On the west coast there is a monastery of great wealth with a church founded by Constantine IX. (1042–54). Starting from the city and encompassing the island, one passes in succession the promontory Posidium; Cape Phanæ, the southern extremity of Chios, with a harbor and a temple of Apollo; Notium, probably the southwestern point of the island; Laii, opposite the city of Chios, where the island is narrowest; the town Bolissus (now Volisso), the home of the Homerid poets; Melæna, the northwestern point; the wine-growing district Ariusia; Cardamyle (now Cardhamili): the northeastern promontory was probably named Phlium, and the mountains that cross the northern part of the island Pelinæus or Pellenæus. The situation of the small towns Leuconium, Delphinium, Caucasa, Cœla, and Polichne is uncertain; probably most of them were in the southern part. The island is subject to earthquakes; a very destructive shock occurred in March, 1881.

The history of Chios is very obscure. According to Pherecydes, the original inhabitants were Leleges, while according to other accounts Thessalian Pelasgi possessed the island before it became an Ionian state. The name Æthalia, common to Chios and Lemnos in very early time, suggests the original existence of a homogeneous population in these and other neighboring islands. Œnopium, a mythical hero, son of Dionysus or of Rhadamanthus, was an early king of Chios. His successor in the fourth generation, Hector, united the island to the Ionian confederacy (Pausan., vii. 4), though Strabo (p. 633) implies an actual conquest by Ionian settlers. The name Hector and the fountain Helene (probably at the modern Thelena in the north) might be expected in the island of the Homeridæ. The regal government was at a later time exchanged for an oligarchy or a democracy, but nothing is known as to the manner and date of the change. As in most other states of Greece, tyrants sometimes ruled in Chios; the names of Amphiclus and Polytecnus are mentioned. The early relations of Chios with other states are very obscure, but it seems to have been an ally of Miletus, and to have been at enmity with the Phocæo-Samian alliance, to which the neighboring Erythræ belonged. The same form of the Ionian dialect was spoken in Chios and in Erythræ.

When the Persians appeared on the Ionian coast Chios willingly submitted, refused to their old enemies the Phocæans, who were fleeing from the Persian yoke, a refuge on their islands Œnussæ, and even surrendered the Lydian fugitive Pactyes in defiance of all religious scruples. Strattis, tyrant of Chios, followed Darius in his Scythian expedition. The Chians joined in the Ionian rebellion against the Persians (500–495) and supplied 100 ships. After the Persian victory at Lade the island was most severely treated, the towns and temples burned, and many of the people enslaved. At Salamis (480) the Chian ships, led by the tyrant Strattis, served in the Persian fleet. After the battle of Mycale (479) the island became free and a democratic government no doubt took the place of the tyranny. Chios was the most powerful state after Athens in the Delian confederacy, and it was an ally on equal terms of the Athenian empire, paying no tribute, but furnishing ships in case of war. It remained a faithful ally of the Athenians till the year 412, when, encouraged by the weakness caused in Athens by the Sicilian disasters, it joined the Lacedæmonians. Its fleet then consisted of fifty ships. The Athenians defeated them in three battles, at Bolissus, Phanæ, and Leuconium, but could not reconquer the island. Finding the Spartan hegemony more oppressive than the Athenian, Chios returned to the Athenian connection in 394, but soon afterwards deserted and joined the Thebans. In the wars of Alexander the Great, Memnon, supported by the oligarchical party, held the island for the Persians. It was afterwards involved in the rapid vicissitudes of Ionian history, falling under the power of various dynasties among the *diadochi*. In the Mithradatic wars it

favored the Roman alliance, and the king's general Zenobius fined the island 2000 talents [in Attic silver = $2,369,350] and carried off a great number of the population into slavery in Pontus. It had many centuries of peaceful prosperity under Roman and Byzantine rule. The Genoese held it from the 14th century till in 1566 the Turks conquered it and the third great Chian disaster and massacre occurred. Except for a brief Venetian occupation in 1694, Chios has remained in Turkish hands till the present day. A fourth massacre afflicted the island in 1822, when the Turks repressed with fire and sword the attempted Greek insurrection. Till this terrible event the island was ruled very leniently by the Turks; the internal government was left in the hands of five archons, three Greek and two Catholic, while two resident Turkish officials represented the sultan and received through the archons the stipulated tribute. (W. M. RA.)

SCIPIO. The Scipios,[1] a memorable name in Roman history, were a branch of the ancient and noble family of the Cornelii. It was in Rome's wars with Carthage that they made themselves specially famous.

1. PUBLIUS CORNELIUS SCIPIO, the father of the Elder Africanus, was the first Roman general to encounter Hannibal in battle. He was consul in 218 B.C., the first year of the Second Punic War, and, having Spain for his province, he went with an army to Massilia (Marseilles) with the view of arresting the Carthaginian's advance on Italy. Failing, however, to meet his enemy, he hastened back by sea to Cisalpine Gaul, leaving his army under the command of his brother Cneius Scipio, who was to harass the Carthaginians in Spain and hinder them from supporting Hannibal. In a sharp cavalry engagement in the upper valley of the Po, on the Ticinus, he was defeated and severely wounded, and it is said he owed his life to the bravery of his son, then a mere stripling. Again, in the December of the same year, he witnessed the complete defeat of the Roman army on the Trebia, his colleague Sempronius having insisted on fighting contrary to his advice. But he still retained the confidence of the Roman people, since his term of command was extended, and we find him with his brother in Spain in the following year, winning victories over the Carthaginians and strengthening Rome's hold on that country, till 212 or 211. The details of these campaigns are not accurately known to us, but it would seem that the ultimate defeat and death of the Scipios were due to the desertion of the Celtiberi, bribed by Hasdrubal, Hannibal's brother.

2. PUBLIUS CORNELIUS SCIPIO AFRICANUS THE ELDER.—After having been present at the disastrous battles of the Ticinus, the Trebia, and Cannæ, and having after that last crushing defeat had the spirit to remonstrate with several Roman nobles who advocated giving up the struggle and quitting Italy in despair, Scipio, at the age of twenty-four, offered to take the command of the Roman army in Spain the year after his father's death. The people already had an intense belief in him, and he was unanimously elected. All Spain west of the Ebro was in the year of his arrival (210) under Carthaginian control, but fortunately for him the three Carthaginian generals, Hasdrubal (Hannibal's brother), Hasdrubal the son of Gisgo, and Mago (also Hannibal's brother), were not disposed to act in concert. Scipio was thus enabled to surprise and capture New Carthage, the headquarters of the Carthaginian power in Spain, from which he obtained a rich booty of war stores and supplies, with a particularly good harbor. The native Spanish tribes now became friendly, and Scipio found useful allies among them. In the following year he fought Hasdrubal somewhere in the upper valley of the Guadalquivir, but the action could hardly have been a decisive one, as soon afterwards the Carthaginian crossed the Pyrenees at the head of a considerable army on his way to Italy. Next year another battle was fought in the same neighborhood, and Scipio's success appears to have been sufficiently decided to compel the Carthaginian commanders to fall back on Gades, in the southwestern corner of Spain. The country was now for the most part under Roman influence, a result due even more to the statesmanlike tact of Scipio than to his military ability. With the idea of striking a blow at Carthage in Africa, the Roman general paid a short visit to the Numidian princes, Syphax and Masinissa, but at the court of Syphax he was foiled by the presence of Hasdrubal, the son of Gisgo, whose daughter Sophonisba was married to the Numidian chief. On his return to Spain Scipio had to quell a mutiny which had broken out among his troops. Hannibal's brother Mago had meanwhile sailed for Italy, and Scipio himself in 206, after having established the Roman ascendency in Spain, gave up his command and returned to Rome to stand for the consulship, to which he was unanimously elected the following year, the province of Sicily being assigned to him. By this time Hasdrubal with his army had perished on the Metaurus, and Hannibal's movements were restricted to the southwestern extremity of Italy. For Rome the worst part of the struggle was over. The war was now to be transferred by Scipio from Italy to Africa. He was himself eagerly intent on this, and his great name drew to him a number of volunteers from all parts of Italy. There was but one obstacle: the old-fashioned aristocracy of Rome did not like him, and his taste for splendid living and Greek culture was particularly offensive to them. A party in the senate would have recalled him, but the popular enthusiasm was too strong for them. A commission of inquiry was sent over to Sicily, and it found that he was at the head of a well-equipped fleet and army. At the commissioners' bidding he sailed in 204 from Lilybæum (Marsala) and landed on the coast of Africa near Utica. Carthage meanwhile had secured the friendship of the powerful Numidian chief Syphax, whose advance compelled Scipio to raise the siege of Utica and to entrench himself on the shore between that place and Carthage. Next year he surprised and utterly defeated Syphax and drove the Carthaginian army out of the field. There was an attempt at negotiation, but the war party prevailed and Hannibal was recalled from Italy. The decisive battle was fought near the Numidian town of Zama in 202 and ended in Hannibal's complete defeat. Peace was concluded with the Carthaginians in the following year on terms which strictly confined their dominion to a comparatively small territory in Africa, almost annihilated their fleet, and exacted a heavy war contribution. In fact, the independence of Carthage was destroyed, and it became simply a rich commercial city. The old-fashioned and narrow-minded aristocrats who were in sympathy with the "delenda est Carthago" policy subsequently announced by Cato thought these terms too lenient; but Scipio was too great and too generous a man to lend himself to the base work of utterly extinguishing an ancient and noble centre of civilization. Rome was now perfectly safe from attack. It was a great Mediterranean power: Spain and Sicily were Roman provinces, and the north of Africa was under a Roman protectorate. Such was the end, after seventeen years, of the Second Punic War. Scipio was welcomed back to Rome with the surname of Africanus, and he had the moderation and good sense to refuse the many honors which the people would have thrust upon him. For some years he lived quietly and took no part in politics. In 190 his brother Lucius Scipio was consul and, on the understanding that he should have the benefit of the military skill and experience of Africanus, he was entrusted with the war in Asia against Antiochus. The two brothers brought the war to a conclusion by a decisive victory at Magnesia in the same year. Meanwhile Scipio's political enemies had gained ground, and on their return to Rome a prosecution was started against Lucius on the ground of misappropriation of moneys received from Antiochus. As Lucius was in the act of producing his account-books his brother wrested them from his hands, tore

[1] The name means a "stick" or "staff."

them in pieces, and flung them on the floor of the senate-house. He was then himself accused of having been bribed by Antiochus, but he reminded his accusers that the day was ill chosen, as it happened to be the anniversary of his great victory over Hannibal at Zama. There was an outburst of enthusiasm, and Scipio was once again the hero and the darling of the Roman people, who, it is said, crowded round him and followed him to the Capitol. After all, however, he ended his days, as a voluntary exile in all probability, at Liternum on the coast of Campania, dying, it would seem, in 183, the year of Hannibal's death, when a little above fifty years of age. Scipio's wife was Æmilia, daughter of the Æmilius Paullus who fell at Cannæ and who was the father of the conqueror of Macedonia. By her he had a daughter, Cornelia, who became the mother of the two famous Gracchi.

Spain, Northern Africa, the so-called province of Asia, were added to Rome's dominion during his life. Scipio lived to see Rome develop from a merely Italian power to be in fact the mistress of the world, and he himself greatly contributed to this result. Among Rome's great generals we must rank him after Cæsar. He knew how to plan a campaign as well as how to fight a battle, and he had the faculty of inspiring his soldiers with confidence and enthusiasm. He never had to make head against such tremendous difficulties as his great antagonist, and his achievements, great as they were, must be distinctly ranked beneath the marvellous successes of Hannibal. Still the story was told that, in a conversation between the two generals at the court of Antiochus, Hannibal, who had named Alexander as the first and Pyrrhus as the second among military commanders, confessed that had he beaten Scipio he should have put himself before either of them. It seems to be at any rate certain that the two great men respected and admired each other, and it is much to Scipio's credit that he withstood the mean persecution with which the Roman senate followed up the Carthaginian. It may be that he had rather too much aristocratic *hauteur* for a statesman in time of peace, but against this we must set the pleasing fact that he was a man of great intellectual culture and could speak and write Greek just as well as his native Latin. He wrote his own memoirs in Greek. There must indeed have been a wonderful charm about the man, and there was a belief that he was a special favorite of heaven and held actual communication with the gods. It is quite possible too that he himself honestly shared this belief; and so it was that to his political opponents he could be harsh and arrogant, and towards others singularly gracious and sympathetic. For a time he enjoyed a popularity at Rome which no one but Cæsar ever attained.

3. Publius Cornelius Scipio Africanus the Younger.—This Scipio, also one of Rome's greatest generals, was the younger son of Æmilius Paullus, and he fought when a youth of seventeen by his father's side at Pydna, 168,—the battle which decided the fate of Macedonia and made northern Greece subject to Rome. He was adopted by the eldest son of Scipio Africanus the Elder, and from him took the name Scipio with the surname Africanus. In 151, a time of defeat and disaster for the Romans in Spain, which as yet had been but very imperfectly subjugated, he served with credit in that country and obtained an influence over the native tribes similar to that which the elder Scipio, his grandfather by adoption, had acquired nearly sixty years before him. In the next year an appeal was made to him by the Carthaginians to act as arbiter between them and the Numidian prince Masinissa, who, backed up by a party at Rome, was incessantly encroaching on Carthaginian territory. Rome's policy in Africa was to hold the balance between Masinissa and Carthage, and, when it was seen that Carthage, as the result of several years of peace, was again becoming a prosperous and powerful city, there grew up a feeling at Rome that the Numidian king must be supported and their old rival thoroughly humiliated. Marcus Cato and his party would hear of no compromise; Carthage, they said, must be destroyed if Rome was to be safe. It was easy to find a pretext for war in the disputes between Carthage and Masinissa. In 149 war was declared, and the Carthaginians felt it to be a life-and-death struggle: every man and every woman labored to the uttermost for the defence of the city with a furious enthusiasm. The Roman army, in which Scipio at first served in a subordinate capacity, was utterly baffled. In the following year he was elected consul, while yet under the legal age, for the express purpose of giving him the supreme command. After two years of desperate fighting and splendid heroism on the part of the defenders, the famished garrison could no longer hold the walls: Carthage was captured, and the ruins of the city were burning for seventeen days; Rome decreed that the place should be forever desolate. On his return to Rome Scipio became the subject of violent political attacks, against which he successfully defended himself in speeches (no longer extant) that ranked as brilliant specimens of oratory. In 134 he was again consul, with the province of Spain, where a demoralized Roman army was vainly attempting the conquest of Numantia on the Douro. Scipio, after devoting several months to the discipline of his troops, reduced the city by blockade. The fall of Numantia, which was utterly destroyed in 133, established the Roman dominion in the province of Hither or Nearer Spain, the eastern portion of that country. Rome meanwhile was shaken by the great political agitation of the Gracchi, whose sister Sempronia was Scipio's wife. Scipio himself, though not in sympathy with the extreme men of the old conservative party, was decidedly opposed to the schemes of the Gracchi. "Justly slain" (jure cæsum) is said to have been his answer to the tribune Carbo, who asked him before the people what he thought of the death of Tiberius Gracchus. This gave dire offence to the popular party, which was now led by his bitterest foes. Soon afterwards, in 129, he was found dead in bed on the morning of a day on which he had intended to make a speech on a point connected with the agrarian proposals of the Gracchi,—"a victim of political assassination" Mommsen confidently pronounces him. The mystery was never cleared up, and there were political reasons for letting the matter drop.

The Younger Scipio, great general and great man as he was, is forever associated with a hideous work of destruction at Carthage, which we feel he might have done more to avert. Yet he was a man of culture and refinement; he gathered round him such men as the Greek historian Polybius, the philosopher Panætius, and the poets Lucilius and Terence. And at the same time, according to Polybius and Cicero, he had all the good sterling virtues of an old-fashioned Roman, and steadily set his face against the increasing luxury and extravagance of his day. As a speaker he seems to have been no less distinguished than as a soldier. He spoke remarkably good and pure Latin, and he particularly enjoyed serious and intellectual conversation. There seems to have been nothing mean or grasping about him. After the capture of Carthage he gave back to the Greek cities of Sicily the works of art of which Carthage had robbed them. He did not avail himself of the many opportunities he must have had of amassing a fortune. Though politically opposed to the Gracchi, he cannot be said to have been a foe to the interests of the people. He was, in fact, a moderate man, in favor of conciliation, and he was felt by the best men to be a safe political adviser, while, as often happens in such cases, he could not help offending both parties.

4. Scipios are continually appearing in Roman history in more or less prominent positions down to the time of the empire. One of them, Scipio Nasica (Nasica denoting an aquiline nose), contemporary of the Younger Africanus, instigated the murder of Tiberius Gracchus, whom the people were bent on reëlecting (133) to the tribuneship. Though he was pontifex maximus at the time, the senate, to save him, had to get him away from Rome, and he left never to return, dying soon afterwards in Asia. (W. J. B.)

SCIRE FACIAS, in English law, is a judicial writ founded upon some record directing the sheriff to make it known (*scire facias*) to the party against whom it is brought, and requiring the latter to show cause why the party bringing the writ should not have the

advantage of such record, or why (in the case of letters patent and grants) the record should not be annulled and vacated. Proceedings in *scire facias* are regarded as an action, and the defendant may plead his defence as in an action. The writ is now of little practical importance; its principal uses are to compel the appearance of corporations aggregate in revenue suits, and to enforce judgments against shareholders in such companies as are regulated by the Companies Clauses Act, 1845, or similar private Acts, and against garnishees in proceedings in foreign attachment in the lord mayor's court. Proceedings by *scire facias* to repeal letters patent for inventions were abolished by the Patents, Designs, and Trademarks Act, 1883, and a petition to the court substituted.

SCOPAS. See ARCHÆOLOGY, vol. ii. p. 315.

SCORESBY, WILLIAM (1789–1857), English arctic explorer and physicist, was born near Whitby, Yorkshire, on 5th October, 1789. His father, also named William, who achieved distinction as an arctic whaler, was the son of a farmer near Crompton, Lancashire, where he was born on 3d May, 1760. He went to sea when he was twenty years of age, and became one of the most prominent and successful, as well as daring, of arctic whale-fishers. In 1823 he retired with an ample competency, and died in 1829. Young Scoresby made his first voyage with his father to Greenland in 1800, when he was only eleven years of age. On his return, up to 1803, he diligently pursued his education, acquiring a very fair knowledge of mathematics and navigation. From 1803 he was his father's constant companion to the whale-fishery. On 25th May, 1806, as chief officer of the "Resolution," he succeeded in reaching 81° 30′ N.[1] in 19° E. long., the farthest point north attained by any navigator up to that date. On his return, during the following winter, Scoresby attended the natural philosophy and chemistry classes in Edinburgh university, as he did again in 1809, when he added several other subjects. In his voyage of 1807 he commenced, as in all subsequent voyages he continued, the study of the meteorology and natural history of the polar regions; among the earlier results are his original observations on snow crystals. In 1809 Professor Jameson of Edinburgh brought Scoresby's arctic papers before the Wernerian Society of that city, of which he was at once elected a member. Soon after attaining his majority, in 1811, Scoresby was promoted to the command of the "Resolution," and in the same year married the daughter of a shipbroker. In 1813 he changed the "Resolution" for the "Esk," in both vessels bringing home large and profitable captures. In his voyage of 1813 Scoresby ascertained that the temperature of the polar ocean is warmer at considerable depths than it is on the surface. Each subsequent spring found Scoresby in search of whales, and no less eagerly of fresh additions to scientific knowledge. His letters of this period to Sir Joseph Banks no doubt gave the first impulse to the modern search for the northwest passage. In 1819 he was elected a fellow of the Royal Society of Edinburgh, and among other papers of the year was one communicated to the Royal Society of London through Sir Joseph Banks, "On the Anomaly in the Variation of the Magnetic Needle," touching upon a subject of the first scientific importance. In 1820 appeared Scoresby's *History and Description of the Arctic Regions*, in which he gathers up the results of his own observation, as well as those of previous navigators, and which still remains a standard authority. In his voyage of 1822 to Greenland, among other scientific work, Scoresby surveyed 400 miles of the east coast, between 69° 30′ and 72° 30′ N., with so much accuracy that the Government expeditions of the next year were unable to make any substantial correction, although they attempted to ignore his work. This was the last of Scoresby's arctic voyages. On his return he found his wife dead, and this event, acting upon his naturally pious spirit along with other influences, decided him to enter the church. After two years of residence in Cambridge, he in 1825 was ordained and on 17th July was appointed curate of Bassingby. Meantime had appeared at Edinburgh, in 1823, his *Journal of a Voyage to the Northern Whale-Fishery, including Researches and Discoveries on the Eastern Coast of Greenland.* The faithful and successful discharge of his clerical duties at Bassingby, in the mariners' chapel at Liverpool, at Exeter, and at Bradford did not prevent Scoresby from taking as much interest in science as he did during his whaling voyages. In 1824 the Royal Society elected him a fellow, and the Paris Academy of Sciences an honorary corresponding member. From the first he was an active member and official of the British Association, to which he made several important contributions, one being "An Exposition of some of the Laws and Phenomena of Magnetic Induction." To the progress of terrestrial magnetism especially Scoresby is recognized as having largely contributed. Of the sixty papers which follow his name in the Royal Society list many are more or less connected with this department of research. But his observations extended into many other departments, including certain branches of optics. In order to obtain additional data for his theories on magnetism he made a voyage to Australia in 1856, the results of which were published in a posthumous work,—*Journal of a Voyage to Australia for Magnetical Research*, edited by Archibald Smith (1859). He made two visits to America, in 1844 and in 1848; on his return home from the latter visit he made some valuable observations on the height of Atlantic waves, the results of which were given to the British Association. Scoresby interested himself much in social questions, especially the improvement of the condition of factory operatives. He also published numerous works and papers of a religious character, a list of which, as well as of his many scientific papers, is appended to the *Life of William Scoresby* by his nephew, Dr. R. E. Scoresby-Jackson (1861). In 1850 he published a work on the Franklin Expedition, urging the prosecution of the search for the missing ships, and giving the valuable results of his own experience in arctic navigation. Scoresby was twice married after the death of his first wife,—to Miss Elizabeth Fitzgerald in 1828, and in 1849 to Miss Georgina Kerr. After his third marriage Scoresby built a villa at Torquay, where he spent the remainder of his life, and where he died, 21st March, 1857. He was a man of simple but deep piety, amiable, cheerful, and guileless.

SCORPION. See ARACHNIDA, vol. ii. p. 247 *sq.*

SCOT, MICHAEL, whose fame as a magician has surrounded his history with legend, is sometimes claimed by the Italians as a native of Salerno and by the Spaniards as a native of Toledo; but there is no reason to doubt the Scottish origin to which his name testifies. Scottish tradition is unanimous in identifying him with Sir Michael Scot of Balwearie in Fifeshire, but the ascertainable dates place some difficulties in the way of this. The traditional date of Scot's birth is 1190, but this does not harmonize well with the embassy to Norway attributed to Sir Michael Scot in 1290. Some accordingly have fixed the date of his birth approximately as 1214, but apparently without any further reason than is afforded by the supposed date of his death in 1291. But Jourdain[2] refers to certain manuscript translations of Scot's which are expressly dated "1217 at Toledo." This would accord fairly well with the date 1190, the translations being executed by Scot soon after the conclusion of his student period. Scot is said to have studied at Oxford, whence he proceeded, as was usual, to Paris, then the centre of me-

[1] [C. R. Markham in POLAR REGIONS, vol. xix. p. 330, says that in 1806 he advanced his ship as far north as 81° 12′ 42″, and, of the voyage in 1822 mentioned below, that he surveyed the east coast of Greenland from 75° to 69° N.—AM. ED.]

[2] *Recherches sur les anciennes traductions Latines d'Aristote*, p. 133.

diæval learning, devoting himself especially to philosophy and mathematics. Du Boulay, the historian of the university of Paris, adds that he received the degree of doctor of theology and acquired a brilliant reputation in that faculty. There is no evidence of this, however, in his writings. At Toledo, where he also studied, Scot acquired a knowledge of Arabic. It is not likely that his knowledge extended to Greek and the other Eastern tongues mentioned by the earlier bibliographers. His knowledge of Arabic was sufficient to open up to him the Arabic versions of Aristotle and the multitudinous commentaries of the Arabians upon them, with which Western Christendom had only lately become acquainted in Latin translations (see SCHOLASTICISM). It also brought him into contact with the original works of Avicenna and Averroes. His own first work was done as a translator. He was one of the savants whom Frederick II. attracted to his brilliant court, and at the instigation of the emperor he superintended (along with Hermannus Alemannus) a fresh translation of Aristotle and the Arabian commentaries from Arabic into Latin. There exist translations by Scot himself of the *Historia Animalium*, the *De Anima*, and *De Cœlo*, along with the commentaries of Averroes upon them. This connection with Frederick and Averroes—both of evil reputation in the Middle Ages—doubtless contributed to the formation of the legend which soon enveloped Michael Scot's name. His own books, however, dealing as they do almost exclusively with astrology, alchymy, and the occult sciences generally, are mainly responsible for his popular reputation. The chief of these according to the more critical views of recent investigators are *Super Auctorem Sphereæ*, printed at Bologna in 1495 and at Venice in 1631; *De Sole et Luna*, printed at Strasburg, 1622, in the *Theatrum Chimicum*, and containing more alchemy than astronomy, the sun and moon being taken as the images of gold and silver; *De Chiromantia*, an opuscule often published in the 15th century; and perhaps best known of all, *De Physiognomia et de Hominis Procreatione*, which saw no fewer than eighteen editions between 1477 and 1660. This treatise is divided into three books, of which the first deals with generation according to the doctrine of Aristotle and Galen, the second with the signs by which the character and faculties of individuals may be determined from observation of different parts of the body. The *Physiognomia* (which also exists in an Italian translation) and the *Super Auctorem Sphereæ* expressly bear that they were undertaken at the request of the emperor Frederick. To the above list should be added certain treatises in manuscript,—*De Signis Planetarum; Contra Averrhoem in Meteora; Notitia Convinctionis Mundi Terristris cum Cœlesti, et de Definitione utriusque Mundi; De Præsagiis Stellarum et Elementaribus.* Michael is said to have foretold (after the double-tongued manner of the ancient oracles) the place of Frederick's death, which took place in 1250. The Italian tradition makes Scot die in Sicily not long afterwards, stating that he foretold the manner of his own death. Jourdain is inclined to agree with this approximate date, observing that Scot is spoken of by Albert the Great as if he were already dead, and that Vincent of Beauvais (d. *c.* 1268) quotes him with the epithet "vetus." But the generally received tradition makes him return by way of England (where he was received with much honor by Edward I.) to his native country. The ordinary accounts give 1291 as the date of Scot's death. According to one tradition he was buried at Holme Cultram in Cumberland; according to another, which Sir Walter Scott has followed in the *Lay of the Last Minstrel*, in Melrose Abbey. In the notes to that poem, of which the opening of the wizard's tomb forms the most striking episode, Scott gives an interesting account of the various exploits attributed by popular belief to the great magician. "In the south of Scotland any work of great labor and antiquity is ascribed either to the agency of Auld Michael, of Sir William Wallace, or the devil." He used to feast his friends with dishes brought by spirits from the royal kitchens of France and Spain and other lands. His embassy to France alone on the back of a coal-black demon steed is also celebrated, in which he brought the French monarch to his feet by the effects which followed the repeated stamping of his horse's hoof. Other powers and exploits are narrated in Folengo's Macaronic poem of *Merlin Coccaius* (1595).[1] But Michael's reputation as a magician was already fixed in the age immediately following his own. He appears in the *Inferno* of Dante (canto xx. 115–117) among the magicians and soothsayers—

> "Quell' altro, che ne' fianchi è cosi poco,
> Michele Scotto fù; che veramente
> Delle magiche frode seppe il giuoco."

He is represented in the same character by Boccaccio, and is severely arraigned by John Pico de Mirandola in his work against astrology, while Naudé finds it necessary to defend his good name in his *Apologie pour les grands personnages faussement accusés de magie.*

SCOT, REGINALD (*c.* 1538–1599), was the son of Richard, third son of Sir John Scot of Scotshall, Smeeth (Kent), studied at Hart Hall in Oxford, and afterwards lived in studious retirement at Smeeth, dying in 1599. He was the author of a very remarkable book, *The Discoverie of Witchcraft*, the object of which was to put an end to the cruel persecution of witches, by showing that "there will be found among our *Witches* only *two sorts;* the *one sort* being such by imputation, as so thought of by others (and these are abused and not abusers), the *other* by *acceptation*, as being *willing* so to be *accounted*, and these be meer *Coseners.*" This thesis is worked out in sixteen books, with great learning and acuteness, in a spirit of righteous indignation against the witch-mongers. Scot was far in advance of his time, and his book, of which the first edition appeared in 1584, was burned by order of King James I. The book is still interesting, not only as having anticipated Bekker by a century, but for the great mass of curious details as to every branch of so-called witchcraft which it contains. It also takes up natural magic and conjuring at considerable length (bk. xiii.), and contains an argument against "alchymistry" (bk. xiv.).

Scot also published in 1574 *A perfite Platforme of a Hoppe Garden* (3d ed. 1578), which is noteworthy as having originated the cultivation of the hop in England. A second edition of the *Discoverie* appeared in 1651 and a third in 1665; the latter contained nine new chapters, prefixed by an anonymous hand to bk. xv. of the *Discoverie*, and the addition of a second book to the "Discourse concerning Angels and Spirits."

See B. Nicholson's *Scot's Discovery of Witchcraft*, London, 1886.

SCOTER, a word of doubtful origin, perhaps a variant of "Scout," one of the many local names shared in common by the GUILLEMOT (vol. xi. p. 232) and the RAZORBILL (vol. xx. p. 315), or perhaps primarily connected with COOT (vol. vi. p. 303),[2] the English name of the *Anas nigra* of Linnæus, which with some allied species has been justifiably placed in a distinct genus, *Œdemia* (often misspelt *Oidemia*) —a name coined in reference to the swollen appearance of the base of the bill. The Scoter is also very generally known around the British coasts as the "Black Duck" from the male being, with the excep-

[1] [This work was first published at Venice in 1520 and in French in 1606. See Lorenz, *Catalogue de la Librairie.* The *Catalogue of Early English Books to* 1640 in the British Museum does not contain Folengo's poem.—AM. ED.]

[2] In the former case the derivation seems to be from the O. French *Escoute*, and that from the Latin *auscultare* (comp. Skeat, *Etymol. Dictionary*, p. 533), but in the latter from the Dutch *Koet*, which is said to be of Celtic extraction—*cwtiar* (*op. cit.*, p. 134). The French *Macreuse*, possibly from the Latin *macer*, indicating a bird that may be eaten in Lent or on the fast days of the Roman Church, is of double signification, meaning in the south of France a Coot and in the north a Scoter. By the wild-fowlers of parts of North America Scoters are commonly called Coots.

tion of a stripe of orange that runs down the ridge of the bill, wholly of that color. In the representative American form, *Œ. americana*, the protuberance at the base of the bill, black in the European bird, is orange as well. Of all Ducks the Scoter has the most marine habits, keeping the sea in all weathers, and rarely resorting to land except for the purpose of breeding. Even in summer small flocks of Scoters may generally be seen in the tideway at the mouth of any of the larger British rivers or in mid-channel, while in autumn and winter these flocks are so increased as to number thousands of individuals, and the water often looks black with them. A second species, the Velvet-Duck, *Œ. fusca*, of much larger size, distinguished by a white spot under each eye and a white bar on each wing, is far less abundant than the former, but examples of it are occasionally to be seen in company with the commoner one, and it too has its American counterpart, *Œ. velvetina;* while a third, only known as a straggler to Europe, the Surf-Duck, *Œ. perspicillata*, with a white patch on the crown and another on the nape, and a curiously parti-colored bill, is a not uncommon bird in North-American waters. All the species of *Œdemia*, like most other Sea-Ducks, have their true home in arctic or subarctic countries, but the Scoter itself is said to breed occasionally in Scotland (*Zoologist*, s.s. p. 1867). The females display little of the deep sable hue that characterizes their partners, but are attired in soot-color, varied, especially beneath, with brownish white. The flesh of all these birds has an exceedingly strong taste, and, after much controversy, was allowed by the authorities to rank as fish in the ecclesiastical dietary (cf. Graindorge, *Traité de l'origine des Macreuses*, Caen, 1680; and *Correspondence of John Ray*, Ray Soc. ed., p. 148).

SCOTLAND.

PART I.—HISTORY.

1. *Roman Period.*—The first certain lines of the history of Scotland were written by the Romans. Their account of its partial conquest and occupation for more than three hundred years gives the earliest facts to which fixed dates can be assigned. The invasion commenced by Julius Cæsar reached in Agricola's last campaign limits never afterwards exceeded. It was in the last year of Vespasian's life that Julius Agricola, the ablest general bred in his camp, came to command the army in Britain. Landing in midsummer, 78, he at once commenced a campaign against Wales. In his second campaign he passed the Solway and, defeating the tribes of Galloway, introduced rudiments of Roman civilization in the district where Ninian taught the rudiments of Christianity three centuries later. This was the first conquest within modern Scotland. Two main roads, of which traces can still be seen, mark his advance: the western, from Carlisle through Dumfries and Lanark, extends across the Clyde to Camelon on the Carron; and the eastern, from Bremenium (High Riechester) in Northumberland, passes through Roxburgh and Lothian to the Forth at Cramond. Next year Agricola subdued unknown tribes, reached the estuary of the Tay, and occupied camps at various points of central Scotland, in the future shires of Stirling and Perth. Traces of them are still visible at Bochastle near Callander, Dalginross near Comrie, Fendoch on the Almond, Inveralmond at the junction of the Almond with the Tay near Perth, Ardargie on the north of the Ochils, and the great camp at Ardoch south of Crieff. The fourth year of his command was devoted to the construction of a line of forts between the Forth and the Clyde. This barrier, strengthened by a wall in the reign of Antoninus Pius, guarded the conquests already made against the Caledonians—the general Latin name of the northern tribes of the forests and mountains, the Highlanders of later times—and, in connection with camps already occupied in the lowlands of Perthshire, formed the base for further operations. In the fifth year Agricola crossed the Clyde, and, without making any permanent conquest on the western mainland, viewed from Cantyre the coast of Ireland. Statements by one of its chiefs as to the character and factions of that country, whose ports were already known to Roman merchants, led to the opinion communicated to Tacitus by Agricola, that with a single legion and a few auxiliaries he could reduce it to subjection. The number of legions in the Roman army of Britain was fixed at five, besides auxiliaries and cavalry,—a total of perhaps 50,000 men. The resistance of northern Britain explains why the easier conquest was not undertaken. A year was required to explore the estuaries of the Forth and the Tay with the fleet. The absence of camps indicates that no attempt was made to conquer the peninsula of Fife, perhaps a separate kingdom; and Agricola prepared to advance against the Caledonians. Two years' fighting, although Tacitus chronicles only an assault on the advanced camp of the IXth legion (at Lintrose (?) near Coupar Angus), passed before the final engagement known in history as the battle of the Grampians (84). It was probably fought in the hilly country of the Stormont near Blairgowrie, the Celts descending from strongholds in the lowest spurs of the Grampians and attacking the Romans, whose camp lay near the junction of the Isla and the Tay. It decided that the Roman conquest was to stop at the Tay. Galgacus, the Caledonian leader, was, according to the Roman historian, defeated; but in the following winter Agricola retreated to the camps between the Forth and the Clyde, while the fleet was sent round Britain. Starting probably from the Forth and rounding the northern capes, it returned after establishing the fact, already suspected, and of so much consequence in future history, that Britain was an island,—planting during its progress the Roman standard on the Orkneys, which had for several centuries been known by report, and sighting Shetland, the Thule of earlier navigators. Agricola, with one legion —probably the IXth, which had suffered most—was now recalled by Domitian.

Agricola's campaigns.

78–120.

The absence of any notice of Britain for twenty years implies the cessation of further advances,—a change of policy due to the reverses in the Dacian War and the financial condition of the empire.

The indefatigable Hadrian came to Britain (120) with the VIth legion, named Victrix, which replaced the IXth. He began, and his favorite general Aulus Plautorius Nepos completed, between the mouth of the Tyne near Newcastle, and the Solway near Carlisle, the great wall of stone (see HADRIAN, WALL OF), about 80 miles in length, 16 feet high, and 8 feet thick, protected on the north by a trench 34 feet wide and 9 deep, with two parallel earthen ramparts and a trench on the south,—proving the line required defence on both sides.[1] Massive fragments of the wall, its stations, castles, and protecting camps, with the foundation of a bridge over the North Tyne, may be still seen. It was garrisoned by the VIth legion, and by the XIth and XXth, which remained throughout the whole Roman occupation. The conquests of Agricola in what is modern Scotland were for a time abandoned. Hadrian's wall was the symbol of the strength of Rome, and also of the valor of the northern Britons. There must have been a stubborn resistance to induce the conquerors of the world to set a limit to their province, though the roads through the wall showed they did not intend this limit to be permanent. The first step had been taken. The country between the Tyne and Solway and the Forth and Clyde, including the southern Lowlands of Scotland, was now within the scope of Roman history, if not yet of Roman civilization. The country north of the last two rivers remained barbarous and unknown under its Celtic chiefs. Hadrian had thus resumed the task of Agricola, in one of the rapid campaigns by which he consolidated the empire through visits to its most distant parts; but it is doubtful whether he passed beyond the wall, which continued to separate the Romans from the barbarians. In the reign of his successor, Antoninus Pius, Lollius Urbicus recovered the country from the wall of Hadrian to the forts of Agricola, and built an earthen rampart about half the length of the southern wall, 20 feet high and 24 thick, protected on the north by a trench 40 feet wide and 20 deep. It was known later as Grim or Graham's dyke. Remains may yet be seen between Carriden near Borrowstounness on the Forth and West Kilpatrick on the Clyde, with forts either then or subsequently erected at intermediate stations, connected by a military road on the south of the wall.

Hadrian's wall.

About this period Ptolemy composed the first geography of the world, illustrated by maps—probably constructed somewhat later—of Ireland and Britain, still called Albion.[2] South of modern Scotland the plan and description of the distances are generally accurate, but north of the Solway (Itunæ Æstuarium) and the Wear (? Vedra) the island is figured as lying west and east instead of north and south. Learned ingenuity corrects this error and, by other modifications and the use of a few points deemed certain,

Ptolemy's geography.

161–364.

[1] [For an exacter statement of dimensions, see vol. xi. p. 326.—AM. ED.]

[2] His information must have come from Roman officers, who, we know studied this branch of the military art, as maps have been found painted on the porticoes of their villas.

applies the names of Ptolemy to places on the map of modern Scotland. But the certain points are almost confined to the Clyde (Glotta Æstuarium), the Forth (Bodreia Æstuarium), the Tay (Tava Æstuarium), and perhaps the Wear (Vedra), and the Nith (Novius), the Caledonian Wood (Caledonia Silva), and the Orkneys (Orcades). Even if the other identifications were clear, it would not add much to our knowledge of ancient Scotland. The names of Ptolemy are names on his map and in books only. No tribe (except the Caledonii), no town, no river (except the Forth and Clyde and Tay), no island (except the Orkneys), was, so far as we know, called before or since by the names which there appear. No inscription or coin confirms them. No mountains in this land of mountains are to be found on the plan of the geographer. Etymological conjecture, after allowance for mispronunciation and errors of transcribers, fails to reconcile the names of Ptolemy with the oldest names of Celtic origin still retained by the rivers and hills. Yet the attempt represents the highest knowledge embodied in writing to which the Romans attained of this distant and disputed part of the empire, for the Itineraries, except the forged one attributed to Richard of Cirencester, stop at Hadrian's wall. His treatise remained until the revival of learning the only written geographical description of the country from which the learned could picture northern Britain. With all its imperfections and mistakes, it conveyed in rough outline the figure of a country to the west of the European continent, to the north of the Roman province of Britain, to the east of Ireland, surrounded by the German Ocean, the Northern Ocean, and the Irish Channel, with bold promontories and many rivers (several tidal), peopled by various tribes, its towns chiefly on the rivers or the coast, and in its centre the vast forest to which the Caledonians gave or from which they received their name, itself the northern part of the largest British island, with groups of smaller isles lying off its northern and western shores. This region was unknown to Cæsar and imperfectly known to Tacitus,—the only writer of the first century to whom we can resort. Yet the description of the Britons by the greatest historical genius of Rome, based on the account of one of its greatest generals, attempts a discrimination between the Celtic tribes first and those afterwards conquered, which may perhaps be applied to the inhabitants of the north as contrasted with those of the south of Britain.

Tacitus's account of inhabitants.

"Whether the inhabitants of Britain were indigenous or foreigners, being barbarian, they did not take the trouble to inquire. The different character of their bodily appearance in different parts of the island gave rise to arguments. The red hair and big limbs of the natives of Caledonia point to a German origin. The colored faces of the Silures, their hair generally plaited, and Spain being opposite give credit to the opinion that the ancient Iberi had migrated and occupied these settlements. Those nearest the Gauls were like them, whether on account of the enduring force of descent or the position of the sky determining in lands adjoining the character of the races. On a general view it is credible that the Gauls occupied the neighboring island. You may detect the same sacred rites and superstitions. There is not much difference in their language. There is the same daring in demanding, the same fear in declining danger. The Britons exhibit greater fierceness, as a long peace has not yet softened them. For we have heard that the Gauls also were distinguished in war, until sloth came with ease and valor was lost with freedom. This too has been the case with the Britons formerly conquered. The rest remain what the Gauls were. Their strength is in their foot; some tribes, however, fight also from chariots. The noble drives; his followers are in front. Formerly they obeyed kings. Now they are distracted by parties and factions amongst their chiefs, and the want of common counsel is most useful to us. An agreement between two or three states to resist a common danger is rare; so while they fight singly the whole are defeated."

In the account of the battle of the Grampian Mount and the speech of Galgacus there is little that is local or individual. What the Celtic chief said in an unknown tongue can scarcely have been literally interpreted to the Romans. The historian trained in oratory embodies in Latin eloquence the universal sentiments of freedom. It may be thought, however, that the soil and air of Scotland favor independence of action and thought, and that the words, whether of Tacitus or of Galgacus, contain an unconscious prophecy of passages in its future annals and traits in the character of its people not yet obliterated. In the first century of the Christian era Scotland was the scene of events which belong to universal history.

The necessity of the walls of Hadrian and Antonine to protect the Roman province soon appeared. It is doubtful how long or during what intervals the country between them remained subject. Few coins of emperors later than Antonine have been found to the north of Hadrian's wall. In the reign of Aurelius, the philosophic emperor, war was not encouraged; but Calphurnius Agricola had to be sent (161) as legate and proprætor to Britain to prevent incursions of the northern tribes. In that of Commodus a more formidable invasion passed the wall, but Ulpius Marcellus drove back the Britons and repaired it, gaining for Commodus the title of Britannicus. While Septimius Severus was removing rivals from his path, his legate, Virius Lupus, purchased peace (201) from the Meatæ, a tribe of central Scotland now first named, who along with the Caledonii supersede the older designations of Tacitus and Ptolemy for the population in the vicinity and to the north of Antonine's wall, until in the latter half of the 4th century the Picts and Scots appear. Seven years later (208) Severus, with his sons Caracalla and Geta, came, like Edward I. in his last campaign, worn out in body but not in spirit, to Britain.[1] After repairing the breaches in Hadrian's wall he not only reconquered the country between it and the wall of Antonine, which he restored, but, passing beyond the steps of Agricola, carried the Roman eagles to the most northern points they reached. The traces of Roman roads from Falkirk to Stirling, through Strathearn to Perth, thence through Forfar, Mearns, and Aberdeen to the Moray Firth, and of Roman camps at Wardykes (Keithock), Raedykes (Stonehaven), Norman Dykes (on the Dee), and Readykes on the Ythan belong to this period and represent an attempt to subdue or overawe the whole island. The historian Dion does not conceal the failure of the enterprise, which he ascribes to the illness that terminated in the death of Severus at York (211). He adds a little to our knowledge of the Caledonians by describing the painting of their bodies with forms of animals, their scanty clothing and iron ornaments, their arms—a sword, small shield, and spear, without helmets or breastplates—their chariots, and their mode of warfare by rapid attack and as rapid retreat to the forest and the marsh. Being without towns, they lived on the produce of herds and the chase, not on fish, though they had plenty. Their mode of government he calls democratic, doubtless from the absence of any conspicious king rather than of chiefs.

Hadrian to Severus.

Severus in Britain.

From the death of Severus to the accession of Constantius Chlorus, a period of nearly a century, the history of northern Britain is unknown. In the first (305) of the two years of his reign Constantius defeated the tribes between the walls called by Eumenius the Panegyrist "the Caledonians and other Picts,"—a name now first heard, and by this association identified with the Caledonians. Next year Constantius died at York; and for more than fifty years a veil is again drawn over northern Britain. It was during this period that Constantine was converted to Christianity, which his father Constantius had favored during the persecutions of Diocletian. So rapid was the progress of the church in the British province that only ten years after the martyrdom of St. Alban Celtic bishops of York, London, and Caerleon—probably the place of that name on the Usk—were present at the council of Arles. In 360 the Scots are for the first time named, by Ammianus Marcellinus, who records their descent along with the Picts upon the Roman province in terms which imply that they had before passed the southern wall. Four years later the Picts, Saxons, Scots, and Attacotts are said by the same writer to have caused the Britons

Constantius to departure of Romans.

[1] Papinian, the great jurist, then administered justice at York. Whether the Roman law so introduced survived in any part of modern England is a problem not yet solved; it certainly did not beyond the wall. The Roman substratum of Scottish law was of later origin, derived chiefly from the canon law of the church.

perpetual anxiety; but Theodosius, father of the emperor of the same name, repulsed them and recovered the country between the walls, which became (368) a fifth province of Britain, called in honor of the reigning emperor Valentia. It remained so for a very brief space: the revolt of Maximus (391), which reduced the Roman troops to two legions, led to fresh raids of the Picts and Scots. A legion sent by Stilicho drove them back to the northern wall. But it was soon recalled, and the garrisons were permanently removed prior to 409.

Effects of Roman occupation.

The Roman empire in Britain left widely different results in the southern and in the northern portions of the island. The former became an organized, and in the centres of population, a civilized province, in which Latin was spoken by the educated, the arts cultivated, Roman law administered, and Christianity introduced. The latter, with the partial exception of the district south of Antonine's wall, remained in the possession of barbarous heathen races, whose customs had altered little since Roman writers described them as similar to, though ruder than, those of the Celts in Gaul before its conquest. The condition of the population between the walls was probably intermediate between that of the southern provincial Britons and that of the northern savages of the same original Celtic stock, more nearly resembling the latter, perhaps not unlike the condition of the people of Wales, which the Romans in like manner overran, but could not hold, or of Afghanistan as compared with British India. No Roman towns existed, and only one or two villas have been found north of York, and quite near to that place. The camp, the altar, the sepulchral monument, possibly a single temple (the mysterious Arthur's Oven or Julius's Hof on the Carron, now destroyed, but described by Boece and Buchanan and figured by Camden), the stations along the wall, the roads with their milestones, a number of coins (chiefly prior to the 2d century), and a few traces of baths are the only vestiges of Roman occupation in this part of Britain. So completely had Britain passed beyond the serious attention of the emperor of the East that in the beginning of the 6th century Belisarius, Justinian's general, sarcastically offered it to the Goths in exchange for Sicily; while Procopius, the Byzantine historian, has nothing to tell of it except that a wall was built across it by the ancients, the direction of which he supposes to have been from north to south, separating the fruitful and populous east from the barren serpent-haunted western district, and the strange fable that its natives were excused from tribute to the kings of the Franks in return for the service of ferrying the souls of the dead from the mainland to the shores of Britain.

2. *Early Celtic Period to Union of Picts and Scots by Kenneth Macalpine.*—It is to the Celts, the first known inhabitants of Britain, that our inquiry next turns. This people were not indigenous, but came by sea to Britain. A conjecture, not yet proved, identifies as inhabitants of Britain before the Celts a branch of the race now represented in Europe only by the Basques. Amongst many names of British tribes in Latin writers, three occur, two with increasing frequency, as the empire drew near its close—Britons, Picts, and Scots—denoting distinct branches of the Celts. Britain was the Latin name for the larger island and Britons for its inhabitants; Albion, a more ancient title, has left traces in English poetry, and in the old name Alba or Albany for northern Scotland. The Britons in Roman times occupied, if not the whole island, at least as far north as the Forth and Clyde. Their language, British, called later Cymric, survives in modern Welsh and the Breton of Brittany. Cornish, which became extinct in the 17th century, was a dialect of the same speech. Its extent northwards is marked by the Cumbraes—the Islands of Cymry in the Clyde—and Cumberland, a district originally stretching from the Clyde to the Mersey.

Brets or Britons.

Picts or Cruithne.

The Picts, a Latin name for the northern tribes who preserved longest the custom of painting their bodies, called themselves Cruithne. Their original settlements appear to have been in the Orkneys, the north of Scotland, and the northeast of Ireland—the modern counties of Antrim and Down. They spread in Scotland, before or shortly after the Romans left, as far south as the Pentland Hills, which, like the Pentland Firth, are thought to preserve their name, occupied Fife, and perhaps left a detachment in Galloway. Often crossing, probably sometimes using, the deserted wall of Hadrian, they caused it to acquire their name,—a name of awe to the provincial Britons and their English conquerors. Their language, though Celtic, is still a problem difficult to solve, as so few words have been preserved. Its almost complete absorption in that of the Gaels or Scots suggests that it did not differ widely from theirs, and with this agrees the fact that Columba and his followers had little difficulty in preaching to them, though they sometimes required an interpreter. Some philologists believe it to have been more allied to Cymric, and even to the Cornish variety but the proof is inconclusive. 368-6th cent.

Scots or Gaels.

The Scots came originally to Ireland, one of whose names from the 6th to the 13th century was Scotia; Scotia Major it was called after part of northern Britain in the 11th century had acquired the same name. Irish traditions represent the Scots as Milesians from Spain. Their Celtic name Gaidhil, Goidel, or Gael appears more akin to that of the natives of Gaul. They had joined the Picts in their attack on the Roman province in the 4th century, and perhaps had already settlements in the west of Scotland; but the transfer of the name was due to the rise and progress of the tribe called Dalriad, which migrated from Dalriada in the north of Antrim to Argyll and the Isles in the beginning of the 6th century. Their language, Gaidhelic, was the ancient form of the Irish of Ireland and the Gaelic of the Scottish Highlanders. No clear conclusion has been reached as to the meaning of Briton, Cruithne, Scot, and Gael.

Order of arrival of Celtic races.

The order of the arrival of the three divisions of the Celtic race and the extent of the islands they occupied are uncertain. Bede in the beginning of the 8th century gives the most probable account.

"This island at the present time contains five nations, the Angles, Britons, Scots, Picts, and Latins, each in its own dialect cultivating one and the same sublime study of divine truth. . . . . The Latin tongue by the study of the Scriptures has become common to all the rest. At first this island had no other inhabitants but the Britons, from whom it derived its name, and who carried over into Britain, *as is reported*, from Armorica, possessed themselves of the southern parts. When they had made themselves masters of the greatest part of the island, beginning at the south, the Picts from Scythia, *as is reported*, putting to sea in a few long ships, were driven by the winds beyond the shores of Britain, and arrived on the northern coast of Ireland, where, finding the nation of the Scots, they begged to be allowed to settle among them, but could not succeed in obtaining their request. The Scots answered that the island could not contain them both, but 'we can give you good advice what to do: we know there is another island not far from ours, to the east, which we often see at a distance, when the days are clear. If you go thither you will obtain a settlement; or if any should oppose, you shall have our aid.' The Picts, accordingly, sailing over into Britain, began to inhabit the northern part of the island. In process of time Britain, after the Britons and Picts, received a third nation, the Scots, who, migrating from Ireland under their leader Renda, either by fair means or force secured those settlements amongst the Picts which they still possess." "There is," he says in another passage, "a very large estuary of the sea which formerly divided the nation of the Picts from the Britons, which gulf runs from the west far into the land, where to this day stands the strong city of the Britons called Alclyth. The Scots arriving on the north side of the estuary settled themselves there as in their own country."

This statement in its main points (apart from the country from which the Picts are said to have come) is confirmed by Latin authors, in whose meagre notices the Picts appear before the Scots are mentioned, and both occur later than the Britons; by the legends of the three Celtic races; by the narratives of Gildas and

Nennius, the only British Celtic historians, the Irish *Annals*, and the Pictish *Chronicle*. It is in harmony with the facts contained in the *Life of Columba*, written in the 7th century, but based on an earlier *Life*, by one of his successors, Cumine, abbot of Iona, who may have seen Columba, and must have known persons who had. The northern Britain brought before us in connection with Columba in the latter half the 6th century is peopled by Cruithne or Picts in the north and central Highlands, having their chief royal fort on the Ness, and by Scots in the Argyll and the Isles, as far north as Iona and on the mainland Drumalban, the mountain ridge which separates Argyll from Perth and Inverness; there is a British king ruling the south-west from the rock on the Clyde then known as Alcylth or Alclyde, now Dumbarton; and Saxony, under Northumbrian kings, is the name given to the district south of the Forth, including the eastern Lowlands, where by this time Angles had settled. The scarcity of Celtic history[1] belonging to Scotland indicates that its tribes were less civilized than their Irish and Welsh kin.

5th and 6th cents.

It is in the records of the Christian church that we first touch historic ground after the Romans left. Although the legends of Christian superstition are almost as fabulous as those of heathen ignorance, we can follow with reasonable certainty the conversion of the Scottish Celts. Three Celtic saints venerated throughout Scottish history—Ninian, Kentigern, Columba—Patrick, the patron saint of Ireland, David, the patron saint of Wales, and Cuthbert, the apostle of Lothian and patron saint of Durham, belonging to the Celtic Church, though probably not a Celt, mark the common advance of the Celtic races from heathenism to Christianity between the end of the 4th and the end of the 6th century. The conversion of Scotland in the time of Pope Victor I. in the 2d century is unhistoric, and the legend of St. Rule (Regulus) having brought the relics of St. Andrew in the reign of Constantius from Achæa to St. Andrews, where a Pictish king built a church and endowed lands in his honor, is, if historical at all, antedated by some centuries. There is no proof that amongst the places which the Romans had not reached, but which had accepted Christianity when Tertullian wrote, there was any part of modern Scotland; but, as Christian bishops from Britain without fixed locality begin to appear in the 4th century, possibly the first converts in Scotland had been made before its close.

Conversion to Christianity.

[1] Of the three branches of the Celts which appear as the first known inhabitants of Scotland the native records are scanty and of late date. Respecting the Britons nothing remains except the *History* of Gildas in the 6th and that of Nennius in the 9th century, of which very small parts relate to Scotland; the poems of Aneurin and Taliessin, commonly called Welsh bards, but perhaps natives of Strathclyde; the lives of saints: and a fragment of criminal law, common to them and the Scots, preserved at the time of its suppression by Edward I.

Dealing with the Picts there is a Latin *Chronicle* of the 10th century and additions of later date, containing a valuable list of kings in their own language, and the entries in the *Book of Deer* of the gifts to that monastery by the Pictish mormaers (chiefs) of Buchan; but the earliest of these is in an old form of Gaelic.

The Scots are noticed in the *Life of Columba*, the *Duan Albanach* of the 11th century, a Latin *Chronicle* of the 12th century, a few poems treating of their origin and migration. Later Latin tracts describing their settlement in Scotland, and the lives of saints, not written in their existing form till the 12th century. But a considerable amount of legendary material, chiefly consisting of additions to or glosses on the earlier sources, has been collected. When all is told, Scotland has nothing to compare with the Irish *Annals* and the Welsh *Triads*, whose fulness of detail and fabulous antiquity in the early portions raise suspicions as to the later which are perhaps undeserved. It has no equivalent to the collection of laws contained in the *Senchas Mor* or *Kain Patrick* of Ireland and the Dimetian and Venedotian codes of Wales, where, in the midst of a crowd of minute customs implying a long settlement in western lands, there are traces of others that seem to have come with the Celts from their far-off Eastern birthplace. From these sources—especially from the Irish *Annals*, and in particular the *Annals* of Tigernach, who died in 1088, the *Synchronisms* of Flann Mainistreach, who died in 1056, the *Annals* of Innisfallen, compiled in 1215, and of Ulster, compiled in 1498, but from older authorities—the dearth of proper Scottish material has been supplemented; but this source of information has to be used with caution. The whole materials are collected in the *Chronicles of the Picts and Scots*, edited by Mr. Skene for the lord clerk register of Scotland.

Ninian (*q. v.*), the son of a British chief in Galloway already Christian, after converting or reforming his countrymen—one of his converts being Tudwalla, king of Alclyde (? Tothael, father of Rydderick Hael)—and organizing a diocese, went as a missionary to the southern Picts, who lived amongst or near the mountains north of the Forth and Clyde in the modern counties of Stirling, Perth, and Forfar. His fame grew with the church, and as far north as Shetland, as far south as Westmoreland and Northumberland, churches were dedicated in his name. His wonder-working relics in the shrine of Candida Casa (at Whithorn[2] in Galloway) became an object of pilgrimage for more than a thousand years. Three other missionaries belong to the period between Ninian and Kentigern, his successor amongst the Britons of the west: Palladius, sent to the Christians in Ireland by Pope Celestine, died at Fordoun in Mearns laboring amongst the Picts, and his disciples Serf and Ternan converted respectively the Picts of Fife and those of the Lowlands of Aberdeen. Kentigern (*q. v.*) of Strathclyde was supported by Rydderick or Roderick, called Hael ("the Liberal") from his bounty to the church. Columba visited Kentigern at the cemetery of Ninian, on the Molendinar Burn, where courtesies were interchanged between these representatives of the two branches of the Celtic Church in western Scotland, shortly before the British bishops declined at the meeting at St. Augustine's oak to submit to the Roman missionary who had converted the Saxons of southern England. Jocelyn of Furness states that Kentigern was at Rome seven times and obtained the privilege of being the pope's vicar free from subjection to any metropolitan. The prince of Cumbria is even said to have acknowledged his precedency. These are inventions of a later age; but the large possessions, extending over the whole western kingdom, conferred by Rydderick, and after a long lapse of time found by the inquest of David I. when prince of Cumbria to have belonged to the see, may be historical. He died about the beginning of the 7th century, and a long period of darkness hides the British kingdom and church of Strathclyde. St. Patrick (*q. v.*), succeeding where Palladius failed, Christianized Ireland in the middle of the 5th century. A passage in his *Confession*, if all of it applies to Scotland, seems to prove the existence of the church in Scotland for two generations before Patrick's birth, and the allowance during these of marriage to the clergy.

Ninian.

Kentigern.

Scotland gave Patrick to Ireland, and Ireland returned the gift in Columba. A rare good fortune has preserved in Adamnan's *Life* the tradition of the acts of the greatest Celtic saint of Scotland, and a picture of the monastic Celtic Church in the 6th and 7th centuries, an almost solitary fragment of history between the last of the Roman and the first of the Anglo-Saxon historians. Born in 521 at Gartan in Donegal, Columba (*q. v.*) spent his boyhood at Doite Eithne near Gartan, his youth at Moville on Strangford Lough under Abbot Finian, called the foster-father of the Irish saints from the number of his disciples. Here he was ordained deacon, and, after completing his education under Gemmian, a Christian bard, at the monastery of Clonard, he received priest's orders. In 561 he took part in the battle of Culdrevny (in Connaught), when the chiefs of the Húi Néill (Dalriad Scots), his kindred, defended Diarmid (Diarmait), a king of eastern Ireland. Excommunicated by the synod of Teltown in Meath, the country of Diarmid, for his share in the battle—according to one account fought at his instance—and moved by missionary zeal, he crossed two years afterwards the narrow sea which separates Antrim from Argyll with twelve companions and founded the monastery of Iona (Hy), on the little island to the west of Mull, given him by his kinsman Conall. The Dalriad Scots, who had settled in the western islands of Scotland and in Lorn early in the 6th century, were already Christians; but Columba soon after visited the Pictish king Brude, the son of Mailochon, at Craig Phadrich, the isolated hill fort on the Ness, whom he converted, and from whom he received a confirmation of Conall's grant. Columba, on the death of Conall, gave the sanction of religion to the succession of his cousin Aidan and at the council of Drumceat in Derry obtained the exemption of the Dalriads of Iona from tribute, though they were still bound to give military service to the Irish king, the head of the Húi Néill. He frequently revisited Ireland and took part in its wars: the militant spirit is strongly marked in his character; but most of his time was devoted to the administration of his monastery of Iona, and to the planting of other churches and religious houses

Columba.

[2] In a cave at Glasserton rude crosses incised on stone—probably a font—and the letters SANCT. NI. P. (?) have recently been found.

in the neighboring isles and mainland, till his death in 597. None of the remains now found in almost every island—not even those in Iona itself—date from his time, when wood was still used for building. But the original foundations of the churches of Skye and Tiree were his work; those extending from Bute and Cantyre—on Islay, Oronsay, Colonsay, Mull, Eigg, Lewis, Harris, Benbecula, and even the distant St. Kilda—to Loch Arkaig on the northern mainland of Scottish Dalriada are to be ascribed to him or his immediate followers or successors in the abbacy, as well as those in the country of the Picts, from the Orkneys to Deer in Buchan. The churches which received his name farther south were later foundations in his honor. The most celebrated of his disciples were Baithene, his successor as abbot; Machar, to whom the church of Aberdeen traces its origin; Cormac, the navigator, the first missionary to the Orkneys, who perhaps reached the Faroes and Iceland; and Drostan, the founder of the Scottish monastery of Deer.

Celtic Church of Columba.

The character of the Celtic Church of Columba was, like its mother church in Ireland, modified by migration to a country only in small part Christian. It was a missionary church, not diocesan but monastic, with an abbot who was a presbyter, not a bishop, for its head, though the office of bishop for ordination existed, and bishops were, in Ireland at least, more numerous than in the later church. It spread, not by the erection of parishes and the care of parochial clergy, but by the reproduction of similar monasteries, the homes of those who adopted a religious life, the only schools in an age of war. It preferred islands for its monasteries for safety, and, in the case of some of its members, who sought, in the language of those times, "a desert in the ocean," as hermitages where they might live and die apart from the world. But these were exceptions. The idea of the Celtic monastery was that of a Christian celibate society. Its inmates regarded themselves as being, and often were, members of a family or clan, preserving the customs of their race so far as consistent with celibacy and religious discipline. Of eleven successors of Columba as abbot nine were of his kin. The rule, though its confession is primitive, adapted to an infant and isolated church planted in a heathen world, did not differ greatly from that of later orders. Implicit obedience to the superior, poverty, chastity, hospitality, were the chief precepts. The observance of Easter according to the ancient cycle, the use of the semicircular instead of the coronal tonsure, and a peculiar ritual for mass and baptism were its chief deviations from the practice of the catholic church as fixed by the council of Nice, to which it yielded in the beginning of the 8th century; frequent prayer, the singing of psalms and hymns, the reading of Scripture, the copying and illuminating of MSS., the teaching of children and novices, and the labor to provide and prepare the necessary food (the service of women being excluded) were the occupations of the monks. A similar conventual system of which St. Bridget, abbess of Kildare, was foundress enlisted the fervor of her sex, and had followers in Darlugdach, abbess of Kildare, who founded Abernethy, in Æbba at Coldingham, and in Hilda at Lindisfarne. It was a form of Christianity fitted to excite the wonder and gain the affection of the heathen amongst whom the monks came, practicing as well as preaching the self-denying doctrine of the cross. The religion of the Celts is a shadowy outline on the page of history. Notices of idols are rare. They had not the art necessary for an ideal representation of the human form, though they learnt to decorate the rude stone monuments of an earlier age with elaborate tracery. They had no temples. The mysterious circles of massive stones, with no covering but the heavens, may have served for places of worship, as well as memorials of the more illustrious dead. The names of gods are conspicuously absent, though antiquaries trace the worship of the Sun in the Beltane fires and other rites; but in the account of their adversaries we read of demons whom they invoked. Divination by rods or twigs, incantations or spells, strange rites connected with the elements of water and of fire, "choice of weather, lucky times, the watching of the voice of birds," are mentioned as amongst the practices of the Druids, a priestly caste revered for superior learning and, if we may accept Cæsar as an authority, highly educated. This, rather than fetish or animal worship, appears to have been their cult. It was, so far as scanty indications allow a generalization, by an empirical knowledge of the minor and secondary rather than the greater phenomena of nature that the Druids of Britain and Ireland exercised influence,—the tempest and its elements—wind and rain and snow, thunder and lightning—rather than the sun, moon, and stars. Whatever its precise form, this religion made a feeble resistance to the Christian, taught by the monks, with learning drawn from Scripture and some acquaintance with Latin as well as Christian literature, and enforced by the example of a pure life and the hope of a future world. The charms of music and poetry, in which the Celt delighted, were turned to sacred use. Columba was a protector of the bards,—himself a bard.

> "It is not with the 'screod' our destiny is,
> Nor with the bird on the top of the twig,
> Nor with the trunk of a knotted tree,
> Nor with a 'scadan' hand in hand.
>
> . . . . . .
>
> I adore not the voice of birds,
> Nor the 'screod' nor destiny nor lots in this world,
> Nor a son nor chance nor woman:
> My Druid is Christ the Son of God,
> Christ, Son of Mary, the Great Abbot,
> The Father, the Son, and the Holy Ghost."

Adamnan relates miracles of Columba scarcely above the level of the practices of the Druids. But superstition is not vanquished by superstition. Celibacy was a protest against the promiscuous intercourse for which Christian fathers condemn the Celts. Fasts and vigils contrasted with the gross, perhaps cannibal, practices still in use. The intense faith in Christ, of lives such as Patrick's and Columba's, won the victory of the cross.

597-685.

When we pass to civil history our knowledge is restricted to a list of names and battles; but the labors of recent scholars allow a brief account of the Celtic races from the end of the 6th to their union in the middle of the 9th century, in part hypothetical, yet a great advance on the absolute blank which made historians of the 18th century, decline the task in despair.

Britons of Strathclyde.

The Britons, whose chief king had ruled at Alclyde, were separated from their fellow-countrymen, the Cymry in Wales, shortly after Columba's death by the rapid advance of the Anglian kingdom of Northumberland, founded in the middle of the 6th century by Ida of Bamborough. One of his successors, Ethelfred, struck the blow, completed by the wars of the next king, Edwin, which severed modern Wales from British Cumbria and Strathclyde. Even Mona, the holy isle of both heathen and Christian Britons, became Anglesey, the island of the Angles. A later incursion towards the end of the century reached Carlisle and separated the kingdom of Alclyde, which had for its boundary the Catrail or Picts' trench between Peel Fell and Galashiels, from English Cumbria (Cumberland south of the Solway), and reduced for a short time Strathclyde to a subject province. When Bede wrote in 731 an Anglian bishopric had been established at Whithorn, which continued till 803. The decline of the Northumbrian kingdom in the 8th century enabled the kings of Strathclyde to reassert their independence and maintain their rule within a restricted district more nearly answering to the valley of the Clyde, and in Galloway, in which there are some faint indications of a Pictish population, till it was united to the kingdom of Scone by the election of Donald, brother of Constantine II., king of the Scots, to its throne.

Northumbrian supremacy.

Of the Scots of Dalriada somewhat more is known. Their history is interwoven with that of the Picts and meets at many points that of the Angles of Northumberland, who during the 7th and the beginning of the 8th century, when their kings were the greatest in Britain, endeavored to push their boundaries beyond the Forth and the Clyde. The history of this kingdom —see NORTHUMBERLAND (KINGDOM OF)— forms part of that of Scotland during these centuries. It planted in LOTHIAN (*q.v.*) the seed from which the civilization of Scotland grew. To an early period of the contest between the Angles and the Britons, and to the country between the Forth and the Tweed and Solway, perhaps belong the battles magnified by successive poets who celebrated the hero of British mediæval romance. Whether these battles were really fought in southern Scotland and on the borders, and Arthur's Seat was one of his strongholds, still "unknown is the grave of Arthur." Before Edwin's death (633) his kingdom extended to the Forth, and the future capital of

Scotland received the name of Edwinsburgh from him in place of the Mynyd Agned and Dunedin of the British and Gaelic Celts. During the reign of Oswald (635-642) the Northumbrians were reconverted by Aidan, a monk whom Oswald summoned from Iona, and who became monastic bishop of Lindisfarne—a southern Iona—from which the Celtic form of the Christian church spread amongst the Angles of the the north and east of England, until the council of Whitby and the election of Wilfrid to the see of York restored the Roman ritual and diocesan episcopacy, when Colman, their Celtic bishop at Lindisfarne, retired with his monks to Iona. Oswald's brother Oswy extended the dominion of Northumberland over a portion of the country of the northern Picts beyond the Forth. In his reign lived CUTHBERT (*q.v.*), the apostle of Lothian, where the monastery of St. Æbba at Coldingham, the church on the Bass, the three churches of St. Baldred at Auldham, Tynninghame, and Preston, and the sanctuary of Wedale (Stow) kept alive the memory of the Celtic Church. His name is preserved in St. Cuthbert's church at Edinburgh and in Kirkcudbright. To the same period belong two inscriptions, the earliest records of Anglian speech, one on the cross of Bewcastle in Cumberland, commemorating Alfred, a son of Oswy, the other taken perhaps from a poem of Cædmon, at Ruthwell in Dumfries. Neither the Tweed nor the Solway was at this time a line of division. Oswy was succeeded by his son Egfrid (685), against whom the Picts successfully rebelled; and the Scots and a considerable part of the Britons also recovered their freedom. Anglian Bishops, however, continued to hold the see of Whithorn during the whole of the 8th century. The Northumbrian kings, more successful in the west than in the east, gradually advanced from Carlisle along the coast of Ayr, and even took Alclyde. In what is now England their power declined from the middle of the 8th Century before the rise of Mercia. Shortly before the commencement of the 9th century the descents of the Danes began, which led to the conflict for England between them and the Saxons of Wessex. The success of the latter under Alfred and his descendants transferred the supremacy to the princes of the southern kingdom, who, gradually advancing northwards, before the close of that century united all England under their sceptre.

685-756.

Before its fall Northumberland produced three great men, the founders of English literature and learning, though two of them wrote chiefly in Latin,—Cædmon, the monk of Whitby, the first English poet; Bede, the monk of Jarrow, the first English historian; and Alcuin, the monk of York, whose school might have become the first English university, had he not lived in the decline of Northumbrian greatness and been attracted to the court of Charlemagne. It is to this early dawn of talent among the Angles of Northumberland that England owes its name of the land of the Angles and its language that of English. The northern dialect spoken by the Angles was the speech of Lothian, north as well as south (in Northumberland) of the Tweed, and was preserved in the broad Scotch of the Lowlands, while modern English was formed from the southern dialect of Alfred, Chaucer, and Wycliffe. This early Teutonic civilization of the lowland district of Scotland, in spite of the Danish wars, the Celtic conquest, and border feuds, never died out, and it became at a later time the centre from which the Anglo-Saxon character permeated the whole of Scotland without suppressing, as in England, the Celtic. Their union, more or less complete in different districts, is, after the difference in the extent of the Roman conquest, the second main fact of Scottish history, distinguishing it from that of England. Both, to a great degree, were the result of physical geography. The mountains and arms of the sea repelled invaders and preserved longer the ancient race and its customs.

It is necessary, before tracing the causes which led to the union of races in Scotland, to form some notion of northern Scotland during the century preceding Kenneth Macalpine, during which—the light of Adamnan and Bede being withdrawn—we are left to the guidance of the Pictish *Chronicle* and the Irish *Annals*. The Picts whom Columba converted appear to have been consolidated under a single monarch. Brude, the son of Mailochon, ruled from Inverness to Iona on the west and on the north to the Orkneys. A sub-king or chief from these islands appears at his court. The absence of any other Pictish king, the reception of the Columbite mission in Buchan under Drostan, a disciple of Columba, and perhaps Columba himself, the foundation of the church of Mortlach near Aberdeen, by Machar, another of his disciples, favor the conclusion that Brude included Aberdeen as well as Moray and Ross. Its southern limits are unknown. The Picts[1] of Stirling, Perth, and Forfar, corresponding to Strathearn and Menteith,—Athole and Gowrie, Angus and Mearns, had been already converted by Ninian in the 5th century—may have already come under a single king, ruling perhaps at Abernethy, with mormaers under him. It seems certain that Abernethy was earlier than Dunkeld a centre of the Celtic Church distinct from Iona and the seat of the first three bishops of Scotland. Its round tower cannot safely be ascribed to an earlier date than the 9th century, but may have been preceeded by a church dedicated to St. Bridget either in the 5th by Nechtan Mórbet, or in the 6th century by Garnard, son of Donald, a later Pictish king. Although there exists a complete list of the Pictish kings from Brude, son of Mailochon, to Brude, son of Ferat, conquered by Kenneth Macalpine, and of the Scots of Dalriada from Aidan (converted by Columba) to Kenneth Macalpine, with their regnal years, it is only here and there that a figure emerges sufficiently distinct to enter history. Parts of these lists are fictitious and others doubtful, nor do we know over what extent of country the various monarchs ruled. Of the figures more or less prominent amongst the Pictish kings are Brude, the son of Derili, the contemporary of Adamnan, who was present at the synod of Tara when the law called Kain Adamnan, freeing women from military service, was adopted, and who died in 706, being then styled king of Fortren. Nechtan, another son of Derili, was the contemporary of Bede, who gives (710) the letter of Ceolfrid, abbot of Wearmouth to him when he adopted the Roman Easter and the tonsure. Six years later Nechtan expelled the Columbite monks from his dominions. They retired to Dalriada, as their brethren in Northumberland had done when a similar change was made by Oswy. Nechtan also asked for masons to build a church in the Roman style to be dedicated to St. Peter, and several churches in honor of that apostle were founded within his territory. Shortly after, Egbert, an Anglian monk persuaded the community of Hy (Iona) itself to conform, but too late to lead to the union of the churches of the Scots and Picts, which were separated also by political causes.

Early Pictish annals.

[1] But there had been a time when not one but several Pictish kings ruled the northern and central districts of Scotland, and of this we have perhaps a trace in the Pictish legend according to which Cruithne, the eponymus of the race, had seven sons,—Cait, Cee, Ciric, Fib, Fidach, Fotla, Fortren, Conjecture identifies five of these names with districts known in later history,—Cait with Caithness, Ciric with Mearns (Magh Circen, the plain of Ciric), Fib with Fife, Fotla with Athole (Athfotla) Fortren with southern Perthshire, connecting it with a division of the same county in a tract of the 12th century. (Comp. plate VI.) Six of the divisions—Angus and Mearns, Athole and Gowrie, Strathearn and Menteith, Fife and Fortreive, Mar and Buchan, Moray and Ross—fairly correspond to districts afterwards ruled by the Celtic mormaers of Angus, Athole, Strathearn, Fife, Mar, and Moray; Caithness in the 9th century became Norse, and a new earl (of March) was introduced from the south of the Forth. They correspond also to seven great earldoms of Scotland, which appear with more or less distinctness on several occasions in the reigns of the Alexanders. This, at least, is a highly ingenious theory, but not a certain history.

Fifteen years later the greatest Pictish monarch, Angus MacFergus, after a contest with more than one rival, gained the supremacy, which he held for thirty years (731–761). In revenge for the capture of his son Brude by Dungal, son of Selvach, king of the Dalriad Scots, he attacked Argyll, and laid waste the whole country, destroying Dunuad (? on Loch Crinan), then the capital, burnt Creich (in Mull), and put in chains Dungal and Feradach, the sons of Selvach. He next conquered (739), and it is said drowned, Talorgan, son of Drostan, king of Athole, one of his rivals and, resuming the Dalriad war, reduced the whole of the western Highlands. The Britons of Strathclyde were assailed by a brother of Angus, who fell in battle at Mugdoch in Stirling; and Angus, with his ally Ecbert,[1] king of Northumberland, retaliated by burning Alclyde (756). About this time (752) Coilin Droighteach (the Bridgemaker), abbot of Iona, removed most of the relics of his abbey to Ireland, and this is the most probable date of the legend of the relics of St. Andrew being brought from Patras to St. Andrews, where the sons of a Pictish king, Hungus (Angus MacFergus), who was absent in Argyll, or, according to another version, Hungus himself, dedicated Kilrighmont (St. Andrews) and the district called the Boar's Chase to St. Andrew. The ascription of the foundation to an earlier king of the same name in the 4th century was due to the wish to give the chief bishopric of Scotland an antiquity greater than Iona and Glasgow, greater even than Canterbury and York. After the death of Angus MacFergus no king is connected with any event of importance except Constantine, son of Fergus (died 820), who is said to have founded the church of Dunkeld,—226 years after Garnard, son of Donald, founded Abernethy. This fact, though the earlier date is not certain, points to the Perthshire lowlands as having been for a long time the centre of the chief Pictish monarchy. Probably Scone was during this period, as it certainly became afterwards, the political capital; and the kings latterly are sometimes called kings of Fortren. If so, the chief monarchy under the pressure of the Norse attacks had passed south from Inverness, having occupied perhaps at various times, Dunottar, Brechin, Forfar, Forteviot, and Abernethy as strongholds; but it is not possible to say whether there may not have continued to be independent Pictish rulers in the north.

Angus MacFergus.

The annals of Dalriada are even more perplexing than those of the Picts after the middle of the 6th century. There is the usual list of kings, but they are too numerous, and their reigns are calculated on an artificial system. The forty kings from Fergus MacEarc to Fergus MacFerchard, who would carry the date of the Scottish settlement back to three centuries at least before the birth of Christ, have been driven from the pale of history by modern criticism. The date of the true settlement was that of the later Fergus, the son of Earc, in 503. From that date down to Selvach, the king who was conquered by Angus MacFergus about 730, the names of the kings can be given with reasonable certainty from Adamnan, Bede, and the Irish *Annals*. But the subsequent names in the Scottish chronicles are untrustworthy, and it is an ingenious conjecture that some may have been inserted to cover the century following 730, during which Dalriada is supposed to have continued under Pictish rule. This view is not free from its own difficulties. It is hard to explain how Kenneth Macalpine, called by all Scottish records a Scot, though in Irish *Annals* styled (as are several of his successors) king of the Picts, succeeded in reversing the conquest of Angus MacFergus and establishing a Scottish line on the throne of Scone, in the middle of the 9th century. This difficulty is supposed to be solved by the hypothesis that Kenneth was the son of a Pictish father, Alpine, but of a Scottish mother, and was entitled to the crown by a peculiarity of Pictish law, which recognized descent by the mother as the test of legitimacy. The records which speak of the destruction of the Picts are treated as later inventions, and it is even doubted whether the connection between Alpine and Kenneth and the older race of Dalriad kings is not fictitious.[2]

Early annals of Dalriad Scots.

Whatever may be the solution ultimately reached as to Kenneth Macalpine's antecedents, his accession represents a revolution which led by degrees to a complete union of the Picts and Scots and the establishment of one kingdom—at first called Albania and afterwards Scotia—which included all Scotland north of the Forth and Clyde, except Caithness, Sutherland, Orkney and Shetland (the northern isles or Nordreyar), the Hebrides (the southern isles or Sudreyar), and Man; these fell for a time into the hands of the Norsemen. This revolution had two causes or concomitants, one religious and the other political. Kenneth Macalpine in the seventh year of his reign (851) brought the relics of St. Columba from Iona to a church he built at Dunkeld, and on his death he was buried at Iona. A little earlier the Irish Culdees, then in their first vigor, received their earliest grant in Scotland at Loch Leven from Brude, one of the last kings of the Picts, and soon found their way into all the principal Columbite monasteries, of which they represent a reform. The Irish monastic system did not yet give place to the Roman form of diocesan episcopacy. The abbot of Dunkeld succeeded to the position of the abbot of Iona and held it until the beginning of the 10th century, giving ecclesiastical sanction to the sovereign at Scone, as Columba had done in the case of Aidan. As early as the beginning of the 8th century, however, a Pictish bishop of Scotland appears at a council of Rome, and he had at least two successors as sole bishops or primates of the Celtic Church before dioceses were formed. Scotland north of the firths thus remained at a lower stage of church organization than England, where a complete system of dioceses had been established in great part answering to the original Anglo-Saxon kingdoms or their divisions, with Canterbury and York at their head as rivals for the primacy. But the Celtic clergy who now conformed to the Roman ritual preserved some knowledge of the Latin language, and a connection with Rome as the centre of Latin Christianity, which was certain to result in the adoption of the form of church government now almost universal. The other circumstances which had a powerful influence on the foundation of the monarchy of Scone and the consolidation of the Celtic tribes was the descent on all the coasts of Britain and Ireland of the Norse and Danish vikings.

756–867. Union of Picts and Scots.

The Danes chiefly attacked England from Northumberland and along the whole east and part of the southern seaboard; the Norsemen attacked Scotland, especially the islands and the north and west coasts, going as far south as the Isle of Man and the east and south of Ireland. It had now become essential to the existence of a Scottish Celtic kingdom that its centre should be removed farther inland. Argyll and the Isles, including Iona, were in the path of danger. No monk would have now chosen island homes for safety. In 787 the first arrival of the viking ships is noticed in the *Anglo-Saxon Chronicle*. Some years later the Irish *Annals* mention that all "the islands of Britain were wasted and

Viking raids.

[1] [Eadbert, cousin of Ceolwulf, who turned monk, in Skene's *Celtic Scotland*, vol. i. p. 291. So in vol. xvii. p. 584, of this work.—AM. ED.]

[2] The above statement is a brief outline of the reconstruction of this period of Scottish history due to two scholars who have done more than any others to elucidate it, Father Innes and Mr. Skene. Their negative criticism, which destroys the fabric reared by a succession of historians from Fordun or his continuator Bowmaker to Buchanan, is a masterly work, not likely to be superseded. Whether the constructive part will stand is not certain, but it explains many of the facts.

much harassed by the Danes." Amongst these were Lindisfarne, Rathlin off Antrim, Iona (794), and Patrick's island near Dublin (798). Iona was thrice plundered between 802 and 826, when Blathmac, an abbot, was killed. A poem composed not long after the event states that the shrine of Columba was one of the objects in search of which the Norsemen came, and that it was concealed by the monks. It was to preserve the relics from this fate that some of them were transferred by Droighteach, the last abbot, to Ireland and others by Kenneth to Dunkeld. For half a century the vikings were content with plunder, but in the middle of the 9th they began to form settlements. In 849 Olaf the White established himself at Dublin as king of Húi Ivar; in 867 a Danish kingdom was set up in Northumberland;[1] and Harold the Fairhaired, who in 872 became sole king of Norway, soon after led an expedition against the vikings, who had already seized Orkney and Shetland, and established an earldom under Rognwald, earl of Mœri, whose son Hrolf the Ganger conquered Normandy in the beginning of the next century. The position of Scotland, therefore, when Kenneth united the Picts and Scots was this: central Scotland from sea to sea—Argyll and the Isles, Perthshire, Angus and Mearns, and Fife—was under the dominion of the king who had Scone for his capital; the southwest district—the valley of the Clyde, Ayr, Dumfries, and Galloway—was under a British king at Dumbarton; the southeast district or Lothian was part of "Saxon or Sassenach Land,"—the general Celtic name for the country of the Anglo-Saxons, but now owing to the divided state of Northumberland held by different lords; the north of Scotland was under independent Celtic chiefs, as Moray and Mar, or already occupied by Norsemen, as Caithness, Orkney and Shetland, and the Hebrides. The whole Celtic population was Christian; but the Norse invaders were still heathen. Their religion was similar to that of their Anglo-Saxon kin, of a type higher than the paganism of the Celts. It resembled the Celtic indeed in the absence or infrequency of idols, but a complex mythology peopled heaven with gods—Woden and Thor, Freya and Balder, and others of inferior rank—devised legends of the origin of earth and man, Valhalla the hero's paradise, and a shadowy hell for all who were not heroes. Some of its legends are colored from Christian sources, and underneath the mythology may be detected a ruder and more ancient superstitious belief in omens and divination,—a nature-worship more like that of the Celts. But it is the later form which represents the Norse character as it was when it came into contact with the nations of Britain,—its daring defiance of man and the gods, its struggle with, yet in the end its calm acceptance of, the decrees of fate. The Norsemen both at home and in their colonies in Scotland embraced Christianity under Olaf Tryggvason in the end of the 10th century; but along with Christianity they retained the old heathen sentiments and customs, which, like their language, mingled with and modified the Celtic character on the western but far more on the northern coasts and islands, where the population was largely Norse. A strain neither Celtic nor Teutonic nor Norman occasionally meets us in Scottish history: it is derived from the blood or memory of the Norse vikings.

867-914.

Religion of Norse vikings.

3. *Later Celtic Period: Growth of the Kingdom of Scone from Kenneth Macalpine to Malcolm Canmore.*—During this period, though the Celtic annals are still obscure, we can trace the united Celtic kingdom growing on all sides under Kenneth's successors,—southward by the conquest of Lothian on the east and by the union of the Strathclyde kingdom on the west, and for a time by holding English Cumbria under the English kings, and northward by the gradual incorporation of Angus, Mearns, Moray, and possibly the southern district of Aberdeen. Kenneth Macalpine's reign of sixteen years (844–860) was a time of incessant war. He invaded Saxony (Lothian) six times, burnt Dunbar, and seized Melrose (already a rich abbey, though on a different site from the Cistercian foundation of David I.), while the Britons (of Strathclyde) burnt Dunblane and the Danes wasted the land of the Picts as far as Cluny and Dunkeld. After they left Kenneth rebuilt the church of Dunkeld and replaced in it Columba's relics. He died at Forteviot and was buried at Iona.

Kenneth Macalpine.

He was succeeded by his brother Donald I. (861–863), who, with his people the Gaels, established the laws of Aed, son of Eachdach at Forteviot. Aed was a Dalriad king of the 8th century; but the contents of his laws are unknown. Perhaps tanistry, by which the successor to the king was elected during his life from the eldest and worthiest of his kin, usually a collateral in preference to a descendant, was one feature, for it certainly prevailed amongst the Irish and Scottish Gaels. The next king, who succeeded in accordance with that custom, was Constantine I. (863–877), son of Kenneth. His reign was occupied with conflicts with the Norsemen. Olaf the White, the Norse king of Dublin, laid waste the country of the Picts and Britons year after year, and in 870 reduced Alclyde, the British capital; but, as he disappears from history, he probably fell in a subsequent raid. He is said to have married a daughter of Kenneth, and some claim in her right may account for his Scottish wars. In the south the Danish leader Halfdan devastated Northumberland and Galloway; while in the north Thorsten the Red—a son of Olaf by Audur, the wealthy daughter of Ketil Flatnose (called Finn, "the Fair," by the Celts), a Norse viking of the Hebrides, who afterwards went to Iceland and figures in the sagas—conquered the coast of Caithness and Sutherland as far as Ekkials Bakki (the Oikel). But he was killed in the following year. Constantine met with the same fate at a battle at Inverdovat in Fife in 877, at the hands of another band of northern marauders. His death led to a disputed succession. His heir, according to the custom of tanistry, was his brother Aodh, who was killed by his own people after a year. Eocha, the son of Run, a king of the Britons, claimed in right of his mother, a daughter of Kenneth, according to the Pictish law, and governed at first along with Cirie or Grig, his tutor; then Grig ruled alone, until they were both expelled from the kingdom and Donald II., son of Constantine, came to the throne (889). The Pictish *Chronicle* reports that during the government of Grig the Scottish Church was freed from subjection to the laws of the Picts (meaning probably from liability to secular service). Grig is also said to have subdued all Bernicia and "almost Anglia," a statement which if confined to the north of the Northumbrian kingdom is not improbable, for it had then fallen into anarchy through the attacks of the Danes. The church of Ecclesgreig near Montrose possibly commemorates Grig and indicates the northward extension of the monarchy of Scone. In the reign of Donald II. (889–900), son of Constantine I., Scotland was again attacked by the Norsemen. Sigurd, the Norse earl of Orkney, seized Caithness, Sutherland, Ross, and part of Moray, where he built the fort of Burghead, between the Findhorn and the Spey. Farther south the Danes took Dunottar, where Donald was slain. After his time the name of the kingdom of Scone was no longer Pictavia, but Albania or Alba, a more ancient title of northern Scotland, perhaps resumed to mark the growth of the Scottish-Pictish monarchy in the central and eastern Highlands.

Donald I.

Constantine I.

Grig.

Donald II.

[1] [Halfdan the Dane occupied Northumbria in 875, which is the first notice of Danish settlement in that region in Skene's *Celtic Scotland*, vol. i. p. 325. See also vol. xvii. p. 584.—AM. ED.]

Donald II. was followed by Constantine II. (900–940), son of Aodh and grandson of Kenneth, and his long reign is a proof of his power. He was the greatest Scottish king, as Angus MacFergus had been the greatest of the pure Pictish race. In the first part of it his kingdom was still beset by the Norsemen. In his third year they wasted Dunkeld and all Alba. Next year they were repulsed in Strathearn. In his 8th year Rognwald, the Danish king of Dublin, with earls Ottir and Oswle Crakaban, ravaged Dunblane. Six years later the same leaders were defeated on the Tyne (? in East Lothian) by Constantine, who had been summoned to assist Eldred, lord of Bamborough. Ottir was slain, but Rognwald escaped and reappears some years later as king of Northumberland. This is a battle whose site and incidents are told in a conflicting manner by different chronicles; but it appears certain that Constantine saved his dominions from further serious attacks by the vikings. He had now to meet a more formidable foe,—the West Saxons, whose kings, the descendants of Alfred, were steadily moving northwards. In spite of his wars, Constantine found time in the early part of his reign for two important reforms,—one ecclesiastical, the other civil. In his sixth year (906) he, along with Cellach, bishop of St. Andrews—the first of twelve Celtic bishops of Scotland—swore on the hill of Faith at Scone (906) that "the laws and discipline of the faith, and the rights of the churches and the gospel, should be preserved on an equal footing with the Scots." This obscure notice of the Pictish *Chronicle* indicates the establishment or restoration of the Scottish Church, which the Pictish kings had oppressed, to an equality with that of the Pictish. As a sign of the union the crozier of St. Columba, called Cathbuadth ("victory in battle"), was borne before Constantine's armies. Two years later, on the death of Donald, king of the Britons of Strathclyde, Constantine procured the election of his own brother Donald to that kingdom. Though he thus strengthened church and state, Alfred's successors were too powerful for him. The *Anglo-Saxon Chronicle* records of Edward the Elder, that in 924, having built a fort at Bakewell, in the Peak of Derbyshire, "the king and nation of the Scots, Rognwald the Northumbrian and others, and also the king of the Strathclyde Welsh and his people, chose him for father and lord." His son Athelstan is related by the same authority to have subjugated all the kings in the island, amongst whom are mentioned by name Howell king of the west Welsh, Constantine king of the Scots, Owen king of Gwent, and Eldred of Bamborough, who "made peace with oaths at Emmet and renounced every kind of idolatry." These entries are not beyond suspicion. The Peak was a distant point for the Scottish king. Rognwald, the Northumbrian, died in 920, according to the Irish *Annals*. Howell and Constantine were already Christians and could not have then renounced idolatry. If there is any truth in the submission of the Scots to Edward the Elder it did not last, for some years later the *Chronicle* states that Athelstan went into Scotland with a land and sea force and ravaged a great part of it. A league of the northern kings against Athelstan was dispersed (937) by his great victory at Brunanburgh (? Wendun, between Aldborough and Knaresborough, according to Skene). The forces allied against him were those of Constantine, his son-in-law Olaf, son of Sitric (called also the Red), and another Olaf, son of Godfrey, from Ireland, besides the Strathclyde and north Welsh kings. For Athelstan there fought, in addition to his own West Saxons, the Mercians and some mercenaries from Norway, amongst them Egil, son of Skalagrim, the hero of a famous Icelandic saga. No greater slaughter had been known since the Anglo-Saxons, "proud war-smiths," as their poet calls them, overcame the Welsh and gained England. A son of Constantine was slain, four kings, and seven earls. Constantine himself escaped to Scotland, where in old age he resigned the crown for the tonsure and became abbot of the Culdees of St. Andrews. Athelstan died two years after Brunanburgh, but before his death granted Northumberland to Erik Bloody-Axe, son of Harold Haarfagr, who was almost immediately expelled by the Irish Danes. Athelstan, even after so great a victory, could not annex Northumberland, much less Scotland, to his dominions.

Constantine II.

Constantine's successor, Malcolm I. (943–954), son of Donald II., began his reign by invading Moray and killing Cellach, its chief king. Meantime the Danish kings of Dublin had been endeavoring to maintain their hold on Northumberland with the aid of the Cumbrians, whose country they had already settled, and in this attempt the two Olafs had a temporary success; but Eadmund, the successor of Athelstan, expelled Olaf, son of Sitric, from Northumberland, and in the following year, to prevent the Cumbrians from again aiding the Danes, he "harried Cumberland and gave it all up to Malcolm, king of Scots, on condition that he should be his fellow-worker both on sea and land." This was the same policy which led his father to call in the aid of Erik Bloody-Axe. The kings of Wessex wisely granted what they could not hold to the best northern warrior, Celt or Scandinavian, under conditions which acknowledged more or less strictly their supremacy. The Cumbria so granted was the country south of the Solway to the Dee, but it may also have included Strathclyde, for at this period Strathclyde Waelas and Cumbrians are frequently used as equivalent names. Malcolm lent no aid to Erik Bloody-Axe, when in the reign of Eadred he tried (949) to recover Northumberland, but he joined his brother-in-law Olaf, Sitric's son, in an expedition with the same object, when they laid waste the country as far south as the Tees. Three years later Erik again returned, and finally drove Olaf back to Ireland, where he founded the kingdom of Dublin, which lasted till the battle of Clontarf. Malcolm died fighting either against the men of Mearns or of Moray. Three kings followed (954–971),—Indulf, son of Constantine, Duff, son of Malcolm, Colin, son of Indulf; in the reign of Indulf the Northumbrians evacuated Edinburgh, which thenceforward was Scottish ground. A Saxon burgh, a fort, perhaps a town, was now for the first time within the Celtic kingdom.

Malcolm I. 914-1014.

Kenneth II. (971–995), son of Malcolm, soon after his accession made a raid on Northumberland as far south as Cleveland. The statement of two English chroniclers (John of Wallingford and Henry of Huntingdon), that Lothian was ceded to him by Eadgar on condition of homage, and that the people should still use the language of the Angles, is not mentioned in the Anglo-Saxon or any Scottish chronicle. Nor is it easy to believe the *Anglo-Saxon Chronicle* as amplified by Florence of Worcester, that Kenneth was one of the kings who rowed Eadgar on the Dee in sign of homage. At this time, in the north and west, the Orkney earls were all-powerful, and Kenneth was occupied with contests nearer his own territory,—especially with the mormaer of Angus, whose grandson, through his daughter Fenella, he slew at Dunsinane, and in revenge for which he was himself treacherously killed at Fettercairn in Mearns by Fenella, whose name is still preserved in the traditions of that district. The foundation of the church at Brechin is attributed to this king.

Kenneth II.

Kenneth was followed, as he had been preceded, by insignificant kings,—Constantine, son of Colin, and Kenneth, son of Duff. His son, Malcolm II. (1005–34), gained the throne by the slaughter of his predecessor Duff at Monzievaird, and at once turned his arms southwards; but his first attempt to conquer northern Northumberland was re-

Malcolm II.

pelled by Ethelred, son of Waltheof, its earl, who defeated him at Durham. About the same time Sigurd, earl of Orkney, having defeated Finlay, mormaer of Moray, became ruler, according to the Norse saga, of "Ross and Moray, Sutherland and the dales" of Caithness. He had conflicts with other Scottish chiefs, but appears to have made terms with the kings of both Norway and Scotland,—with Olaf Tryggvason by becoming Christian and with Malcolm by marrying his daughter. He fell at Clontarf (1014), the memorable battle near Dublin, by which Brian Boru and his son Murcadh defeated the Danish kings in Ireland and restored a Celtic dynasty. Malcolm conferred the earldom of Caithness on his grandson Thorfinn, the infant son of Sigurd; and Sigurd's Orkney earldom fell to his sons, Somerled, Brusi, and Einar; while Moray again came into the possession of a Celtic mormaer, Finlay, who is called king of Alba by one of the Irish chronicles, and the Hebrides probably into that of a Norse earl, Gilli, from whom they were afterwards recovered by Thorfinn. While the Celts of Ireland were thus expelling the Danish invaders and in Scotland there was divided possession, the result of compromise and of intermarriage, England fell under the dominion of the Danish kings Sweyn and Canute. Canute committed Northumberland to Erik, a Dane, as earl; but Eadulf Cudel, a weak brother of the brave Oswulf and son of Waltheof, the Anglian earl, still retained the northern district as lord of Bamborough. Profiting by the distracted state of northern England, Malcolm again invaded Northumberland with Owen of Cumbria, called the Bald, and by the victory of Carham (1018) near Coldstream won Lothian, which remained from that time an integral part of Scotland. Canute, on his return from a pilgrimage to Rome, is said by the *Anglo-Saxon Chronicle* to have gone to Scotland, where Malcolm and two other kings, Maelbeth and Jehmarc, submitted to him, but he held Scotland for only a little while. Maelbeth is supposed to be Macbeth, then mormaer of Moray, afterwards king, and Jehmarc, a Celtic or Scandinavian chief in Argyll. The hold which Canute, who was trying to grasp Norway and Denmark as well as England, had upon northern Britain must have been slender as well as short; but the acknowledgment of the supremacy of so great a king was natural. At his death his overgrown empire fell to pieces, and Scotland was left to itself. Two years before Malcolm II. died. His conquest of Lothian perhaps led to the new name of Scotia (now generally applied to his kingdom), which was to become its permanent name. The Scotland he governed still had its centre at Scone, but included besides the original Pictish district of Perthshire, Angus and Mearns, Fife, the southern district of Aberdeen, and Lothian, his own conquest, while Moray and western Ross, and perhaps Argyll and the Isles, owned his suzerainty. But the Norse earl, Thorfinn, at this time held the Orkneys, Caithness, Sutherland, and the Hebrides. Whether a Cumbrian king still ruled Strathclyde and Galloway is doubtful. After Owen the Bald, who fought at Carham, the next king mentioned is Duncan, son of the grandson and the successor of Malcolm. Malcolm II. was liberal to the church, as we know from his gifts to the church of Deer; but the foundation of Mortlach (Banffshire), the future see of Aberdeen, belongs to the reign of Malcolm Canmore. The laws attributed to him are spurious, introducing into the Celtic kingdom a fully developed feudalism, which was not known in England, still less in Scotland, till after the Conquest. As he left no male heir, Malcolm's death led to a doubtful succession and a perplexed period of Scottish history.

1014–1058.

Conquest of Lothian.

The Scottish historians and the Norse sagas can with difficulty be reconciled. Little light can be got from either the *Anglo-Saxon Chronicle* or the Irish *Annals*. Shakespeare seized the weird story of Macbeth, as told by Boece and translated in Holinshed, and history can hardly displace the tragedy, so true to the dark side of human nature, by the meagre outline at its command. This outline is supported by authentic evidence, and agrees with the situation which existed between the death of Malcolm II. and the accession of Malcolm Canmore.

Malcolm II. was succeeded by his grandson Duncan (1034–40), son of his daughter Bethoc and Crinan, a lay or secular abbot of Dunkeld; but his right was probably from the first contested by Thorfinn, who had become the most powerful of the Norse earls. If the Orkney saga could be relied upon, he had as many as eleven earls or mormaers subject to him, and a modern but unsafe interpretation of one passage extends his dominion as far as Galloway. Duncan, after an unsuccessful attempt on Durham, turned his arms to the north to check the further advance of his kinsman, but was defeated on the Pentland Firth. Moddan, whom he had tried to set up as earl of Caithness, was burnt in his own house, and Duncan himself was killed at Bothgownan near Elgin by Macbeth, his own general. Macbeth was son of Finlay, mormaer of Moray, and his wife Gruoch was daughter of Boete, son of Kenneth II.; thus he had a possible pretension to the crown if it could descend by females. But his real position appears to have been that of a successful general asserting the independence of the northern Celts against Duncan, who by his marriage with the daughter of Earl Siward, the Northumbrian earl, had shown the tendency to unite Saxon with Celtic blood which was followed by his son Malcolm (III.) Canmore. Macbeth reigned seventeen years (1040–57). He was, as far as records state, an able monarch, who succeeded in repelling the attacks of Siward on behalf of his grandson, who showed liberality to the church, as the foundation of himself and his wife at Loch Leven testify, sent money for the poor to Rome, and possibly went with it on a pilgrimage; but he fell at last in the battle of Lumphanan in Mar, where the young Malcolm was aided by Tostig, son of Godwine, the great West Saxon earl who had become earl of Northumberland. A few months later, Lulach, the son of Gillecomhain, a former mormaer of Moray, who had continued the war, and is nominally counted a king, though called fatuous, was slain at Essie in Strathbogie (N.W. Aberdeen), and Malcolm Canmore became king. With his reign a new and clearer era of the history of Scotland commences.

Duncan.

Macbeth.

The Scottish Gaels had proved themselves capable of government. The united monarchy of Scone lasted for two centuries in spite of its powerful neighbors, but it was dependent almost entirely on the attachment of the clans to their chiefs and of the whole race to the hereditary king. It was traditional, not constitutional, with some accepted customs, otherwise it could not have held together, but with little settled law and no local government. It wanted the elements of civil life, for it had no organized towns or assemblies of the people. There was little commerce or trade. Cattle and sheep were the chief commodities, and the medium of exchange. There is no trace of an independent coinage. Christianity had not yet leavened the whole population, though the monasteries were centres of light within limited circles. The Celtic character, alien to set and quick forms of business, was alive to the pleasures of the imagination, oratory and song. Its cardinal defect was a light regard for truth. Its chief virtue was devotion to a leader, whether priest, chief, or king. The Christian Anglo-Saxons of the Lothians, the Norsemen, only recently and half converted, in the islands of the north and west, brought qualities and customs into the common stock of the future Scottish people which were wanting to the Celts. The Anglo-Saxon in his original home, as in Britain the inhabitant of the plain—"the creeping Saxon," as he was called by an Irish bard—developed in the house and the town a better regulated freedom,—the domestic and civic virtues. His imagination, even his poetry, had a touch of prose, but he possessed the prosaic qualities of plain speech, common sense, and truth,—the essence of trust. The contact—for it was a contact, not a conquest—with this race was of the

Monarchy of Scone

Celtic and Anglo-Saxon character.

highest value to the Scottish nation of the future. The Normans introduced new elements, the spirit of chivalry and the too rigid bonds of the feudal law. The changes due to these new elements began in Scotland in the reign of Malcolm Canmore, and were completed in those of his descendants. The Scottish Celtic kingdom became gradually civilized under Saxon and Norman influences, while retaining its native vigor. The result was the establishment of the independence of Scotland within its present bounds during the prosperous reigns of the Alexanders (1107–1285).

4. *Transition from a Celtic to an Anglo-Norman Feudal Monarchy: Malcolm Canmore and his Descendants.*—Malcolm Canmore (1058–93) spent his boyhood in Cumbria, his youth at the court of Edward the Confessor of England. He was by race only half a Celt, for his mother was an Anglo-Dane, sister of Earl Siward. The court which helped to form his character was already subject to Norman influence. The Confessor, like Canmore, had been educated in exile, at the Norman court, and favored the Normans. Though the course of events led Malcolm to ally himself with the Anglo-Saxon royal house, the Anglo-Saxon and Anglo-Norman periods of Scottish history were not, as in England, separated by several centuries, but were nearly contemporaneous. If Malcolm, Edgar, and the first Alexander may be regarded as Scoto-Saxon, David I. and his successors were truly Scoto-Norman feudal monarchs. Apart from the customs and language of Lothian, which descended from Anglican Northumberland, Scotland received scarcely any pure Saxon institutions. Those it did receive have a mixed Saxon and Norman imprint. There were no tithings, wapentakes, or hundreds, no trial by compurgation, no frank-pledge. No witenagemot or folkmotes preceded the great council which became parliament. In short, the system of government we call the Anglo-Saxon constitution never existed in Scotland, although the court of the four southern burghs and the customs of the towns of Lothian copied from those of Newcastle, and a similar association of burghs, the Hanse of Aberdeen, of which there are faint traces in the north, had a Teutonic origin. And some traces of Anglo-Saxon criminal law are to be found in the early Scottish charters.

Malcolm III. Canmore.

Canmore ascended the throne (1058) not long before England was subjugated by William the Conqueror. The only recorded event of his reign prior to the Conquest was his quarrel with Tostig, his "sworn" brother, when he made a raid south of the Tweed and violated the peace of St. Cuthbert by ravaging Lindisfarne. The early years of his reign were devoted to establishing his rule in the northern districts, where his marriage to Ingebiorg, widow of Earl Thorfinn, related by the Norse but not the Scottish writers, may have aided him. Ingebiorg, already old, cannot have long survived the union, nor is the fact of the marriage certain. The victory of Hastings brought to the Scottish court as refugees Edgar Atheling, grandson of Edmund Ironside, and his three sisters. Their father, Edward, had found shelter in Hungary in the reign of Canute and married an Hungarian princess. The eldest daughter of the marriage, Margaret, became the wife (1068) of Malcolm Canmore. Her virtues more than his wars make his reign an epoch of Scottish history. This alliance and the advance of the Conqueror on Northumberland in the third year of his reign rendered a collision inevitable. Malcolm twice harried Northumberland during the reign of the Conqueror with the view of restoring the Atheling. In the interval between these expeditions William retaliated by invading Scotland as far as Abernethy, where he forced Malcolm to do homage. After the second he sent his son Robert, who reached Falkirk; but he returned without having accomplished anything, except that he built Newcastle as a frontier fortress. In this reign Northumberland itself was never really subdued, and William laid waste the district between the Humber and the Tees as a barrier against the northern Angles and Danes. After the Conqueror's death Malcolm prepared for war but peace was made before he had left Lothian, and he again took an oath of homage. Next year William Rufus succeeded in reducing Cumbria south of the Solway, then held by Dolphin, lord of Carlisle, a vassal of Malcolm, rebuilt the castle of Carlisle, and made the adjoining country for the first time English. He then summoned Malcolm to Gloucester; but the meeting ended, like others when a summons to do homage at a distance from the border was sent to the kings of Scotland, in settling both in a more hostile attitude. Malcolm on his return raised his whole forces for the last expedition of his life, in which he was slain (1093) in an ambuscade near Alnwick by Morel of Bamborough. He left to his successor a kingdom bounded on the south by the Tweed, the Cheviots and the Solway, though there was much debatable land along the borders, and the English king claimed Lothian as successor of the Northumbrian Angles, while the Scotch claimed English Cumberland as a dependency dating from the grant of Eadgar. Malcolm's defeat of the mother of Maelsnechtan, son of Lulach and mormaer of Moray, is the only event recorded to indicate that his relations with the Celtic population were not peaceful, but the materials are too scanty to make it clear how far the northern chiefs asserted their independence. The foundation of Mortlach by Malcolm is proof that the Aberdeen lowlands at least were within his dominions.

1058-1097.

The brightest side of Malcolm's reign was the reform due to Margaret. Her life by Theodoric, a monk of Durham, or her confessor, Turgot, though colored by partiality for a good woman, the patron of the church, bears the marks of a true portrait. The miraculous element in the lives of the Celtic saints, diminished but still present in Bede disappears. The chief changes in the Celtic Church effected by Margaret with the aid of monks sent by Lanfranc from Canterbury were the observance of Lent, the reception of the Eucharist at Easter, which had fallen into neglect, the use of the proper ritual in the mass, the prohibition of labor on the Lord's day, and of marriage between persons related by affinity. She restored Iona, long desecrated, founded the church of Dunfermline, in commemoration of her marriage, and protected the hermits, still common in the Scottish Church. Her severe fasts and her liberality to the sick and aged are especially noted. She washed the feet of the poor and fed children with food she had prepared, procured freedom for captives, and on either side of the ferry called Queensferry after her she erected hostelries for pilgrims. Nor did her piety lead her to neglect domestic duties. The rude manners of the Celtic court were refined by her example. The education of her children, her chief care in her husband's frequent absence, was rewarded by the noble character of the saintly David and the good Queen Maude. She did not long survive her husband; hearing of his death she thanked the Almighty for enabling her to bear such sorrow, to cleanse her from sin, and after receiving the sacrament died praying. The chapel on the castle rock at Edinburgh, erected in her memory, is the oldest building now existing in Scotland, with the exception of the meagre ruins of the Celtic Church in the western Highlands.

Margaret.

After Malcolm's death there was a fierce contest for the crown (1093–97), which showed that the union of Celtic and Saxon blood was not yet complete in the royal house, much less in the nation. Before the corpse of Margaret could be removed to Dunfermline for burial, Donald Bain, brother of Malcolm Canmore, besieged the castle, and its removal was only accomplished under cover of mist. Donald, who had the support of the Celts and the custom of tanistry in favor of his claim, was king nominally at least six months, when he was

Donald Bain.

expelled by Duncan, son of Malcolm and Ingebiorg, assisted by an English force, in which there were Normans as well as Saxons; but his tenure was equally short, and Donald, aided by Edmund, the only degenerate son of Malcolm and Margaret, who slew his half-brother Duncan, again reigned three years. This was the last attempt of the Celts—though partial risings continued frequent—to maintain a king of their race and a kingdom governed according to their customs. Edgar Atheling, who had become reconciled to the Norman king, led an army into Scotland and by a hard-fought battle dispossessed Donald and restored his eldest nephew, Edgar, to his father's throne.

The reign of Edgar (1097–1107) was unimportant. Its chief event was the cession of the Sudreyar or islands on the west coast to the Norse king Magnus Barefoot, who also conquered Man and Anglesea. The terms of the treaty which, after two expeditions, he extorted from Edgar were that every island was to be his between which and the mainland a helm-bearing ship could pass, and by carrying one across the mainland he included Cantyre. Magnus was killed in Ulster; but the Hebrides remained in the hands of the Norse kings or lords, and acknowledged their sway till the battle of Largs (1263). Their cession was the necessary price for the consolidation of the Scottish monarchy in the south of the kingdom. Edinburgh was the capital of Edgar, a circumstance which marked the removal of the centre of the kingdom to its southern and Saxon district. His standard had been blessed at Durham when he recovered the crown, and it was to Durham or Dunfermline, where he was buried, that his benefactions were made. Iona had passed into the hands of Magnus, but he, being a Christian, respected its sanctity. Scone was henceforth only the scene of the coronation ceremony.

Edgar. 1097–1127.

Edgar, dying childless, was succeeded by his brother Alexander I. (1107–24). Educated by his mother, and after her death in England, Alexander, like his brothers, brought to the government of Scotland Saxon combined with Norman culture. The singular will by which Edgar left Cumbria to his younger brother David was not to Alexander's taste; but the support which the Saxon population and the Norman barons, now beginning to hold land in that district, gave to David forced his brother to acquiesce in the division of the kingdom. It was now restricted to Lothian, Merse, and the country beyond the firths, as far as Mar and Buchan. His hold of Moray and Ross, Sutherland and Caithness, must have been rather as suzerain than as sovereign; the mainland of Argyll was now or soon after in the posssession of Somerled, ancestor of the lords of the Isles; the northern isles (Nordreyar) as well as the Sudreyar remained Norse. The chief towns of Alexander were Edinburgh, Stirling, Inverkeithing Perth, and Aberdeen. At Scone he founded a monastery for canons of St. Augustine; but St. Andrews was still the sole Scottish bishopric. Alexander married Sibylla, a natural daughter of Henry I. of England, and secured peace with that country. His only recorded war was with the men of Mearns and Moray, who surprised him at Invergowrie. He pursued them to the Moray Firth, where a signal victory (1114) gained for him the epithet of "The Fierce." The change from the Celtic to the Roman form of church government commenced by his mother and his brother Edgar was continued. Anselm congratulated him on his accession, and asked protection for monks sent to Scotland at Edgar's request. On the death of Fothad, the last Celtic bishop of St. Andrews, Alexander procured the election of Turgot, his mother's confessor and prior of Durham. His consecration was delayed through a dispute between Canterbury and York, and, having failed to effect the anticipated reforms, he went back to Durham. On his death Eadmer, a monk of Canterbury and chronicler of note, was selected for the office by Ralph, archbishop of Canterbury. The choice was confirmed by the clergy and people; but a quarrel with Alexander as to his investiture led to his return to Canterbury. Robert, prior of Scone, became bishop in the year of Alexander's death, but his consecration also had to be put off. These disputes as to the consecration and investiture of the bishop of St. Andrews turned on the rival claims of Canterbury and York to be the metropolitan of Scotland, and the refusal of Alexander to cede the independence of the Scottish Church, though anxious for an English monk to organize the diocese. National feeling was already strong in Scotland, even in a king with English sympathies. Without the aid of Turgot or Eadmer, Alexander himself laid the foundation of diocesan episcopacy. The first bishops of Dunkeld and Moray date from his reign, and the first parish on record, Ednam in Roxburghshire. At Inchcolm, as well as Scone, he introduced the canons regular of Augustine, and on an island of Loch Tay a cell from Scone was built in memory of his wife Sibylla. He restored the "Boar's Chase" to St. Andrews and increased the endowments of Dunfermline. The offices of chancellor, constable, and sheriff also now appear; and the mormaers of the Celtic districts are designed as earls (*comites*) in one of his charters. The transition from the Celtic to the feudal monarchy had begun. Alexander was a learned monarch, like his father-in-law Henry Beauclerk, pious and friendly to the church, but severe to his subjects.

Alexander I.

David I. (1124–53), the youngest son of Malcolm and Margaret, became king at the ripe age of forty-four. He had been trained at the court of Henry I. and his sister Matilda, so that "his manners were polished from the rust of Scottish barbarity." After Edgar's death he served an apprenticeship for the royal office as earl or prince of Cumbria, where his power was little short of regal. He married a Saxon, the daughter of Waltheof, earl of Northumberland, widow of Simon de St. Liz, Norman earl of Northampton, and his friends and followers were chiefly Norman. His marriage brought him the earldom of Huntingdon, and he was guardian of the earldom of Northampton during his stepson's minority, so that he entered into feudal relations with the Norman king of England. In the government of his principality he succeeded in reducing a wild part of Scotland into order, using for this purpose the agency of the church.

David I.

The history of the church in Strathclyde since Kentigern's death is obscure. The records of York claim the consecration of a bishop of Glasgow in the middle of the 11th and another at the commencement of the 12th century; but they are unknown in the records of Glasgow, and were perhaps invented to support the metropolitan claim of York over that see. Glasgow certainly was restored after some considerable lapse in the person of John, the tutor of David, who at his request was consecrated by Pope Paschal II. This was a parallel step to the summons of Turgot and Eadmer to St. Andrews, but David, like Alexander, maintained the independence of his own bishopric, and, though pope after pope sent letters and legates exhorting obedience to York, neither John nor his successors yielded it. A new see erected at Carlisle by Henry I. and the restoration of Whithorn by Henry II., both subject to York, were counter measures on the part of the English sovereigns. The independence of the Scottish from the English Church (with the exception of Galloway and some places of Lothian still under Durham) thus asserted by the rulers of Scotland was of great moment in its subsequent history, and was promoted by the liberality of David and his brothers. The inquest by David's order by which the land of the see of Glasgow was made may refer to ancient possession, but it had the effect of a new grant.

Ecclesiastical affairs.

Its extent— covering lands in the dales of the Clyde, Tweed, Teviot, Annan, Nith, and in Ayrshire—corresponds to the district of Cumbria under David and, with slight deviations, to the future diocese of Glasgow. While David's province did not include all of ancient Cumbria, it did include some parts of ancient Lothian, the future shires of Berwick, Roxburgh, and Selkirk. The Cumbrian nobles were a mixed class,—some Saxon and others Norman. There were few of pure Celtic blood.

David and Matilda.

Three years after his accession David was present at the council of London, where, along with the English barons, he swore to accept his niece Matilda as the successor of Henry I., who had lost his only son by the shipwreck of the "White Ship." Soon after a rising of Scottish Celts under a natural son of Alexander and Angus, a grandson of the mormaer of Moray, was defeated at Stracathro (Forfar) by David's troops in his absence in England, and four years later another under Wimund, who pretended to be Malcolm MacHeth, a chief in Ross, aided by Somerled of Argyll, who had acquired some of the adjacent isles, was put down by Wimund's capture. The death of Henry I. and the claim of Stephen to the English throne led to the invasion of England by David, in support of Matilda, with an army drawn from all parts of his kingdom,—the men of Galloway, Cumbria, Teviotdale, Lothian, Lennox, the Isles, Scotia (the country south of the Forth or Scots Water), and Moray. Their defeat at the battle of the Standard at Cuton Moor (1138) near Northallerton by the barons of northern England was due to the want of discipline of the men of Galloway, and though signal, was not decisive. At Carlisle peace was made on condition that David's son Henry should hold Northumberland as an earldom under Stephen, with the exception of the castles of Bamborough and Newcastle. David gave hostages, but retained Carlisle and Cumberland without any condition of homage. Two years later, when Matilda seized London, David joined her; but she was unable to maintain her advantage. David was forced to return to Scotland, and did not again engage in active hostilities against Stephen. His death was preceded by that of his only son; but his power was so firm that he procured the acknowledgment of his grandson Malcolm, a boy of twelve, as successor to the Scottish crown, while William, his younger grandson, succeeded to Northumberland and the English fiefs his father had held.

Diocesan and feudal organization of kingdom.

The comparative peace of his last twelve years gave David opportunity for the ecclesiastical and civil organization of the kingdom. He found three and left nine bishoprics, adding to St. Andrews, Moray, and Dunkeld the new sees of Glasgow, Brechin, Dunblane, Aberdeen (transferred from Mortlach), Ross, and Caithness. Closely connected with their establishment was the suppression of the Celtic Culdees at Dunkeld, St. Andrews, and Loch Leven, and perhaps also at Dunblane and Dornoch, where canons regular of St. Augustine became the chapters of the bishop. The abbeys, chiefly Cistercian, which he founded were Holyrood, Newbattle, Melrose, Jedburgh, Kelso, Cambuskenneth, Urquhart, and Kinloss. He added to the endowments of his father and mother at Dunfermline, and so lessened the crown lands that James I. called him "a sore saint for the crown." The division into dioceses stimulated the formation of parishes endowed by the bishops or by the lords of the manor; but the first steps of the parochial division of Scotland are obscure. The diocesan episcopate now included the whole of Scotland except what was held by the Norsemen, who had bishops of their own for the Orkneys and the western isles, subject to the metropolitan of Drontheim. It preceded the civil division into sheriffdoms, which also began in this reign, but took a longer period to complete. The Celtic chiefs in the north and in Galloway were as yet too powerful to allow royal officers to hold courts within their territory, and regalities with the full rights of the crown in matters of justice were more lavishly granted in Scotland than in England, where they were confined to the few palatine earls or bishops on the border. The feudal system in Scotland, erroneously antedated to the reign of Malcolm II. or Malcolm Canmore, really took root in that of David. The king administered justice in person. The great judicial officer of state, the justiciar, who went circuits in the king's name, appears either in this or the preceding reign; so also do the seneschal or steward of the royal household and the chamberlain who collected the royal revenues. The tenure of land by charter, of which there are a few examples by Edgar in favor of Durham and by Alexander I. in favor of Scone, now became common. The charters of David to the abbey of Holyrood, to Robert Bruce of Annandale, and others are in the regular style of the Norman chancery. There are also instances of subordinate grants by subjects, which the king confirms. Though no charter to a burgh is extant, David refers to Edinburgh, Perth, and Stirling as his burghs. The inquest in favor of the see of Glasgow is, by the verdict of those best acquainted with the facts, similar to the Norman inquest. The laws of the four burghs of Lothian — Berwick, Roxburgh, Edinburgh, and Stirling—are records of customs existing in this reign, while a variety of other laws called assizes, chiefly relating to tolls and matters of criminal jurisprudence, were the legislative acts of the king, assisted by the council of his great nobles. The beginning of the feudal system in Scotland was invigorated by the personal character of David. The absence of any large body of settled Celtic or Saxon customs gave full play to its assimilative influence. In the reigns which followed Scotland became a purer example of a feudal state than England, where a large number of Teutonic customs contributed to form the common law. A few of these found their way into Scotland, chiefly through the burghs or the medium of Norman charters, in which they had been incorporated. But the Scottish common law was in the main derived from the Roman code through the canon law, and not from Anglo-Saxon customs. Though never canonized by the church, this great monarch, for his faithful administration of justice and the purity of his domestic life, was deemed a saint by the people.

1127-1165.

Malcolm IV.

David's grandson and successor Malcolm IV. (1154–65), called "The Maiden," died too young to leave a permanent impression. A rising by Somerled, lord of the Isles, and the sons of Malcolm MacHeth, mormaer of Moray, was suppressed in the early years of his reign, and peace was made with Somerled in 1158. A treaty by which Malcolm surrendered Northumberland and Cumberland to Henry II., and his following that king (who knighted him at Tours) in an expedition to Toulouse, led to the revolt of the earl of Strathearn with five other chiefs. This brought him suddenly home. An attempt to take him by surprise at Perth failed, and next year he succeeded in reducing Moray and Galloway, whose earl, Fergus, had also taken advantage of his absence. Moray was occupied by foreign settlers (1160), amongst whom, besides Norman barons, were Flemings,—a race fitted to civilize a new country by their industry. It is to this settlement that the permanent subjection of Moray to the Scottish kings, and perhaps the peculiar dialect and character of the inhabitants of that part of Scotland, were due. Four years later Somerled again attacked the west coast, but was defeated and slain at Renfrew, when the isles south of Ardnamurchan, which he had won from Godred the Black, son of Olaf, king of Man, were divided amongst his sons Dugall, Reginald, and Angus. Next year (1165) the young king himself died at Jedburgh. While he was reproached for yielding too much to the powerful English monarch, his service abroad enabled

him to obtain the necessary experience to contend with the Celtic chiefs. The reduction of Galloway and Moray more than compensated for the loss of the earldoms in northern England, the possession of which by the Scottish king must have been precarious. Before his death Bute had been taken by the steward of Scotland,—the first footing the Scotch got on the larger isles, but it was afterwards recovered by the Norwegian king Haco and restored to Ruari, a descendant of Reginald.

William the Lion. 1165–1214.

Malcolm, dying childless—though he had an illegitimate son who predeceased him—was succeeded by his brother William the Lion (1165–1214). His reign, the longest of any Scottish monarch, though not so uniformly successful as that of his grandfather, was an important era in Scottish history. It is divided into nearly equal portions by the accession of Richard Cœur de Lion. The first consists of the war with Henry II., in which William was captured (1175), and this made him the subject of the English king for fourteen years. In the second he recovered his independence, and resuming the task of his predecessor, consolidated the Scottish kingdom in the north and west. William commenced his reign by taking part in the war with France as vassal of Henry II. for the fief of Huntingdon ; but, being disappointed of the promised restoration of the northern earldoms, he entered into negotiations with Louis VII. of France. This memorable event is the first authentic connection between Scotland and France, and was afterwards antedated by a fiction to the time of Charlemagne. Dictated by the situation of the two countries, equally exposed to danger from the power of England under the Angevin or Plantagenet kings, the alliance between France and Scotland continued with few breaks until the close of the 16th century, and even in the 17th and 18th was relied upon by the last of the Stuarts. France proved a broken reed to the Scottish kings ; but the intercourse between the two countries brought the Scottish people, when war with England after the close of the 14th century shut them out from the advancing civilization of that country, into contact with the chivalrous manners of the court and the learning of the schools of France during the best period of French history. Nothing came of the alliance at this time, and two years later William and his brother David, in whose favor he resigned the earldom of Huntingdon, attended the coronation (during his father's life) of the younger Henry at Windsor. That ill-judged step and the murder of Becket led to a domestic revolution, and William, tempted by the promise of the earldom of Northumberland, joined the young king against his father (1173). He failed in the sieges of Wark and Carlisle, and next year was taken prisoner at Alnwick by Ranulph de Glanville and sent by Henry's order to Falaise in Normandy. To procure his release he made a treaty with Henry by which he became his vassal for Scotland and all his other territories. The Scottish Church then for the first and last time owned subjection to that of England. This treaty settles the disputed question of the Scottish homage. It was only by conquest and the captivity of its king that such terms could be obtained. To secure the observance of the treaty the four burghs of Scotland were to be placed in Henry's hands and hostages given till their delivery. The ambiguous terms of the clause as to the church enabled the Scottish bishops to refuse obedience to the see of York, and, Canterbury having advanced a rival claim, Henry, not displeased to see ecclesiastics quarrel, allowed the Scottish bishops to leave the council of Norham without acknowledging it. The foundation of the abbey of Arbroath in memory of Becket, whom he had known at Henry's court, was almost the only endowment of William. At home he put down revolts in Galloway, Ross, and Caithness. A long dispute with successive popes as to the see of St. Andrews afforded a signal example of the perseverance of William. He also procured a distinct acknowledgment of the independence of the Scottish Church and its immediate subjection to Rome alone, which Henry II., now approaching the calamitous end of his reign, could not prevent ; nor was he able to enforce payment of the Saladin tax from the Scottish bishops. Immediately after Henry's death Richard Cœur de Lion, moved by the necessity of money for the crusades, consented for a payment of 10,000 marks ($32,400) to the abrogation of the treaty of Falaise (1189) as having been extorted from William when a captive, and restored Scotland's ancient marches.

War with England.

The second part of William's reign was occupied with internal affairs. Richard's absence and John's disputes with the pope and his own barons gave a relief from English war. The raising of the ransom tried the resources of Scotland, and was met by an aid from the clergy and barons. Risings by Harold, earl of Caithness, and his son Torphin (1197), and another by Guthred (1211), a descendant of the mormaer of Ross, were quelled. The birth of a son strengthened William's throne. He at one time contemplated an invasion of England, for which John's weakness afforded a good opportunity, but desisted, it is said, in consequence of a vision, perhaps remembering his own age and that of his heir. The proposed erection by John of a castle at Tweedmouth to overawe Berwick led to a rupture ; but, after protracted negotiations and threats, a treaty was made (1209) by which William agreed to pay 15,000 marks ($48,600). John was to procure suitable matches for his two daughters, and Tweedmouth was not to be rebuilt. The barons promised at a council in the following year to raise 10,000 [$32,400] and the burghs 6000 marks [$19,440]. This is the first mention of a contribution by the burghs to a feudal aid. William was their great benefactor, as Henry the Fowler in Germany and Richard in England : many of their charters date from his reign. Legislation continued in the form of assizes, which required the sanction of a great council. As in England, the necessity of raising money first gave rise to municipal rights and to facilities for some discussion of public affairs in what afterwards grew to be the parliament. This assembly was still the *curia regis* of the vassals of the king, and the Scottish parliament never lost marks of its origin. William died at Stirling, in 1214, in the seventy-second year of his age. The lion rampant, which he took for his seal, became his epithet, and represents his chivalrous and determined character. He set the example, which his son and grandson followed, of cultivating friendly relations with the English sovereign, and his efforts to maintain the independence of Scotland were rewarded by internal peace. It was only in the outlying districts that risings had now to be feared. The number of shires where the king's sheriff, frequently (by a policy wise at the time, but afterwards dangerous) the chief baron of the district, administered justice at the head towns increases, and this, as well as the growth of trade, brought into prominence the burghs, each with a royal castle where the king in his frequent progresses held his court, and if needful summoned the great council of his realm. The chief burghs whose charters date from this reign are Perth, Aberdeen, Inverness, Dumfries, Lanark, Irvine, Ayr, Forfar, Dundee, Arbroath, Montrose, Inverurie, Kintore, Banff, Cullen, and Nairn.[1] Their number and sites, spread over the whole country, mark a settled policy and the progress of the kingdom in the arts of peace. A new diocese—Argyll—was founded by separation from Dunkeld, to which John the Scot, then bishop, sent his chaplain as knowing Gaelic ; and, though the Hebrides were still Norse, this was a step towards the

Internal affairs.

[1] [For specific dates of these charters see the several articles in this work upon the towns named. Five of these towns claim charters older than William the Lion, but not necessarily as royal burghs.—AM. ED.]

complete organization of the church and to the extension of the kingdom which followed in the next two reigns, when the isles also were added (1266) to Scotland.

Alexander II. (1214–49), son of William, was crowned at Scone in his seventeenth year, in time to take part in the great struggle in England for Magna Charta, which had reached its crisis. He sided with the English barons, who made an agreement by which Carlisle and the county of Northumberland were to be given to Alexander. In fulfilment of his part he besieged Norham, while the barons inserted in Magna Charta a clause by which John promised to render to Alexander what was his right with reference to the marriage of his sisters and his kingdom, unless the charters of his father William authorized otherwise, and this was to be decided by the judgment of his peers in the *curia regis*. The position of the Scottish king as one of the English barons in whose favor Magna Charta was granted is pregnant evidence of the fact that he was not, like John, Henry III., and Edward I., a monarch with imperial tendencies, the adversary of the rights of the barons and the people. The Scottish kings in this century and Bruce in the next were popular sovereigns, and their memory supported the crown when it was worn by less worthy successors. Next year John broke the charter, reduced by the aid of mercenaries the northern counties of England, and, advancing into Scotland, stormed Berwick and burnt Roxburgh, Haddington, and Dunbar. On his return he pillaged Coldingham and set fire to Berwick. Alexander retaliated by wasting England as far as Carlisle, which town, but not the castle, he took in the autumn; then, marching to Dover, he did homage to Louis, the son of Philip Augustus, whom the English barons had chosen as king. Next year (1217) he again invaded England, but made peace with Henry III., which was confirmed three years later at York. Alexander agreed to restore Carlisle, do homage for his English fiefs, and obtain release from the excommunication which the pope had declared against the barons and their allies. Henry promised to give Alexander one of his sisters in marriage and to procure suitable husbands for the Scottish princesses. Accordingly, Alexander married Joan, the elder daughter of John, while Margaret, his sister, became the wife of Hubert de Burgh, earl of Kent, and Isabella of Roger Bigod, earl of Norfolk, both nobles who took a prominent part in the Barons' War. These alliances rendered the peace with England more secure, and allowed Alexander to devote himself to the reduction of the periodical insurrections of the Celtic and Norse chiefs on his northern and western borders. He reduced Argyll (1222), which he created a sheriffdom, and forced John, earl of Caithness, to surrender part of his lands and pay compensation for his share in the burning of Adam, its bishop. The wisdom of his settlement of Argyll was proved by the inhabitants repelling an attack by Haco, the Norse king. He was equally successful in quelling the risings of two chiefs of the same name, Gillescop, one in the west, the other in Moray. Five years later (1230) a disputed succession in Galloway gave him the opportunity of chastising that turbulent province and dividing it among three co-heiresses.[1] The fall of Hubert de Burgh and the succession of Peter des Roches to the chief place in the council of Henry III. changed the attitude of that king toward Scotland, but Otho, the papal legate, preserved peace by a compromise of the rival claims. A little more than a year after the death of his wife Joan without issue, Alexander married Mary de Couci, daughter of a French noble house, which counted itself the equal of kings, and Alexander III., the child of the marriage was betrothed when an infant of a year old to Margaret, daughter of Henry III. Two years later (1244) a serious rupture, fomented by Walter Bisset, a Scottish exile, and caused by a projected alliance of Alexander with France and the erection of castles on the border, was averted by the treaty of Newcastle, by which the kings of England and Scotland bound themselves not to make alliances with the enemies of each other. The last year of his life was occupied in putting down a second rising in Galloway, and in preparing for an expedition against Haco, with the view of annexing the Hebrides; but he died of fever at Kerrera, in the Bay of Oban, while mustering his fleet. These expeditions, all successful, are proof of the active character of the king, who must have been called "Peaceful" because he preserved peace with England, for he was in fact a warlike monarch, enforcing the feudal levy, which according to Matthew Paris, amounted in his time to 10,000 horse and 100,000 foot, and extending the feudal civil government. Like his predecessors, he was a benefactor of the church, especially of the new mendicant orders, whose monasteries were founded in all the principal towns. The most important of his statutes were the substitution of trial by jury for the ordeals of fire and water, and the regulation of trial by battle, with provision for the case of women and the clergy. He was deemed, like David, a protector of the poor.

Alexander II. 1215-1266.

Alexander III. (1249–85) was only eight years old when his father died. A succession of contests for the regency between a party of nobles who favored English influence and a national party was the consequence. The former tried to delay the coronation on the pretence that the young prince was not a knight; but Comyn, earl of Menteith, baffled them by the proposal that the bishop of St. Andrews should perform both ceremonies. The rehearsal of his descent from the Celtic line of kings was made, according to a custom becoming old-fashioned, for the last time by a Highland sennachy, to please the Gaelic subjects, while the translation of the corpse of St. Margaret into a precious shrine at Dunfermline was calculated to have a similar effect in the Lowlands. Henry III. had asked the pope to declare the coronation illegal without his consent, but the pope refused. Foiled in this, Henry celebrated at York the nuptials of his daughter and the young king, whom he asked to render homage for his kingdom. The reply that he had not come to answer such a question and must advise with his counsellors implied that he had counsellors little likely to grant it. About this time Durward the justiciar and Robert the chancellor were dismissed, and the earl of Menteith held the chief power for five years. A secret mission of Simon de Montfort led to the earl of March, Durward, and other nobles seizing the young king and queen, and at a meeting with Henry at Kelso the Comyns and their supporters were removed from office (1255) and other regents appointed. Two years later the bishop of St. Andrews got the pope to excommunicate Durward and the English regents. Next year a compromise was effected and a joint regency appointed, consisting of the queen dowager and her husband, the earl of Menteith and Durward, and the supporters of both parties. When Alexander was nearly of age the earl of Menteith died, whereupon the king took the government into his own hands (1261). Henry, engaged in the dispute with his barons, could not interfere. Alexander at once resumed his father's project for the reduction of the Hebrides: but Haco, the Norwegian king, forestalled him by invading Scotland, when a storm, which dispersed his fleet, and the loss of the battle of Largs (1263) forced him to retire to the Orkneys, where he died. Magnus Olafson, king of Man, the chief Norse feudatory, a descendant of

Alexander III.

Reduction of the western isles.

[1] [The disputed succession arose upon the death in 1234 of Alan, lord of Galloway, and Alexander's invasion followed in the next year. Skene's *Celtic Scotland*, vol. i. p. 487. See also *Fordun's Chronicles* in *Historians of Scotland* (1872) vol. iv. p. 286.—AM. ED.]

Godred the Black, submitted to Alexander, and although some of the islands held out they were reduced by the earls of Buchan and Mar and Alan Durward. At last Magnus, the son of Haco, concluded a treaty at Perth (1266), by which he surrendered Man and the Sudreyar for a payment of 4000 marks [$12,960] and an annual rent of 100 [$324]; the rights of the bishop of Drontheim were reserved. From this time the western isles were subject to Scotland. At the parliament of 1284, which settled the crown on the Maid of Norway, their great nobles, descendants of Somerled, attended as vassals, and the subsequent revolts (of which there were many) were instigated by the English king, who found useful allies in the chiefs of the Isles. In the Barons' War Alexander aided his father-in-law, on whose side three Scottish barons, John Comyn, Robert Bruce, and John Baliol, fought at Lewes, where the first two were taken prisoners. In the matter of the independence of his kingdom Alexander was as firm as his predecessors, and would not allow Henry himself or the legate Ottobon to collect within it a tithe for the crusade which the pope had guaranteed to the English king. On the accession of Edward I. (1272) Alexander attended his coronation, but neither then nor six years later, when specially summoned to Westminster, would he do homage for Scotland. The closing years of Alexander were saddened by domestic losses. His wife died in 1273, his younger son David in 1281. His only daughter, Margaret, married two years before to Erik of Norway, and his elder son, Alexander, both died in 1283. The following year the estates at Scone recognized the succession of Margaret, the Maid of Norway; but Alexander, in hope of a male heir, married Joleta, daughter of Count de Dreux. At the festivities in Jedburgh in honor of the marriage a ghostly figure in the mask was deemed an omen of the king's death, which followed from a fall near Kinghorn (1285). The prosperity of Scotland in his reign was celebrated in one of the earliest verses preserved in the Sottish dialect:

1266–1292.

> "Quhen Alysander oure kyng was dede,
> That Scotland led in luve and le,
> Away wes sons of ale and brede,
> Of wyne and wax, of gamyn and gle,
> Oure gold was changed into lede.
> Cryst, born into virginite,
> Succour Scotland and remede
> That sted in his perplexitie."

Under the wise rule of three kings, extending over more than a century—a circumstance rare in that age—Scotland attained a degree of wellbeing before unknown, which did not return till the 18th century. The extent of the revenue is attested by the returns of the sheriffs to the chamberlain and by the accounts of the tax which Boiamund de Vicci, the pope's representative, levied from the clergy for the crusade. Berwick, the chief Scottish port, was likened to Alexandria, and attained an importance it never recovered after its union with England. Its customs were reckoned as equal to a third of those of all England,—a statement hardly credible till we remember that the trade of Britain was chiefly with France and Flanders, and that a harbor for small craft was sufficient. The personal character and bravery of these kings subdued the turbulence of the outlying districts and kept in check the ambition of the nobles. The bounds of the kingdom were almost as they now are, and the name of Scotland permanently passed to the whole country south as well as north of the Forth. In spite of differences of race, the unity of the nation had been secured, and its independence was acknowledged by the pope and other sovereigns; the English alone kept up a nominal claim to rights which had for short periods been held by Canute and the Conqueror, and for longer by the second Henry, until they were abandoned by the treaty of Canterbury. But now all was to be changed. Three centuries of war, though diminishing in intensity as time went on, display heroic character, but imply an amount of suffering to the people which cannot be told. Perhaps a contest between the two proud nations which shared Britain was inevitable, yet the reigns of the Alexanders suggest a different possibility. That the contest came when it did was due to the disputed succession on the death of Margaret, the Maid of Norway. This gave to the ambition of Edward I. an opportunity to reduce the whole island to his sway, which he was quick to seize.

Feudal Scotland.

5. *War of Independence; from Death of Alexander III. to Accession of House of Stuart.*—The Maid of Norway, whose right was at once acknowledged (for Scotland, like England, knew no Salic law), was not to wear the crown. A regency administered the kingdom for five years after Alexander's death. A conference at Salisbury between commissioners of Erik of Norway, Edward I., three of the regents, and Bruce, lord of Annandale, agreed that Margaret should be sent home unbetrothed. Her marriage to Edward's son, for which a dispensation had been got from Rome, was sanctioned by an assembly at Brigham near Roxburgh (18th July, 1290), in a treaty which made anxious provision for the independence of Scotland. This country was to remain free, and, saving the right of the king of England in the marches or elsewhere, separate from England by its lawful bounds. No parliament was to sit, and no Scottish suit to be tried, out of Scotland. Edward confirmed this treaty by oath; but the death of Margaret in the Orkneys rendered it abortive. To prevent an armed contest for the crown, Fraser, bishop of St. Andrews, invited Edward to intervene, and certain Scottish nobles made a similar request. He accordingly summoned the Scottish estates to meet him on the 10th May, and the English Parliament on 3d June, 1291, at Norham near Berwick. When the Scots came Edward refused to judge the cause of the Scottish succession unless his title as superior of Scotland was admitted. After some delay the barons and clergy gave the admission, as also did the claimants—no fewer than thirteen—but the representatives of the commons withheld any such acknowledgment. The court for the decision of the cause was then appointed. Forty members were named by Baliol and as many by Bruce, between whom the competition really lay, while Edward chose twenty-four. On the following day the competitors agreed that sasine of the kingdom should be given to Edward; a week later the regent surrendered the kingdom of Scotland and the keepers the chief castles into his hands as lord paramount. He restored possession after adding several Englishmen to the regency. After another adjournment the competitors put in their claims. Three descendants of David, earl of Huntingdon, brother of William the Lion—all English barons, though one, Bruce, had large estates in Scotland—were alone serious. John Baliol claimed as grandson of David's eldest daughter Margaret, wife of Alan, lord of Galloway; Robert Bruce as son of David's second daughter, wife of the lord of Annandale; while David de Hastings, grandson of the third daughter Ada, contended that the kingdom was partible. This last question was postponed until the claims of Baliol and Bruce had been considered. After two long adjournments it was at last decided (14th October, 1292) that the case was to be ruled by the law of the kingdom applicable to titles of earldoms, baronies, and other indivisible inheritances, and "that by this law in every heritable succession the more remote by one degree descended from the eldest sister was preferable to the nearer in degree from the second." Edward accordingly decided (17th November, 1292) in favor of Baliol. Two days afterwards the regents were ordered to give sasine to

Maid of Norway.

Treaty of Brigham.

Competition between Bruce and Baliol.

Baliol made king.

Baliol; the day following he swore fealty to Edward at Norham; ten days after he was crowned at Scone; within a month he did homage to Edward at Newcastle.

The judgment was just, according to the principles of feudal law afterwards fixed, though then imperfectly established, in favor of primogeniture; the acknowledgment of the suzerainty of Edward was a different matter. In the course of the proceedings Edward obtained from the cathedrals and religious houses of England returns of homage by Scottish kings. No such returns were asked from Scotland. Those from England recited the well-known cases of isolated conquest followed by homage to Saxon, Danish, and Norman kings, Edward the Elder and Athelstan, Canute and the two Williams, and the treaty of Falaise by which William the Lion surrendered the independence of Scotland. They ignored the treaty of Canterbury by which it was restored, the clause of Magna Charta relating to Scotland and the rights of its king, the refusal of the last two Alexanders to render homage for their kingdom, and the treaty of Brigham by which Edward had acknowledged the independence of Scotland. One result of the submission to the English king overlooked by the eager competitors, but not by the lawyers who advised Edward, immediately emerged. An appeal was soon taken from the court of Baliol to the court of his superior at Westminster. Baliol referred in vain to the express clause in the treaty of Brigham that no Scottish suit was to be tried beyond Scotland; Edward replied this was an appeal from his own officers during the interregnum, but asserted his right to hear appeals in all cases. Other appeals followed, and Baliol weakly surrendered his claim to independent jurisdiction. Shortly afterwards (October, 1293) he was himself summoned to Westminster as defendant in a suit by Macduff, son of the earl of Fife. Declining to appear, he was condemned for contempt, and three of his principal castles were ordered to be seized. He again yielded and promised to attend next parliament. There could be no longer doubt what had been the effect of submitting the dispute as to the crown to Edward. Instances of homage had not been difficult to find; but the records might be ransacked in vain for an example of what would now become frequent,—the adjudication by the court of the English king on the rights of Scotsmen. The execution of this decision by force in Scotland carried with it at no distant date the subjection of the kingdom. Baliol quitted Westminster suddenly in 1294 to escape service in the Gascony war. By yielding in the question of appeal he had lost the confidence of the Scottish barons. In the parliament of Scone a council was appointed to control him, and all fiefs held by Englishmen were forfeited. In the following year he formed an alliance against England with the French king, and his son was promised the daughter of that king's nephew, the count of Anjou, in marriage. The Scottish army headed by six earls then invaded England, but was repulsed at Carlisle (28th March, 1296), and Edward, leaving his French campaign, at once marched northward. Before the end of March, 1296, he stormed Berwick. While there the abbot of Arbroath brought him a renunciation of Baliol's homage. Dunbar was taken soon afterwards by the earl of Surrey; Roxburgh, Jedburgh, and Edinburgh fell before the end of June; Stirling, Perth, and Scone surrendered without a blow. At this time no Scottish town was walled and no resistance could be made against the English feudal levy led by such a general as Edward. In the churchyard of Stracathro in Forfar Baliol renounced his alliance with France, and a few days afterwards (10th July) surrendered Scotland to Anthony Beck, bishop of Durham. Edward marched as far as Elgin, but it was a conquest of Baliol, not of Scotland. This impotent monarch was carried captive with his son to London and vanishes from Scottish history. He died at one of his French fiefs twenty years afterwards, never having attempted to regain the kingdom. On his homeward march Edward took and recorded in the Ragman Rolls the homage of the Scottish nobility, and carried to Westminster the sacred stone of Scone, on which the Celtic monarchs had been crowned, and the black rood[1] of Margaret, the hallowed relic of the Saxon line. Surrey was appointed guardian, Sir Hugh Cressingham treasurer, and William Ormsby justiciar of Scotland; the nobles were treated with lenity and the bishops bribed by the privilege of bequeathing their movables like their English brethren. The most important result of the campaign was the capture and fortification of Berwick. That city, the key to the Lothians, was the commercial capital; and Scotland was left without one until the rise, after the union, of Glasgow and the mercantile centres of the Clyde. 1292–1298.

When the fortunes of Scotland were at the lowest, when the country was deserted by the king, and its nobles and clergy were making terms with the conqueror, Wallace, the man of the people, appeared. The second son of Sir Malcolm Wallace of Elderslie near Paisley, his name indicates a remote Celtic origin from a Welsh or Cambrian stock. In the spring of 1297, in revenge for the murder of his wife, Wallace slew Hazelrig, sheriff of Ayr, and burned Lanark. Collecting a band of followers animated with like patriotism, and aided by a single noble, Sir William Douglas, he surprised and drove Ormsby, the justiciar, from Scone and Beck, the bishop of Durham, from Glasgow. Some of the barons, headed by James the Steward, joined him, and Wallace and Douglas carried everything before them in Lennox and Galloway,—districts more favorable to the national cause than Lothian. The nobles fell away from Wallace almost as soon as Percy appeared at the head of an English force, and Douglas, the Steward, Bruce the future king, and others capitulated at Irvine (9th July, 1297). Wallace, while engaged in the siege of the castle of Dundee, heard that Surrey and Cressingham were advancing on Stirling, and he marched to its relief. There at the bridge over the Forth near Cambuskenneth he won his most famous victory (11th September). The English were totally routed and Cressingham was killed. The disparity of numbers was great, for the English had 50,000 foot and 1000 horse, against at most 40,000 foot and only 180 horse. The generalship of Wallace, who tempted his adversary to cross the bridge in his face and held his troops in hand until the moment of the charge, won the day, the first in which a feudal army was beaten by light-armed peasants. Wallace attempted to organize the kingdom he had won. He assumed the title of guardian of the realm in name of the Lord John (Baliol), and associated with himself Sir Andrew Moray of Bothwell, son of the only baron who stood by him and who fell in the battle. He held the nobles in awe, while he rewarded his adherents. The grant (fortunately preserved) of the office of constable of Dundee to Alexander Scrymzeour can scarcely have been a solitary one. He introduced better discipline in the army, and tried also to revive trade.[2] Shortly after the battle of Stirling Wallace carried the war as far as Hexham, whose monks he protected. That he penetrated farther south and won the favor of Eleanor, Edward's wife, is one of the romantic additions to his scanty history in the poem of Blind Harry. Edward recognized the crisis and, leaving Flanders, sent a force before him under Pembroke, following in person at the head of 80,000 foot and 10,000 horse. For a brief space success attended Wallace, who defeated the English in Fife and Ayr; but the bishop of Durham retook the castle of Dirleton, and Edward himself, by the Wallace's struggle for independence.

[1] [Burton adds (*v. Hist. of Scotland*, vol. ii. p. 274), "The Holy Rood was afterwards returned to Scotland, and was again lost at the calamitous battle of Neville's Cross."—Am. Ed.]

[2] A letter from him and Moray to the citizens of Lübeck and Hamburg who sympathized with the Scottish commons has been found in the archives of Hamburg.

victory of Falkirk (22d July, 1298), in which the nobles again proved false to the popular cause, reversed that of Stirling. Wallace took refuge in France, and, although the French king at Amiens offered to surrender him, he was soon released and provided with a safe conduct to the pope. Papers found on him when captured show that he received similar letters from Haco of Norway and Baliol. Whether he went to Rome is not certain, but he may have been one of the Scots who at this time induced Boniface VIII. to claim the superiority of Scotland. The claim was indignantly repelled by the English barons at the parliament of Lincoln; Edward, however, thought it prudent to lay before the pope a statement in which he advanced not only the instances of homage collected for use at Norham but the fable of Brute the Trojan, from whose eldest son Locrinus he claimed descent, and therefore superiority over the Scottish kings sprung from Albanactus the second as well as those of Wales descended from Camber the third. Baldred de Bisset, the Scottish commissioner at Rome, in his answer admitted the pope's right, but replied to Edward's fiction by another as bold,—the descent of the Scots from Scota, the daughter of Pharoah. A more solid argument was founded on the treaty of Brigham. The pope delayed judgment, and in 1302 suddenly changed sides and exhorted the Scots, by several bulls, to submit. Edward had not waited for this sanction; the period between the battle of Falkirk and the taking of Stirling was a continuous and bloody struggle. In person he laid waste Galloway and took Caerlaverock (1300); in 1302, his general Sir John Segrave, having fought a battle of doubtful issue with Comyn and Fraser at Roslin, Edward returned (1303), marched as far as Caithness, and reduced the whole east of Scotland by the capture of Stirling (24th January, 1304). Scotland was subdued, yet Wallace lived, and we catch glimpses of him, in the woods of Dunfermline, in the forest of Ettrick, in the neighborhood of Lanark. A price was set on his head, and at last he was betrayed by a servant of Sir John de Menteith near Glasgow and taken to London, where, after a mock trial in Westminster Hall, he received the traitor's doom (23d August, 1305), though he denied with truth that he had taken any oath to Edward.

1298–1328.

This time Edward, in order to make the conquest of Scotland permanent, proceeded to incorporate it in the empire of England. With apparent fairness an assembly was summoned to Perth to elect ten representatives to attend a parliament at Westminster to treat of the affairs of Scotland. Nine commissioners came to London, where they were associated with twenty Englishmen. The result was the "Ordinacio facta per dominum regem pro stabilitate terræ Scotiæ" (1305). Though never fully carried out, this document, on the model of similar ordinances for Wales and Ireland, discloses Edward's designs. English nobles were appointed to administer the government of the country, and eight justices to administer the law. The law and usages of Scotland (except those of the Brets and Scots, which were abrogated) were to be observed in the meantime; but the lieutenant (John of Brittany, the king's nephew) and council were to amend what was contrary to God and reason, or in case of difficulty refer to Edward at Westminster. The whole country was divided into sheriffdoms, the sheriffs being removable at the discretion of the lieutenant. The office of coroner, more important then than now, was also regulated; certain persons were nominated constables of the chief castles; and many nobles were fined and others banished. Bruce (the competitor's grandson) was ordered to put Kildrummy Castle (Aberdeen) in charge of an officer for whom he should be responsible. The ordinance was suitable to its object,—moderate, even humane. The banishment of the nobles was limited as to time.

Settlement of Scotland by Edward I.

Relief was given in the payment of fines. Many old officers were continued. Edward's aim at this time was to pacify the country he had conquered, to put down resistance, but to encourage submission. It is as wrong to call him a tyrant as Wallace a rebel; the one was a statesman king with imperialist aims, the other a patriot leader with keen popular sympathies. The king triumphed; but before his death his well-laid plans were shattered; Scotland again rose in arms, and this time the nobles joined the people, under the leadership of Robert the Bruce.

The position, as well as the character of Bruce contrasted with that of Wallace. Instead of being a cadet of the ordinary landed gentry, Bruce represented a family in which for more than two centuries the purest Norman blood had flowed. The English branch of Skelton in Cleveland and the Scottish branch of Annandale divided their large possessions; but those of the latter sufficed to make its head one of the most powerful nobles in Scotland, who still retained, as so many did, English fiefs. More than one of his ancestors had intermarried with the royal house of Scotland (see ROBERT THE BRUCE, vol. xx. p. 608). On his father's death Bruce succeeded to Annandale. He held besides several manors in England. During the early part of the War of Independence, like many barons with conflicting interests, he had wavered, sometimes supporting Wallace, more frequently the English king. In 1303–4 he assisted Edward in the preparation for the siege of Stirling. He had been consulted with regard to the ordinance of 1305. But there were already signs of mutual distrust. The provision in the ordinance as to Kildrummy shows that Edward was aware special precautions had to be taken to secure the loyalty of Bruce, and on 11th June, 1304, Bruce secretly met near Cambuskenneth Lamberton, bishop of St. Andrews, and entered into a bond referring to future dangers from Edward. Of all the Scottish clergy Lamberton had been most friendly to Wallace, and this bond was a link between the two periods of the War of Independence, and their leaders. Bruce had attended at Westminster when the ordinance was settled, but left suddenly, arriving at Dumfries on the seventh day. There he met in the church of the Friars Minor John (the Red) Comyn of Badenoch, Baliol's nephew, and slew him before the high altar (10th February, 1306). The die was cast, and indecision vanished from the character of Bruce. Collecting his adherents at Lochmaben and Glasgow, he passed to Scone, where he was crowned by the bishop of St. Andrews. It at first seemed likely that a saying of his wife would prove true,—that he was a summer but would not be a winter king. His defeat at Methven (19th June, 1306) was followed by another at Strathfillan (11th August), and Bruce took refuge in the island of Rathlin (off Antrim, Ireland). The tales of his hairbreadth escapes, his courage and endurance in all changes of fortune, were gathered by Barbour from the mouths of the people, who followed the life of their champion with the keenest interest. Meanwhile Edward came north and gave a foretaste of his vengeance. But his severity strengthened the party of Bruce, which grew daily. All classes now made, with few exceptions, common cause against the enemy of all. Edward's death at Burgh-on-Sands (7th June, 1307) at once changed the whole aspect of the invasion. Edward II. wasted in the ceremony of a funeral and the diversions of a youthful court the critical moment of the war. Bruce seized his opportunity, and by the close of 1313 Berwick and Sterling alone remained English. The independence of Scotland was finally determined by the ever-memorable victory of Bannockburn (24th June, 1314).

Robert the Bruce.

Bruce reigned fifteen years after Bannockburn and (if the Irish expedition of his brother Edward be left out of account) with almost uninterrupted success. On his return from Ireland he reduced Berwick (March,

1318) and converted it from an English to a Scottish frontier town. His recognition by the pope was followed by the acknowledgment of Flanders and France; and the long truce which Edward II. had been forced to agree to before his death became in the new reign a formal treaty known as that of Northampton (April, 1328). By its leading article "Scotland according to its ancient bounds in the days of Alexander III. shall remain to Robert king of Scots, and his heirs, free and divided from England, without any subjection, servitude, claim, or demand whatsoever." In pursuance of another article Johanna, Edward's sister, was married to David, the infant son of Bruce, at Berwick on 12th July. As an administrator and legislator he showed an ability not inferior to that which in his earlier years he had manifested as a warrior and a general. He obtained from the estates a settlement of the succession, reformed abuses in the feudal law, regulated the courts, providing equal justice for poor and rich, and framed strict acts against sedition. He also encouraged trade, especially shipbuilding, foreseeing its future importance to Scotland. Never off his guard, amongst his most anxious legislative provisions are those relating to the defence of the kingdom,—arming all able-bodied men, prohibiting exports of arms, fortifying the towns and castles on the borders, arranging signals to give notice of invasion. Though attacked by leprosy contracted in his campaigns, he remained active to the last,—a monarch such as occurs only once in many centuries, brave, liberal, wise, and pious, like the English Alfred, the darling of the nation he had delivered. (For fuller details, see ROBERT THE BRUCE, vol. xx. p. 608 *sq.*)

Treaty of Northampton.

The wise provision that Bruce made for the regency secured the peaceful succession of his son David II. (1329–70), who was the first Scottish king anointed at his coronation,—a privilege conceded to Bruce in a bull which reached Scotland after his death. According to the ideas of the age this placed the Scottish king on an equality with the sovereigns of Europe. The War of Independence quickened the sentiment of Scottish nationality, and left the country poorer in wealth but richer in spirit. The memories of Wallace and of Bruce educated the people and produced in the next generation their earliest literature. England, unconscious of the benefit, gained by its own defeat. But for the resistance of the Scots it might have become earlier than France a centralized feudal monarchy. The distinct character of the Scots —a blend of the Celt, Saxon, Norseman, and Norman —strengthened by variety the collective force of Britain. The loss which must be balanced against the gain was the bitter hatred between two races of kindred origin within one narrow isle, which for centuries retarded the progress of both, especially of the smaller kingdom.

David II.

The almost contemporaneous reigns of David II. and Edward III. reversed the position of the two countries: Scotland had now one of its feeblest and England one of its most powerful kings. Had not the love of liberty become the life-blood of both nobles and commons in Scotland it must have succumbed in the desperate struggle. After the death of Robert, Randolph, earl of Moray, governed with wisdom and vigor for three years. On his death the estates chose Donald, earl of Mar, another nephew of Bruce, whom he had passed over, foreseeing his incapacity. Encouraged by the divisions of the nobles, Edward, son of John Baliol, with the barons who had lost their land by espousing the English side, suddenly landed at Kinghorn. Nine days after his election, Mar was met and worsted by Baliol on Dupplin Muir (11th August, 1332), where Mar himself and many nobles were slain. Baliol was crowned at Scone; but Perth was immediately retaken, and Baliol, having been defeated at Annan by the young earl of Moray, left Scotland. Next year Edward came with a large army to his support and defeated at Halidon Hill (20th July, 1333), chiefly through the skill of the archers, the Scots led by Archibald Douglas, lord of Galloway, who was now regent. Berwick capitulated and Baliol surrendered it to England, pledging in addition the castles of the Lothians, including Edinburgh and Linlithgow, in security for an annual tribute of £2000. Like his grandfather, Edward III. made a new ordinance for the government of Scotland, but his officers never obtained possession of their posts. Meantime David and his queen fled to France, where they remained seven years. Fortunately for Scotland a new race of patriotic leaders appeared: Moray of Bothwell handed down the traditions of Wallace and Bruce, while Robert the Steward, Douglas the knight of Liddesdale, and Sir Alexander Ramsay of Dalhousie sustained the fame of Bruce, Randolph, and Douglas. The attraction of a French campaign with the crown of France as prize prevented Edward from ever using his whole force against Scotland, and a French fleet made a diversion by attacking the Channel Islands and threatening the Isle of Wight. Edward retaliated by assuming the title of king of France, and after two years' preparation invaded that country from Flanders. The armies met at Vironfosse (26th September, 1339), where David of Scotland was present. Never was the pomp of chivalry seen in greater splendor, but the first act of the Hundred Years' War, which seemed destined to make French and English eternal enemies and French and Scots perpetual allies, passed without a blow.

Struggle against Edward Baliol.

1328–1365.

Two years later the recovery of the Scottish castles and the repulse of Salisbury's attempt on Dunbar made it safe for David to return to Scotland, which Baliol had abandoned. Though scarcely eighteen, he assumed the government (30th March, 1342). Before his arrival Edinburgh had fallen, and next year Roxburgh was taken by Sir Alexander Ramsay, whom David unfortunately rewarded by the sheriffdom of Teviotdale, which the knight of Liddesdale claimed, and Ramsay, seized by treachery, was starved to death at the Hermitage by the knight of Liddesdale, who entered into correspondence with the English king, and dishonored his name of the "Flower of Chivalry." Bullock, an ecclesiastic who had risen to the office of chamberlain under Baliol and transferred his services to David, met the same fate at the hands of the king on a suspicion of treason. Other signs of weak government were not wanting. On the conclusion of a brief truce, David, tempted by Edward's absence, invaded England in spite of the defection of some of his chief nobles, and was defeated at Neville's Cross (17th October, 1346) near Durham by the archbishop of York and the northern barons, the king and several of his nobles being taken prisoners. The rigor of David's captivity (which lasted eleven years) was relaxed so far as to allow him to return frequently to Scotland and try to persuade the people to raise his ransom, which the English king urgently required. Though Baliol was still acknowledged as nominal king by Edward, he resided in Galloway, while Robert the Steward, elected regent in the name of David, really governed. At length by the treaty of Newcastle (13th July, 1354) David's ransom was agreed on, sufficient hostages being taken for its payment. Next year the French king resumed the Scottish war by sending Eugène de Garancière with men, money, and arms. Several border engagements followed, but Edward, advancing to the frontier, took Berwick, and obtained from his puppet Baliol an absolute surrender of the Scottish kingdom for an annuity. He ravaged the Lothians in the raid called the Burnt Candlemas, but failed really to reduce the country. Edward's victory over the French at Poitiers, in which many Scots were slain, forced the Scottish parliament to grant the terms dictated by the English king. Peace was finally concluded by the treaty of Berwick (3d October, 1357), and confirmed at

David's captivity and release.

Scone,—the ransom being raised and the condition as hostages made more severe. David at once returned to Scotland. But his sympathies had become English; he revisited that country almost every year, and it required all the strength of the Scottish estates to prevent the son of Bruce from making a surrender of his kingdom more ignominous than Baliol's. The enormous ransom pressed hard on so poor a country. An attempt to induce France to resume the war failed, and David, like a debtor dealing with a money-lender, had to renew his bills at usury. Negotiations for this purpose went on till 1365, when a truce for four years was agreed to. Edward and David latterly devised schemes for payment by another process,—the transfer of the crown at David's death to an English prince. At the parliament of Scone David proposed that Lionel, duke of Clarence, should be recognized as his heir; but the estates replied with one voice that no Englishman should rule Scotland, and renewed the settlement of the succession by Bruce on Robert the Steward. Hatred of foreign aggression and the weakness of the king enabled the Scottish barons to play a part similar to that taken by the nobles of England in the reigns of John and Henry III., and obtain guarantees for the constitution by limiting the monarchy. Such was probably the origin of the committees of parliament (at a later date turned to an opposite use) for legislation and for judicial business which first appear in 1367,—the statutes for the more regular administration of justice, purity of the coinage, and the revocation of the grants of royal revenues and estates. It was expressly declared that no attention was to be paid to the royal mandate when contrary to law. About this period David entered into a secret agreement with Edward, promising in return for a remission of the ransom to settle the crown on him failing heirs of his own body, but the public negotiation for its payment went on. In the same year his marriage with his second wife, Margaret Logie, a daughter of Drummond, a lesser baron, led to a revolt. He quelled it and threw the steward and at least one of his sons into prison, making lavish grants to Margaret and her relatives. Her influence did not last long, and she was supplanted in the king's favor by Agnes of Dunbar. Margaret was divorced by the Scottish bishops, for what cause is not known, and, though her appeal to the pope succeeded, David did not survive the decision. He died on 21st February, 1370, childless, and the succession opened to Robert, son of Bruce's daughter Marjory, the first of the Stuarts, who were to govern Scotland for the next two centuries.

Relations with Edward III.

1365–1390.

6. *House of Stuart from Robert II. to James IV.*—The descent of the house of Stuart is traced from Walter Fitz-Alan, a Norman, steward of David I. His estates were in Renfrew, to which Alexander, the fourth steward, added Bute by marriage. Walter, the sixth steward,[1] was scarcely one of the chief nobles; but his prowess in the War of Independence gained him the hand of the daughter of Bruce. Robert II. was their only son. Such was the prosperous record of the family before it ascended the throne. Its subsequent history presents a series of tragedies of which that of Mary Stuart is only one, though the most famous. While the fate of kings excites the imagination, history must trace the growth of the nation and the slow changes which transformed the bulk of the Scottish people from loyal subjects to bitter enemies of their native kings and its kings from patriots to tyrants.

Robert II. (1370–90), already fifty-four, continued rather than commenced his government on the death of David II., for he had been twice regent during David's exile and captivity. He did not ascend the throne without opposition, but the memory of Bruce was too fresh to admit of his settlement being put aside. The earl of Douglas, whose great estates on the border made him more formidable as a competitor than his claim by descent from a daughter of David, earl of Huntingdon, was conciliated by the marriage of the king's daughter Isabella to his son and by his own appointment as justiciar south of the Forth and warden of the eastern marches. This impediment removed, the coronation proceeded, and it was followed by a public declaration of the settlement of the crown on Robert's son John, earl of Carrick, at his father's death. A still more explicit settlement was made two years afterwards on the king's sons by his first marriage with Elizabeth More, John earl of Carrick, Robert earl of Fife, and Alexander lord of Badenoch; and failing them on those of his second with Euphemia Ross,—David earl of Strathearn and Walter his brother. A question as to the legitimacy of the children by Elizabeth More rendered this declaration necessary. The first fourteen years of Robert's reign passed with scarcely anything worthy of record. The king, whose portrait is drawn by Froissart as a man "not valiant, with red bleared eyes, who would rather lie still than ride," left the cares of government to his sons, especially the second. England, after the death of Edward III. (1377), was occupied with the necessary arrangements for a new reign and with the rising of Wat Tyler (1381). The absence of any movement in Scotland similar to this or the French Jacquerie perhaps indicates a better relation between the peasantry and the upper classes; but a third estate of the commons was as yet unknown in Scotland. John of Gaunt, who had invaded Scotland the year before, now took refuge there and was hospitably received in Edinburgh till the young Richard II., by putting down the rising, made it safe for him to return. This visit led to the first entrance into the northern kingdom of the principles of Wickliffe and the Lollards, whom Gaunt favored. The French, still anxious to incite the Scots to attack England, sent a small party of free lances, who landed at Montrose and were allowed to make a raid on their own account. They were followed by John de Vienne with 1000 men-at-arms and many followers.[2] The license of the French knights did not promote good feeling; but the interest of the two countries prevented a rupture. After the French left, the Scots made another raid into Northumberland, in retaliation for an expedition in which Richard II. wasted the Lothians. Three years later, under the earl of Douglas, they attacked Newcastle, but were repulsed by Henry Percy, who, true to his name of Hotspur, in order to recover his pennon, pursued them to near Redesdale, about 20 miles from their own border, and fought the battle of Otterburn (19th August, 1388). Douglas himself fell, but the victory went to the dead man, for young Percy and his brother were taken captive, and the bishop of Durham would not venture to intercept the retreat of the Scots. In 1388, Robert's inactivity increasing and his son the earl of Carrick being disabled by a kick from a horse, the earl of Fife was chosen regent by the estates under condition of annually accounting to them for his administration. In April, 1390, his father died. His prosperous reign rather than any personal quality, except an easy disposition, gained Robert the praise of Wyntoun, who, writing under his son, prays God to give him grace

Robert II.

> "To govern and uphold the land
> In na war state nor he it fand,

[1] [Fisher's *Genealogical Atlas of the Kings of England* gives Alexander, the son-in-law of Angus, lord of Bute, as the sixth, and Walter, son-in-law of the Bruce, as the eighth steward.—AM. ED.]

[2] Froissart gives a vivid account of the poverty of the country and the rudeness of its people. "The people set little upon the distinction of their houses and said shortly how with three or four poles they would make them again. Edinburgh, though the king kept there his chief residence and it is Paris in Scotland, is not like Tournay or Valenciennes, for in all the town there are not 4000 houses." The men Vienne brought with him had to be lodged in Dunfermline, Kelso, Dalkeith, Dunbar. On his return he was asked by the young king Charles VI. how he fared; he said he had rather be count of Savoy or Artois than king of Scotland.

For quhen his fadyr erydt was
Of Scotland was na part of land
Out of Scottys mennys hand,
Outwith Berwick, Roxburgh, and Jedburgh."

This prayer was only partially fulfilled. The English did not acquire more of Scotland, but the border war was not so successful, and the royal house was the scene of tragic events which threatened to change the order of succession.

Robert III. (1390–1406)—for under that name the earl of Carrick was crowned to avoid the hated name of John—was even less active than his father. He is briefly but truly described by an historian as a good man but not a good king. He scarcely reigned, for the regency of his brother continued after his accession till it was succeeded for a few years by that of Robert's son, on whose death the earl of Fife again became regent. There was a truce with England for nine years, during which the irrepressible love of fighting had to satisfy itself within Scotland. The king's younger brother, Alexander, called the Wolf of Badenoch, who had been created earl of Buchan, quarrelled with the bishop of Elgin and burnt his cathedral. The Wolf and his sons were constantly engaged in private wars. The earl died in 1394, but his son Alexander continued to defy the law, which the Government was too weak to enforce in the northern Highlands. Policy was used to suppress the violence of the clans. Such seems the explanation of the combat between thirty of the Clan Kay and as many of the Clan Chattan before the king on the North Inch of Perth, which ended in the slaughter of nearly all the combatants on both sides. In the council or parliament of 1398 a change was made in the Government due to the general distrust of Fife and the rising spirit of the earl of Carrick, the king's eldest son. The form of it was a compromise. The young prince was made lieutenant for three years, but with the advice of a council, of whom his uncle Fife was one; they were created dukes of Rothesay and Albany respectively, the first of that title in Scotland. Other acts of this council were designed to restrain the monarchy by constitutional laws. Parliament was to meet annually. The king, if accused of misgovernment or breach of law, might, "to excuse his defaults," arraign his officers before the council. No one was to ride through the country with more followers than he could pay for. The grant of £11,000 [$53,460] for the common weal and profit of the kingdom by the three estates—barons, clergy, and burghs—was made under protest that it was not to be a precedent, and the burghs stipulated that in future they were not to pay more than under Robert II. In the following year the revolution took place in England which led to the deposition and death of Richard II. and the accession of Henry IV. An impostor who had assumed the name of Richard took refuge in the Hebrides and was received at the Scottish court. The expedition of Henry to Scotland (1400), partly due to this, was also prompted by the desire to distinguish a new reign and by the invitation of the earl of March, indignant at the preference given to the daughter of Douglas over his own as wife for Rothesay. Reviving the old claim of feudal superiority, which was now supported by the forged charters of Hardyng as well as the fictions of Geoffrey of Monmouth, Henry cited Robert to do homage at Newcastle, and, on his failing to appear, marched to Edinburgh. Rothesay successfully defended the capital, and Henry was suddenly recalled by the rising of Owen Glendower and the Percies. Next year (1401) occurred the death of Rothesay by starvation at Falkland, where he had been committed by his father at Albany's instance on account of his bad government and dissolute conduct. The declaration of the council at Edinburgh, which acquitted Albany of all concern in the death, was enough for the moment, but in after times, like Bothwell's acquittal, a corroboration of guilt. The last years of Robert were clouded by private and public misfortune. His queen, Annabella Drummond, his son-in-law, the earl of Douglas, and Trail, bishop of St. Andrews, one of the wisest of his council, died within a short interval. The son of Douglas, though brave, was unequal to the task of holding the border against the Percies and the earl of March, and so constantly lost battles that he was called Archibald Tyneman. The Scots were signally defeated at Nisbet Muir (14th September, 1402) in Merse and at Homildon Hill near Wooler by Percy, where the slain and prisoners equalled the number at Otterburn. Nor could order be maintained within Scotland itself, of which the forcible marriage of the countess of Mar by Alexander, a bastard of the Wolf of Badenoch, was an example. Afraid of Albany, and warned by the fate of Rothesay, Robert sent his remaining son James to France (1405); but the ship in which he sailed was taken by an English cruiser, and the future king was a prisoner in England for nineteen years. This last blow broke the weak heart of Robert, who died at Dundonald and was buried at Paisley. Though his reign was inglorious, the tradition of the War of Independence still warmed the heart of the nation and produced the earliest writers in Scottish literature,—Barbour, Fordun, and Wyntoun. The *Bruce* of Barbour became the national epic.

Robert III.

1402–1413.

The year after Robert's death the first martyr in Scotland, James Resby, an English priest, was burnt at Perth by Albany, who is described by Wyntoun as "a constant Catholic." Resby was condemned at the instance of Laurence of Lindores, called the Inquisitor of Scotland, for forty theses from the books of Wickliffe. The Lollard doctrines continued to be secretly held by a small sect, chiefly in the west. Knox traces the descent of the first Scottish Reformers —the Lollards of Kyle—from Wickliffe and Hus. This religious movement was destined to exercise a profound influence on the history of Scotland. The time when the church was a civilizing and purifying power was passing away. Its enormous wealth, a contrast to its early poverty, its developed so different from its primitive doctrine, celibacy, and the confessional in a lax society, that was no longer moved by the fervor of a new faith, produced a corruption which forced itself on minds of a reforming tendency. Catholicism allowed no place for individual reformers, and their protests, often carried to extremes, were deemed attacks upon the church itself, which became (unwillingly on the part of its best friends) the defender of its worst abuses. From first to last in Scotland the movement was popular, though not at first democratic. It did not at all or only to a slight extent change through political causes as in England.

Though he was a captive, the right of James I. (1406–37) on his father's death was at once acknowledged by a general council held at Perth; but the appointment of Albany as governor boded ill for his return. He held the office thirteen years, administering it till his death so as to conciliate all classes and pave the way to his own accession to the throne, which would have been his by right had the young king died. The recovery of Jedburgh (1408), long in the hands of the English, gave the regent an easy opportunity of popularity. It was decided by a general council that its walls should be razed and the expense defrayed by a poll tax, but Albany refused to burden the people and paid it out of the royal customs. Next year Albany and Douglas (now released from captivity in England) entered into a bond of alliance. With the earls of March and Mar and others similar engagements were made; but Douglas, who had acquired the lands of March, which, however, were now restored, had to be conciliated by a grant of Lochmaben and Annandale, the patrimony of the Bruces. The more independent nobles of the north could not be so easily gained, and

James I.

Albany's regency.

Donald, lord of the Isles, disappointed in a claim to the earldom of Ross, invaded Aberdeenshire with a great host, whose defeat by the earl of Mar at Harlaw (17th May, 1412,)[1]—the Otterburn of northern ballads—was followed by the capture of Dingwall, his chief castle on the mainland, and his final defeat at Lochgilphead.

The first Scottish university—St. Andrews—was founded by bulls granted a year later at the instance of James and Bishop Wardlaw, who had been his tutor. The higher education had already been to some extent supplied by cathedral and monastic schools; but Scots who sought a complete curriculum had to resort to Oxford or Paris. One of their number, Major, expresses his wonder that the Scottish prelates had not earlier thought of a national university. That now founded was destined to play an important part in promoting the Reformation and along with the later universities in civilizing Scotland. 1413-1436.

Little of note occurred during the remaining years of Albany's regency. His futile siege of Roxburgh (1415), soon abandoned, got the name of the Fool's Raid. Greater credit attended the Scottish arms in France, where the earls of Douglas, Buchan, and Wigtown won battles for the French king, and lands and honor for themselves; but the defeats of Crevant and Verneuil effaced the honors of Beaugé (in Anjou), and though the remnant of the Scots remained as the king's bodyguard, no considerable number of troops from Scotland afterwards went to France. Albany died at Stirling in his eightieth year (3d September, 1419). His son Murdoch assumed the regency as if hereditary; but, himself indolent and with lawless sons, he did not retain the influence of his father. In 1423 ambassadors sent by the Scottish parliament to England at last arranged terms for the return of James from his long exile (12th May, 1423).

Exile had its uses, and, except at the beginning and again after the accession of Henry V., his captivity had not been rigorous. Sir John Pelham was his governor, and he was instructed in Latin grammar, oratory, and poetry, as well as in bodily exercises,—wrestling and the use of the spear. Though distinguished for physical strength, his bent was to the Muses, and he became proficient in dancing, music, and poetry. Buchanan blames this taste as carried beyond what became a king, but nothing in his after life showed he was ever led by amusements to neglect graver studies. When thirty he was taken by Henry V. to France with the view of detaching the Scottish allies of the dauphin, but refused to be made a tool of, saying he had as yet no kingdom and they owed him no allegiance. He proved his soldiership by the capture of Dreux. On his return to England he married (11th February, 1423) Johanna Beaufort, daughter of the earl of Somerset and granddaughter of John of Gaunt. In the *Kingis Quhair* he describes his love at first sight in the language of his master Chaucer, but with original genius. The marriage facilitated his release, which was negotiated for a sum of 60,000 marks [$194,400]. He confirmed the treaty at Melrose and was crowned with his bride at Scone (21st May, 1423[2]) by Wardlaw,—Albany, as earl of Fife, placing him on the throne. Education of James I.

He lost no time in addressing himself to the task of restoring the royal authority and the obedience to the law which the long regency had weakened. From this time dates the conflict between the king and the nobles,—the latter not maintaining, as in England, constitutional rights, but contending for exorbitant privileges. The experiment of government without a king had been tried too long not to make those who had exercised unrestrained power desire its continuance. The nature of the country—divided by rivers, mountains, and arms of the sea—the absence of great cities and the number of strong castles, the close connection of the principal nobles by marriage and bonds of alliance, the large jurisdiction within their territories, the clanship not only in the Highlands and on the borders but in some measure throughout the whole country, which made fidelity to the chief a natural duty, strengthened the aristocracy and weakened the crown. The sovereign had to rely on the people and the clergy, on foreign alliances, on the influence due, partly to the virtues of his predecessors, partly to the magic which in that age encircled the name of king. The first parliament of James at Perth passed quietly, but with indications of a policy long meditated and now to be put into operation. One Act forbade private war; another imposed the penalty of forfeiture of life and goods for rebellion; and a third directed an inquest by the sheriff what lands "pertain to the king or has pertained" in the time of the last three kings and in whose hands they now are. The choice of the privy council was significant. It was headed by Lauder, bishop of Glasgow, who had negotiated the king's release, but none of the greater nobles were included. In their stead appear an unusual number of minor gentry, some holding high offices. The parliament held at Perth in the following year was the scene of a *coup d'état* (12th March). Albany, his younger son Alexander, Alan of Otterburn his secretary, and Sir John Montgomery were seized on one day, and immediately after Isabella, Albany's wife, whose father, the earl of Lennox, had already been arrested. The only one of Albany's kin still at large, his youngest son James, made a short resistance, burnt Dumbarton, and slew the Red Stuart of Dundonald, the king's uncle, but being hotly pursued, fled to Ireland. Parliament, at an adjourned sitting at Stirling, proceeded to the trial of Albany and his adherents, which was held with feudal solemnity before an assize. Albany, his two sons, and Lennox were condemned and executed on the Heading Hill. Clemency was shown to those who had not been his intimate supporters. Historians are divided as to the policy or necessity for such severity. But it secured its immediate object; it was felt that Scotland had again a king to defend his rights. James for twelve years carried out, not without murmurs, but without successful opposition, his projects of reform. James and the nobles.

Foreign states recognized his power. At the request of the Flemish estates Middelburg was restored as the market for Scottish trade; in return the privileges of the Scots were guaranteed and Flemish merchants undertook to raise part of James's ransom. Flemish artisans and manufacturers settled in Scotland. More than one embassy passed to and from Rome with regard to the affairs of the Scottish Church, which James, while strictly repressing heresy (a Bohemian doctor, Crawar, being burnt as a disciple of Hus), showed his intention of reforming. The new pope Martin V. had put an end to the schism. The bitter enemy of the English king on account of the regulations which culminated in the Statute of Præmunire, he welcomed James's advances. James, while showing his attachment to the church by founding a Carthusian monastery at Perth and a Franciscan in Edinburgh, asserted his right to remedy abuses of the ecclesiastical courts, and addressed a letter to the Benedictine and Augustinian monks reproaching them for laxity. To Erik of Norway he sent an embassy and obtained a commutation of the arrears due for the Hebrides under the treaty of Largs. A marriage between the dauphin and Margaret, his infant daughter, previously arranged, was celebrated shortly before his death. He thus established friendly relations with the Continent, and, though his position as regards England could not be James's foreign policy.

[1] [Burton (*Hist. of Scotland*, vol. iii., p. 101) dates this battle 24th July, 1411. St. Andrews (*q.v.*) university was founded in 1411, and if a year later than the battle of Harlaw this date is erroneous. In this case Burton is to be followed.—AM. ED.]

[2] [The date 21st May, 1424, given in vol. xiii. p. 565, is the correct one.—AM. ED.]

the same, the truce was only twice broken towards the end of his reign—by a raid of the English, who were defeated at Peferden (1425) by the earl of Angus, and his own attempt to recover Roxburgh. During the fourteen years of his actual reign James held thirteen parliaments, proving his desire to obtain the support of the nation in his reforms. In 1426 he introduced the session, a royal court for civil causes sitting in the principal towns, to provide the justice too often denied in the baronial courts. Next year he summoned a parliament to Inverness—an unusual place of meeting—for the purpose of restoring the peace of the Highlands. Its records are lost; but the chief event was the seizure of Alexander, earl of Ross, lord of the Isles, and his mother, along with as many as forty chiefs. Two were beheaded and a third hanged, but most of them, including the lord of the Isles, after a short imprisonment, were released. Ross at once raised the standard of rebellion and burnt Inverness, but was defeated by James at Lochaber, where the clans Chattan and Cameron deserted to the royal side. On the Sunday following the former killed in a church the whole of the latter clan who were present. Another internecine conflict took place in Caithness seven years afterwards. Such private feuds, traditional amongst the Celts, were one cause of the success of James and of the ultimate subjugation of the Highlands. So completely was the power of the lord of the Isles broken that he came as a suppliant and placed his sword in the king's hands at Holyrood. His life was spared, but he was confined to Tantallon castle. In a parliament held later in the same year at Perth an Act was passed for the representation of the shires and the election of a speaker; but this imitation of the English House of Commons was not acted on. The Scottish parliament continued to sit in one chamber of lords, clergy, and commons, and it was only in the reign of James V. that representation of the shires was admitted. The following parliament (1428) provided that an oath of fealty should be taken to the queen by all persons succeeding to lands or dignities, which shows that James knew the danger of his policy. In 1429 an Act was passed for the protection of the tillers of the ground, who were not to be removed for a year, and provision was made for arming all landholders and burgesses. The birth of twins—Alexander, who died young, and James, afterwards king—strengthened the king's position by interposing two lives besides his own against any attempt at revolution. Two years later Donald Balloch, a kinsman of the lord of the Isles, renewed the rebellion; but, though he defeated Mar and Caithness, on the approach of James himself he fled to Ireland.

Subjugation of Highlands.

In 1434 the king applied the statute of his first parliament as to the resumption of lands to which no sufficient title could be shown. The estates of the earl of March were forfeited on the ground that Albany had exceeded his power in restoring them. He was created earl of Buchan with the intention no doubt of removing him from the border and conciliating him for his loss. The death in 1435 of Alexander Stuart, earl of Mar, led to the lapse of that earldom to the crown on account of his bastardy, and the following year the earldom of Strathearn was resumed on the ground that it was a male fee and did not pass to the wife of Patrick Graham, the heir-female. It was bestowed in life-rent on the king's uncle, the earl of Athole, and Malise, the son of Patrick Graham, was made earl of Menteith. This assertion of right on the part of the king to deal with the estates of the nobles though fortified by legal documents and recognized possession was certain to make enemies. It is more surprising that James so long succeeded in maintaining his authority than that he at last perished for doing so; but he had the people on his side. In the summer of 1436 he was obliged to relinquish the siege of Roxburgh owing to the barons' refusal of support. In October when the forfeiture of Strathearn was made in a parliament at Edinburgh, Sir Robert Graham, uncle and tutor of the young heir Malise, denounced the king in the boldest terms, and urged the barons to seize his person; but, failing, he was banished from the court. As in other cases, this leniency was not requited. In his Highland retreat Graham formed a conspiracy with Athole, the king's uncle, who aimed at the crown, and Sir Robert Stuart, Athole's grandson. James was to spend Christmas at Perth. Before he crossed the Forth he was warned by an old Highland woman that if he passed he would never return. She tried unsuccessfully to get access to him again at the Dominican monastery at Perth, where he lodged. At midnight, when he was half undressed, Graham with 300 men surrounded the monastery. Their approach was heard; but it was found that the bolts had been removed by treachery. James was hastily concealed in a vault underneath the room. Before the conspirators entered a brave attempt was made by Catherine Douglas, one of the queen's maids, to bar the door with her arm, but the fragile obstacle broke and Graham burst in. The fall of another of the maids into the vault discovered the king, who fought fiercely for his life. The queen was wounded in trying to save him, fulfilling an unconscious prophecy of the *Kingis Quhair*. At last, after killing two of his assailants, he fell, overcome by numbers (February, 1437). Vengeance speedily overtook the murderers, who had made no provision to follow up their deed. Within a month they were all executed in a manner exceeding even the barbarous usages of the time. James was buried in the Carthusian monastery, where his doublet was long kept as a relic and seen by the people with veneration. Such was the sad fate of the best of the Stuarts,—a king in advance of his age and too rapid in his reforms.

Dealings with his nobles.

1436–1448.

James II. (1437–60), an infant of six, called "Fiery-face" from a red stain on one cheek, was crowned at Holyrood five weeks after his father's death, and there commenced one of the long minorities which the early deaths of the Stuart kings made common, and during which history is chiefly occupied with the contest for the person of the king. These have been truly represented as weakening the royal authority. The possession of power rendered the nobles impatient of restraint and accustomed to license; but they had also a reverse effect. When the monarch succeeded he was received with favor by the people as a deliverer from the oppression of the barons, too often petty tyrants. A rule of law allowing him to revoke grants in his minority was often used with great effect. On the whole, monarchy, in spite of the weakness and vices of the kings, was popular in Scotland until the Reformation and the fatal chain of events in which Mary was involved introduced a democratic tendency, which grew under the bad government of her successors. The nobles, though their word was law with their kinsmen and retainers, were seldom favorites of the people. Archibald, fourth earl of Douglas, the greatest of the Scottish nobility and Duke of Touraine in France, was lieutenant-general of the kingdom from James's accession till his own death the year after; but Sir William Crichton, master of the household of James I., who was keeper of the castle of Edinburgh, where the young king was detained, appears to have exercised the chief power. Shortly after the death of Douglas James's mother carried off her son, on the pretext of a pilgrimage, to Stirling, of which Sir Alexander Livingstone of Callander was governor. Livingstone laid siege to Edinburgh, but made terms with Crichton, who became chancellor. The alternate struggles and reconciliations of these rivals continued till James was fourteen, when he favored Douglas (the eighth earl) in order to free himself from their control. This was a

James II.

Struggles for regency.

time of civil or rather of private wars. The only contemporary chronicle marks almost every year with the seizure of a castle or a party fight. Douglas brought the earl of Crawford and his retainers from the Highlands, who ravaged the estates of the bishop of St. Andrews, and himself besieged Edinburgh castle. The castle surrendered; but Crichton, one of the adroit statesmen who rise after every fall, continued chancellor, and soon after, by negotiating the marriage of James with Mary of Guelders (1448), insured his favor with the court. Shortly after the celebration of this marriage Livingstone, now chamberlain, with many of his kindred and friends, was suddenly arrested and tried before a parliament at Edinburgh; two were executed, and the others, including the chamberlain, attainted and placed in strict ward in Dumbarton. Douglas and Crichton received part of the forfeited estates. James was chiefly advised at this period by Bishop Kennedy, whose counsel was the old one of "divide et impera." He now determined to do to the more powerful Douglas as he had done to the Livingstones. The earl had shown no moderation in prosperity. His revenue and retainers equalled those of the king: 1000 horsemen were his ordinary train, and he attended the king's marriage with five times that number. His courts on the borders were almost parliaments. In the year of jubilee (1450) he went to Rome with a large suite. On his return he visited the new king of England, Edward IV. At the parliament of Edinburgh (1451) he submitted to the king's mercy, and at the request of the queen and estates received a regrant of his lands and honors. He was already suspected of treason, and had in fact renewed a secret bond with the earls of Crawford and Ross, the most powerful nobles in the north, which threatened the royal authority.

1448–1479.

James felt a crisis had come and summoned Douglas to Stirling at Shrovetide. There the young king, in violation of hospitality and a safe conduct which he had given the earl, when Douglas refused to break the bond with the other earls, struck him with his knife and killed him (21st February, 1452).[1] An appeal to arms necessarily followed. Douglas's brother James, the ninth earl, came to Stirling and burnt great part of the town. But the clergy and commons and other nobles, some even of Douglas's own kin, not sorry at the fall of one who over-topped them, stood by the king. Parliament sanctioned James's act and declared Douglas had deserved death. At length, after repeated struggles, Crawford was defeated at the Muir of Brechin and Douglas fled to England. His estates were of course forfeited. The lordship of Douglas was granted to Angus. Ettrick Forest and Galloway were annexed to the crown. Some years later Douglas made another desperate effort against James, but after wasting Merse was totally defeated by Angus (1458).[2] The energy of James in visiting all parts of his kingdom was conspicuous during the last period of his reign. The good relations with the French and other Continental courts continued. With England—one brief interruption excepted—peace had been preserved during the reign of Henry VI. Henry even agreed to restore Roxburgh and Berwick to Scotland in return for assistance against the duke of York. When Henry was taken prisoner at Northampton, his queen and her young son fled to Scotland, and James was called on to fulfil his engagements. He laid siege to Roxburgh, which for more than a century had defied his predecessors, and after a stout resistance it was taken; but James did not live to enjoy the triumph. When inspecting the discharge of a new gun it burst, and he was killed (3d August, 1460). He had not reached his thirtieth year.

James's energetic rule.

His reign had been singularly fortunate, for he succeeded (where his father failed) in restoring the royal authority and reducing the power of the nobles. This may have been partly due to the counsels of Kennedy, bishop of St. Andrews, and Crichton; but James showed skill in government and vigor in war, though the murder of Douglas has left a stain on his character. The crown was richer at his death than it had been since the time of Alexander III., by many forfeitures secured from alienation by the Act of Annexation (1455, *c.* 41). The royal prerogative was strengthened by the first statute defining treason (1449, *c.* 25). Provision was made for the execution of criminal justice by the king, his justiciar, and sheriffs, and of civil justice by the session. Stringent rules were laid down against violent spoliation of lands and goods (1449, *c.* 30). The coinage was regulated, an attempt made to preserve its standard, and to prohibit export of gold and silver (1451, *c.* 23). Towards the end of the reign, when war with England was impending, statutes were passed for the defence of the borders, giving the king more direct control, and declaring that the office of warden should not be hereditary. The progress of agriculture was furthered by the famous Act for the encouragement of feu farm, an existing form of tenure becoming more common, and another giving fixity of tenure to leases until the expiry of their terms notwithstanding alienation of the lands. There were also many minor laws which had for their object the welfare of the people. Though the legislation of James II. was not so large, it was perhaps as important as that of James I.

Character of James's legislation.

On the Sunday after his father's death James III. (1460–88) was crowned at Kelso. A regency was formed consisting of the queen, Kennedy, and others. A parliament followed at Edinburgh, which was blamed by the nobles for leaving so much power in the hands of a woman; but there was a full appointment to the offices of state, and, though Mary of Guelders aimed at more than the guardianship of her son, it does not appear that she really exercised royal authority. After the defeat of Towton (29th March, 1461), Henry VI. and his queen took refuge in Scotland. In return for their reception and in hope of further aid, Henry surrendered Berwick (23d April) to the Scottish king, in whose hands it remained till its final annexation to England at the close of the reign. Edward IV. retaliated by a treaty (13th February, 1462) with the banished earl of Douglas, the earl of Ross, lord of the Isles, and Donald Balloch, by which Douglas was to be restored to his estates, and the whole country north of the Forth divided between the two Highland chiefs. George, earl of Angus, who had risen on the ruins of the house of Douglas, made a counter-league with Henry VI., by which he was promised an English dukedom and valuable lands between Trent and Humber, but was to preserve his allegiance to the Scottish king. These were paper promises, and all that came of them were an ineffectual rising in the north and the relief of Alnwick, which had been besieged by the Yorkists. Next year the Lancastrian cause having received a fatal blow by the defeat of Hexham, a singular offer by Edward IV. to marry the queen dowager of Scotland—one of the many schemes of the king-maker, earl of Warwick—was frustrated by her death or perhaps by the discovery of an intrigue with Adam Hepburn of Hales, whose wife was alive. Kennedy, who had the chief control of Scottish affairs, negotiated the release of Alexander, the king's brother, who had been taken by an English cruiser, and secured a truce between England and Scotland for

Minority of James III.

[1] The origin of two great families dates from the fall of Douglas. Sir James Hamilton of Cadzow deserted his kinsman for the king and received large grants of land and the king's daughter as wife. Sir Walter Scott of Kirkurd and Buccleuch, a border chief, was similarly rewarded. These were the ancestors of the dukes of Hamilton and Buccleuch.

[2] In the next reign along with the king's banished brother, Albany, he made a daring raid on Lochmaben, but being taken prisoner he ended his days as a monk at Lindores. A saying attributed to him, "If a man cannot better be, he may be a monk," was a sign of the change of times since Celtic kings were proud to assume the cowl.

fifteen years. He understood the nature of his countrymen better than any man, and was always ready to give counsel in parliament, while his learning, especially in the civil law, made him respected by foreign powers. When he died the country wept for him as for a parent.

Before his death a plot had been formed which threw the young king into different hands. Amongst the barons who received office at the commencement of the reign one of the foremost was Robert Boyd of Kilmarnock, the justiciar. Boyd determined to play the part of Livingstone in the last reign, and usurp the supreme power by seizing the person of the king. Bonds with this object were entered into between him, Fleming of Cumbernauld, Lord Kennedy, a brother of the bishop and others. While holding a court at Linlithgow James was carried off to Edinburgh by Boyd. Kennedy made a feint to save him by seizing his bridle, but was overpowered; perhaps the attempt was real, for Kennedy afterwards separated from the Boyds. In Parliament Boyd went through the form of asking pardon of the young king in presence of the estates, and was immediately entrusted with the custody of the royal person (October, 1466,) and that of his brothers Albany and Mar, as well as the fortresses of the kingdom. Next year he was made chamberlain, which gave him control of the revenue. The marriage of his son Thomas, created earl of Arran, with the king's sister Mary, marked the height of his ambition. The fall of Boyd, as sudden as his rise, whom with his brother Alexander James at first favored, was due to the same cause as that of Livingstone,—the king's marriage and his desire when major to assert his independence. Negotiations for an English match having fallen through, an alliance with a Norwegian princess was determined on, and an embassy sent to Norway by parliament. Christian of Denmark and Norway readily assented. He promised his daughter a dowry of 60,000 florins [*c.* $24,300], besides a surrender of the claim of arrears of the annual payment for the Hebrides. But, as it was inconvenient to pay the dowry, both the Orkneys and the Shetlands were mortgaged to Scotland, and have remained ever since under the Scottish crown. Two years later (July, 1469,) the princess Margaret arrived in Scotland, when the marriage took place. Arran on his arrival at Leith with the king's bride received a message from his wife warning him that James had conceived a great hatred against him; accordingly he fled to Denmark. In the parliament his father and his uncle, Sir Alexander Boyd, were attainted. The chamberlain saved himself by flight; Sir Alexander was executed. The specific charge made was the seizure of the king's person; but a general clause had reference to the immense estates they had annexed. The king's sister, divorced from Arran, was married to Lord Hamilton, who thus laid the foundation of a family whose head more than once aspired to the crown.

Ascendency of Boyd.

The refusal of parliament in 1473 to sanction the proposed passage of James to France, to aid Louis XI. against Charles the Bold, on the score of the expense and risk, was the first indication of the difference between the king and the nobility which led to the disasters of the close of his reign. The parliament of 1476 took a bolder step. At its adjournment it committed its whole powers to certain members, of whom the duke of Albany and the earl of Mar, the king's brothers, were the principal,—a measure which indicated a want of confidence in the king. He had shown himself, like Louis XI., disposed to govern by new men who owed their elevation to himself,—a policy which alienated the aristocracy. Of these favorites the chief were Robert Cochrane, originally, it was said, a mason, who proved himself a skilful architect; Roger, an English musician; and Andrews, a physician, who dealt in astrology,—all able to gratify tastes of James. There were besides a few young men of birth who gained favor by flattery or other arts. Cochrane became all powerful and disgusted the nobles by sumptuousness and arrogance, and the people by debasing the coin. He succeeded, it was reported, by relating a prophecy that a lion should be devoured by its whelps, in producing in the king's mind an aversion to his brothers, whose characters and knightly accomplishments made them popular. James seized Mar and sent him to Craigmillar castle. He soon afterwards died (1479) in Edinburgh under circumstances which gave rise to suspicion of foul play. The gift to Cochrane of the vacant earldom or its revenues strengthened the suspicion of his complicity. Albany, committed to Edinburgh castle (1480), escaped to Dunbar and thence to France. He there married Anne de la Tour d'Auvergne, whose son was the regent Albany in the reign of James V. Failing to induce Louis to do more than urge his restoration, two years afterwards he quitted France and at Fotheringay entered into a treaty (1482) with Edward IV., by which, in return for the empty title of Alexander IV., he owned the subjection of the country to England and made other humiliating promises. Supported by the earl of Gloucester and the exiled earl of Douglas, Albany laid siege to Berwick, while James collected his forces on the Boroughmuir of Edinburgh and advanced to Lauder. There the chief nobles indignant at the favor shown to Cochrane, mutinied, and, led by Angus, who then acquired his name of "Bell the Cat," seized Cochrane and some of the other favorites of James and hanged them before his eyes. Berwick fell and was never afterwards recovered by the Scots. The nobles, distrusting Angus, who had made secret terms with Albany and the English king, were induced by Schivas, the archbishop of St. Andrews, to effect a reconciliation between the king and his brother, who received the vacant earldom of Mar and for a little became chief minister. A parliament in December appointed Albany lieutenant-general, but his continued intrigues with the English king being discovered he was attainted for treason and fled to England (1483), and thence to France. James had now a brief period of peace, during which the revolutions in England freed him from the danger of war in that quarter. New matrimonial projects were tried. It was proposed that the prince of Scotland should marry a niece of Richard III., Anne de la Pole, daughter of the duke of Suffolk, and after Richard's deposition a marriage with Elizabeth, daughter of Edward IV., was suggested. On the death of Queen Margaret James himself made an offer for the hand of the widow of Edward IV. Such proposals, though abortive, were signs of a better understanding between the two countries, or at least between their sovereigns. When the rebellion broke out in the following year, the nobles and James accused each other of treasonable correspondence with England, but no assistance was got by either, for England was still scarcely released from its own civil war. In 1487 the greater part of the Scottish barons rose in arms. James had abandoned himself to another favorite, Sir John Ramsay, whose life had been spared at Lauder. The chiefs of the party were the earls of Angus and Argyll, Blackadder, bishop of Glasgow, and the Homes and Hepburns, powerful barons on the border. Having seized the person of the young prince, whom they already designated king, they pretended to act in his name. James retreated to Aberdeenshire, for the northern barons still adhered to him. Father and son, at the head of their respective forces, first met at Blackness (May, 1488,) on the Forth, where a pacification was agreed to on terms which showed the king's party was the weaker. In the following month the rebellion was renewed and the king was slain at Sauchie (11th June), within sight of Bannockburn. He was buried at Cambuskenneth, being only thirty-

Government by favorites.

1479–1488.

five years of age. He did not fall, like his father, through the strength of the nobles, for they were much divided, and he commenced his independent reign master of the situation. The Wars of the Roses gave him an opportunity, which he missed, of strengthening his kingdom in relation to England, whose monarchs adopted a new attitude towards Scotland from that of the Plantagenets,—seeking alliance rather than war. His own weakness, his love of favorites and of money, his passion for music and art—perhaps inherited from his grandfather, but carried to excess and not counterbalanced by the qualities of a statesman and general—proved his ruin. The rebellions, first that of his brother, then that in the name of his son, were fatal precedents in the reign of Mary Stuart.

1488-1513.

James IV. (1488–1513) was already sixteen when crowned at Scone. His reign is an interlude in the record of almost constant battles, murders, and executions with which Scottish history abounds. There were not wanting causes of offence between England and Scotland, but the politic Henry VII. avoided war and effected what previous kings had failed in the marriage between the royal houses. James, a popular monarch, succeeded better than any of his predecessors and successors in keeping on good terms with all classes. His court was one of splendor for a small country; indeed Scotland, almost for the first time, possessed a court which set the fashion of civilization and culture. The death of James III., instead of exciting the horror awakened by the death of James I., was treated with indifference, almost as a relief. The chief offices of state were distributed amongst the supporters of the young king. The first business of the parliament, which met in Edinburgh, was the treason trials. The persons put on their trial were not those who fought against but those who supported the late king. Several were condemned, but prudently treated with great leniency. All were charged with correspondence with England as well as with their presence at the field of Stirling (Sauchie). There followed a curious transaction called in the records "the debate and cause of the field of Stirling,"—the first debate in a Scottish parliament of which we have any account. The result was a unanimous resolution "that the slaughter committed in the field of Stirling, when our sovereign lord's father happened to be slain, was due entirely to the fault of him and his privy council divers times before the said field." There was not a single execution. Heritable officers who had fought against the prince were only suspended, not deposed, and the heirs of those slain were by special grace admitted to their estates. The only person who felt compunction was the young king. His frequent pilgrimages and an iron belt he wore were due to his remorse for his father's death. The leniency of James was rewarded by the loyalty of the nobility, except a few northern barons headed by Lennox and Huntly, and these, after being defeated by James in the following year, were also treated with clemency. The only trace of rebellion during his reign was a secret intrigue between Henry VII. and Angus, who succeeded to the traditionary policy of the Douglases.

James IV.

A determined effort was made by parliament to put down robbery and theft by special commissions to certain lords who were to be responsible for different districts. It was provided that the king in person should attend the justice air (eyre),—a provision which James acted upon. A new master of the mint was appointed to restore the purity of the coinage. The penalty of treason was to be imposed on those who purchased benefices from Rome. An active spirit of reform, a desire to remedy the evils of the late reign, was displayed by both the king and his advisers. The personal character of James showed itself in a liberality contrasting with his father's avarice, and in a love of chivalrous display, encouraging tournaments and martial exercises, as well as in the care of the navy.

Legislation.

From the time of Bruce we hear of ships and shipbuilding, natural in a country with so large a seaboard; Scottish merchantmen now began to make distant voyages, and their ships, half privateers, half traders, were commanded and manned by sailors who were a match for those of any country. The most famous commander, Wood of Largo, with the "Flower" and the "Yellow Carvel," cleared the Forth of English pirates. Stephen Bull, an English captain, promised to take Wood dead or alive, but was captured himself; James sent him back to Henry VIII. with a chivalrous message that the Scots could now fight by sea as well as land. Wood was made one of the king's council. By his advice James built the "Great St. Michael" for a crew of 300 and 1000 men-at-arms. It exhausted all the woods in Fife except Falkland, and cost £30,000 [$145,800]. The king's policy was not confined to building ships of war: every town was to have vessels of at least 20 tons. The navy was for the protection of trade, to which the national instinct pointed as a source of wealth.

Formation of a navy.

The marriage of James early attracted the attention of parliament, and embassies were sent to foreign courts to seek a suitable sponse; but James had formed a connection with Lady Margaret Drummond, and could not be persuaded to a political alliance. The chief events of his reign prior to his marriage to Margaret Tudor were his expeditions to the northeast and the western Highlands. He adopted with the chiefs a similar policy to that which had succeeded with the barons, attaching them to his person by gifts, offices, and favors, and committing to them the suppression of crime. In 1496 the impostor Perkin Warbeck came to Scotland and was recognized by James, who gave him his kinswoman, Catherine Gordon, daughter of the earl of Huntly, called for her beauty the White Rose, in marriage. Raids were twice made across the border on his behalf, but there was only one engagement of any consequence, at Dunse (1497), and an unsuccessful siege of Melrose. Henry VII., whose talent lay in diplomacy, approached the Scottish king with the tempting offer of the hand of his daughter Margaret. Commissioners met to consider this at Jedburgh, and, though James refused to give up Perkin Warbeck, a truce was arranged, and Perkin left Scotland. The marriage of James and Margaret was soon afterwards agreed to and a peace concluded. The papal dispensation was procured in 1500, but the final treaty was not ratified till two years later (8th August, 1502). Some of Henry's counsellors sought to dissuade him from the marriage, for if his son Henry died James would be next in succession to the English throne; but he replied that if so Scotland would be an accession to England and not the reverse, recalling the example of Normandy and England. Margaret, a girl in her fourteenth year, made a triumphal progress to Scotland, where she was received with pomp; but the marriage was one of policy, and the young wife was discontented with her new country and her husband. Their court as it is painted in the poems of Dunbar was merry, but not moral. The license which prevailed and was tolerated by the church was shown by the elevation of one of the king's bastards by Jane Kennedy to the archbishopric of St. Andrews when a youth of eighteen. Others received rich benefices, and Jane Kennedy herself married the earl of Angus. Scottish history during the six years after the king's marriage was uneventful.

James's marriage to Margaret Tudor.

Henry VII.'s death (1509) changed the relations between Scotland and England. Henry VIII. had not liked his sister's marriage, and his refusal to deliver to her a legacy of jewels left by his father led to a coolness. The mutual

War with England.

attacks of English and Scottish privateers and border frays increased the bad feeling. Andrew Barton's ship the "Lion," after an obstinate conflict, in which Barton was killed, was seized (1512) in the Downs by the sons of Howard, the English high admiral, and James's request for redress was met with the contemptuous answer that kings should not dispute as to the fate of pirates. But it was Henry's Continental policy which in the end provoked the war. The struggle in Italy between Louis XII. and Pope Julius II. gave him an opportunity, and he allied himself with the latter and invaded France. He attempted before leaving England to secure peace with Scotland by promising to redress its grievances. But James had renewed the old alliance with France, and the only answer given to the first embassy in 1512 was an offer to mediate between France and England. In 1513 the message was, that if Henry passed to France war would not be declared without a herald being sent. The French queen (Anne of Brittany) had given James a ring with a substantial subsidy, and he had already made up his mind for war. Like Henry, he longed to win his spurs. Henry went to France in June, and soon after his arrival at the camp at Térouanne, the Scottish Lord Lyon brought the threatened declaration of war (11th August, 1513). The grounds stated were the seizure of Scotsmen on the borders, the refusal of Margaret's legacy, and the death of Barton. No time was lost by James in carrying the declaration into effect; but the war was disliked by the nation. The earl of Arran, sent with the fleet to aid the French, sailed instead, in defiance of orders, to Carrickfergus. James himself called out the whole land force contrary to the advice of his council, mustering at the Boroughmuir 100,000 men according to English accounts—probably exaggerated, but doubtless as large an army as had been seen in Scotland. Crossing the border, he took Norham, Wark, and Ford. At the last of these castles the wife of Heron, the proprietor, then a prisoner in Scotland, beguiled James by her beauty, causing him to waste several days and betraying his movements to the enemy. In the conduct of the battle (9th September, 1513,) which followed he committed almost every fault a general could commit,—neglecting to engage when the enemy were crossing the Till, allowing himself to be outflanked by Surrey, who got between him and the Scottish border, abandoning his strong position on the hill of Flodden, and finally exposing his own person on foot in the centre of the fight. Some Scottish writers claim that the battle was a divided success and that the total number of English killed was greater; but Hall, an exact chronicler, says 12,000 Scots fell and only 1500 English, as appeared from the book of wages when the soldiers were paid. What made Flodden so great a disaster was the quality of the Scottish loss. The king himself, his son, the archbishop of St. Andrews, two bishops, two abbots, twelve earls, and fourteen lords, besides many knights and gentlemen, were left on the field. There was scarcely a noble family which did not mourn some of its members. Surrey did not follow up his victory by invading Scotland, since his object was gained: the diversion by the Scots in favor of France was at an end. Scotland was again left with an infant king, scarcely more than a year old.

Flodden.

The character of James IV. was on the surface. An excellent observer, the Spanish ambassador Ayala, notes his good looks and agreeable manners, his knowledge of languages and history, his respect for the service of the church and its priests, his liberality and courage, "even more than a king should have, not taking the least care of himself," his bad generalship, "beginning to fight before he had given his orders," and his wise statesmanship, deciding nothing without counsel, but acting according to his own judgment, which was generally right.

Character of James IV.

The reign of James fell within the era of the revival of learning, and Scotland, though late, came within the circle of the intellectual which preceded the religious reformation. It was common for Scottish scholars to complete their education and sometimes to remain teaching in the universities of France. One of these, Elphinstone, bishop of Aberdeen, who founded its university, brought another, Hector Boece, the historian, to be first principal of King's College, Aberdeen. James himself engaged Erasmus as tutor to his son, the future archbishop. Two other Scotsmen passed to Paris in the beginning of the next reign, John Major and his pupil Buchanan, who brought back less of the critical but more of the Reforming spirit. These and other learned men neglected a reform as essential as any,—the use of the mother-tongue in their writings, and the neglect has lessened their fame; but it had its exponents in Dunbar, Henryson, Sir David Lyndsay, and Gavin Douglas. The printing press also found its way to Edinburgh, and Chepman and Myllar published their first broad-sheets with works of Dunbar, Douglas, and the remains of the older poetry (see p. 540 *sq.* below).

Scottish learning at this epoch.

1513-1516.

7. *The Reformation, its Antecedents and Consequences.*—James V. (1513–42), scarcely eighteen months old when he succeeded, was at once crowned at Scone, where a parliament met, chiefly attended by the clergy. The queen dowager was appointed regent,—a secret message, however, being sent to John, duke of Albany, to come from France and assume the regency. The son of the exiled brother of James III., Albany had by his marriage to his cousin, the heiress of De la Tour d'Auvergne, become a great noble in France, where he held the office of high admiral, and neither he nor the French king, Louis XII., was willing that he should quit France. The Sieur de la Bastie came as his representative. The precipitate marriage of the queen, four months after the birth of a posthumous child, to the young earl of Angus, and a dispute as to the see of St. Andrews, to which Margaret appointed Gavin Douglas the poet, her husband's kinsman, although Hepburn the prior had been chosen by the chapter, led the Scottish estates to renew their request that Albany should come to Scotland. He arrived at Dumbarton on 18th May, 1515, and was at once appointed regent. The queen refused to give up her son, but Albany besieged Stirling and forced her to surrender. Her new husband fled to France, and Margaret first to Dacre, warden of the marches, and then to her brother's court, where she was joined by Angus. At Harbottle in Northumberland, on her journey south, she bore a daughter, Margaret Douglas, afterwards Lady Lennox, Darnley's mother. Henry VIII. asked the Scottish parliament to remove Albany from the regency, but was met with a decided refusal; for, though a party of nobles, especially the border barons Lord Hume, the chamberlain, and his brother, were opposed to him, he was supported by the nation. The young duke of Ross, Margaret's younger son, having died suddenly, Albany procured a declaration from parliament that Ross's elder half-brother was illegitimate and himself next heir to the crown. Hume and his brother were seized and executed at Edinburgh (26th October, 1516). These events aroused suspicion that Albany aimed at the crown; but the suspicion appears to have been unfounded. His tastes were French; hence he quickly tired of trying to govern Scotland, and in autumn obtained with difficulty leave of absence for four months. Before leaving he put Dumbarton, Dunbar, and Inchgarvie (in the Forth) in charge of French garrisons under De la Bastie, who held the post of warden of the marches; but an interim regency was appointed. Margaret now returned to Scotland; but she was not permitted to take part in the government. Shortly after his arrival in France Albany

James V.

Regency of Albany.

negotiated the treaty of Rouen (20th August) by which an alliance between France and Scotland was agreed on against England, and a promise given that the Scottish king should marry a daughter of Francis I., or if that failed another French princess. In September De la Bastie was murdered near Dunbar by Hume of Wedderburn with the connivance of Dacre. The perpetrators were forfeited, but never brought to justice, although Arran, who succeeded to the office of warden, was sent for that purpose. The absence of a supreme authority gave free scope to the license of the nobles.

1516–1534.

A serious rising in the Highlands to support the claim of Macdonald of Lochalsh to the lordship of the Isles lasted for several years, till the death of the claimant and the vigor of the earl of Argyll, the head of a house now rising into preëminence, led to its suppression. The chief disturbances arose from the ambition of Angus: Archibald, his uncle, was chosen provost of Edinburgh; his brother William seized the priory of Coldingham; his uncle Gavin, though he failed to secure the primacy, retained the see of Dunkeld. Angus was supported by the earls of Crawford, Erroll, and Glamis, by Forman, archbishop of St. Andrews, and most of the other bishops, except James Beaton, archbishop of Glasgow and chancellor. The English warden, Dacre, was also on his side and tried by intrigue and bribery to foment dissension and prevent Albany's return. The opposite faction was headed by Arran, Lennox, Eglinton, Cassilis, Semple, the bishop of Galloway, and the chancellor. Scotland was thus divided between an English party, strongest in the east, and a French party, chiefly in the west. Their disputes reached a crisis in a street fight in Edinburgh, which got the name of "Cleanse the Causeway" (30th April, 1520), in which Angus drove Arran out of the town and seized the castle. Sir Patrick Hamilton, a brother of Arran, was slain by Angus,—an injury never forgiven. Meantime Margaret quarrelled with her husband, and, though there was a temporary reconciliation, mutual accusations of infidelity were too well grounded to permit of its being permanent.

See Plate VI.

Struggle between Angus and Arran.

Next year Albany returned and the queen, who had been in secret correspondence with him, entrusted him with the custody of the young king. Henry VIII. again requested the Scottish parliament to expel Albany; but they again refused, and Angus made terms with Albany on condition that he should himself withdraw to France. War was now declared between England and Scotland (1522); but, although Albany advanced with a large army as far as Carlisle, he was persuaded by Dacre to a month's truce and soon after went back to France, leaving the king in charge of a regency of which Beaton, Arran, Huntly, and Argyll were the leaders. Albany returned in the following year and again with a large force invaded England, but failed to take Wark, while Surrey, the English commander, ravaged the border. This failure lost Albany his credit with the Scots. In 1524 he went to France on condition that if he did not come back before 31st August his regency should end. He never returned, and during his absence Margaret carried off her son from Stirling to Edinburgh, where, although only a boy of twelve, he was declared king. Angus made an agreement with Wolsey to support the English interest; and at a parliament in Edinburgh Albany's regency was declared at an end (12th February, 1525), and Angus and Beaton obtained possession of the king's person and governed in his name. The queen, who had now openly broken with her brother, in vain appealed to France and Albany. The French were occupied with the war against the emperor; but she obtained from James Beaton, now archbishop of St. Andrews, a divorce from Angus and married Henry Stuart, son of Lord Avondale, creating him Lord Methven.

Supremacy of Angus.

For three years Angus retained the supreme power and filled all offices with his adherents. Beaton, with whom he quarrelled, was required to resign that of chancellor, and Angus nominated himself as his successor. The indignant nobles made unsuccessful attempts to seize the person of the king, who, at last, on 23d May, 1528, effected his escape from Falkland, riding at night to Stirling, where he was welcomed by the governor. Before parliament met a proclamation forbade any Douglas to remain in the capital. A new ministry was appointed with Gavin Dunbar, now archbishop of Glasgow, who had been the king's tutor, as chancellor; Cameron, abbot of Holyrood, as treasurer; and the bishop of Dunkeld as privy seal. The Douglases were attainted and their estates divided amongst the nobles of the opposite faction. A truce was made with England for five years. During the minority and duress of James the Scottish nobility became accustomed to bribes either from England or France. The French, to which the higher clergy belonged, were in the ascendant at the court of the young king, who naturally felt ill-will towards the Douglases and leant on Albany, and after a time on Cardinal David Beaton, bishop of Mirepoix in France, and nephew of the archbishop of St. Andrews, whom he afterwards succeeded. Beaton was the Wolsey of Scotland; but James V. was not Henry VIII., and the ambition of the great prelate was baffled, not by the king, but by the nation. Three months before the king's escape Patrick HAMILTON (*q.v.*), abbot of Ferne, was burnt for heresy at St. Andrews.

Assumption of government by James V.

James, only seventeen when he gained his independence (1528), showed, like other Stuarts, activity in government, and the fourteen years of his actual rule, while not marked by outstanding events, were a period of renewed order and prosperity. He first turned to the borders, where constant wars with England had bred a race of lawless freebooters. By the severity of his measures he succeeded in doing what Angus and his predecessors had in vain tried to do. The borders continued till the union to trouble the ministers of the law; but the clans who lived by plunder and blackmail were first really broken by the expedition of James V. But it was not only borderers who required to be taught that a king was again on the throne: Argyll, who had sought to make himself independent, was deprived of his lieutenancy and imprisoned; Bothwell, the father of Mary's husband, was beheaded for the favor he showed the borderers; and the estates of the earl of Crawford were forfeited. James made a progress through the Highlands and was sumptuously entertained by the earl of Athole. While criminal justice was strictly enforced, a step was at last taken to organize a central civil court (15th May 1532), which had been a settled plan of the kings since James I. The College of Justice or Court of Session was founded in Edinburgh by the influence of Albany with the pope,—funds being got from the bishops' revenues for the payment of the judges. Of the fifteen judges eight, including the president, were to be clergy, and the barons were conciliated by the anomalous office of extraordinary lords.[1]

His marriage.

The relations between James and Henry VIII. continued hostile and there were mutual raids till peace was concluded in 1534. Henry was then at the critical point of his divorce from Catherine of Aragon and anxious to secure an ally. France and Spain were also competing for the favor of the Scottish monarch, and Charles V. proposed a marriage with Mary of Portugal. But he had already

[1] There were already signs of the small beginning of the profession of lay lawyers who were to play an important part in Scottish affairs in the 17th and 18th centuries. The establishment of a settled system of justice, independent alike of the baronial and ecclesiastical courts, was a much needed reform; but the latter still retained their consistorial jurisdiction.

SCOTLAND
16TH CENTURY
indicating old Divisions
and the localities of the Highland Clans

English Miles
10 0 10 20 30

Longitude West 5° of Greenwich

7 6 5 4 3 2

58 57 56 55

NORTH SEA
ATLANTIC OCEAN
The Minch
Little Minch
The Sound of Sleat
North Channel
St Patrick's Channel
Solway Firth
Pentland Firth
Moray Firth
Dornoch Firth
Firth of Forth
Firth of Clyde
Firth of Lorn
Kilbrennan Sound
Sunda
Luce Bay

C. Wrath
Butt of Lewis
Loch Roag
Lewis Cas.
Pen. of Eye
Scarpa I.
Taransay I.
Harris
Shiant Is.
Pabbay I.
Benna I.
Sound of Harris
Dunvin Cas.
CLAN DONALD NORTH
North Uist
Unish Cas.
Benbecula
South Uist
Eriskay I.
Barra
Rona I.
Loch Roag
Loch Resort
Loch Seaforth
Loch Tarbert
Loch Shell
Loch Boisdale
Loch Eynort
Loch Skiport
Loch Eport
Loch Maddy
Loch Obisary
Loch Aline
Loch Sunart
Loch Linnhe
Loch Leven
Loch Etive
Loch Awe
Loch Fyne
Loch Tarbert
Loch Gilp
Loch Ryan
Loch Doon
Loch Trool
Loch Ken
Loch Dee
Loch Skerrow
Loch Urr
Loch Fleet
Loch Shin
Loch Naver
Loch Eriboll
Loch Broom
Loch Ewe
Loch Maree
Loch Torridon
Loch Carron
Loch Duich
Loch Long
Loch Lomond
Loch Katrine
Loch Voil
Loch Earn
Loch Tay
Loch Rannoch
Loch Lyon
Loch Ericht
Loch Laggan
Loch Garry
Loch Quoich
Loch Hourn
Loch Nevis
Loch Morar
Loch Arkaig
Loch Lochy
Loch Oich
Loch Ness
Loch Rothiemurchus
Loch Insh
Loch Vaich
Loch Glass
Loch Achanalt
Loch Luichart
Loch Fannich
Loch Morie
Loch Leven
Loch Fitty
Loch Ore
Loch Tummel
Loch Garry
Loch Lubnaig
Loch Achray
Loch Venachar
Loch Katrine
Loch Arklet
Loch Chon
Loch Ard
Loch Lomond
Loch Long
Loch Goil
Loch Striven
Loch Ranza
Loch Tarbert
Loch Fad
Loch Gilp
Loch Crinan
Loch Sween
Loch Caolisport
Loch Indaal
Loch Gruinart
Loch Ryan
Loch Doon
Loch Trool
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Loch Caolisport
Loch Indaal
Loch Gruinart
Loch Ryan

THE CLAN MORGAN
STRATHNAVERN
OR MACKAYS
CAITHNESS
THE CLAN CURN
Earl of Caithness
MACLEODS
THE MURRAYS
SUTHERLAND
OR SUTHERLANDS
Ardvreck Cas.
Dunrobin Cas.
MACLEODS OF LEWIS
Lewis Cas.
MACLEODS OF HARRIS
Seaforth
MACLEODS
GLENGARRY
MACKENZIES
CLAN ANRIAS OR THE ROSSES
Balnagown Cas.
Kinnaird Cas.
Pitfour Cas.
Fowlis Cas.
Leod's Cas.
Fairburn Cas.
Redcastle
Ferintosh
Tarbat Ness
Pictish Cas.
Carnbulg Cas.
Finlater Cas.
Duntulm Cas.
Dunvegan Cas.
CLAN DONALD NORTH
MACDONALDS OF SLEAT
MACCLEODS OF HARRIS
MACCLELLANS
MACGILLICHALLUM
MACKINNONS
MACLEODS
MACDONALD
CLAN RANALD
CLAN RANALD OF LOCHABER
MACDONALDS OF KEPPOCH
Earl of Atholl
CLAN MACIAN OR OF ARDNAMURCHAN & SUNART
MACLEANS
MACQUARIES
Staffa
CLAN GILLEAN OR MACLEANS
Duart Cas.
Moy Cas.
Tiree
Coll
Iona
Colonsay I.
CLAN DUFFUS OR MACFIES
Macdonalds Cas.
CLAN DONALD SOUTH
MACDONALDS
Islay
Dunyveg Cas.
Ancient Clan Neill
Kintyre
Sunda
Ailsa Craig
Arran
Marquis of Hamilton
Dunaverty Cas.
Rum I.
Eigg I.
Muck I.
Canna I.
Soa I.
Scarba I.
Jura
Earl of Argyll
Inveraray
Dunoon Cas.
Upper Carrick Cas.
Kilchurn Cas.
Kilmun
Strachur
Cairndow
Inverary Cas.
Castle Lachlan
Ardkinglas
Ardentinny
Ardincaple Cas.
Rosneath
Helensburgh
Row
Gareloch
Port Glasgow
Greenock
Gourock
Dunoon
Rothesay
Rothesay Cas.
Mount Stuart
Kilbride Hill
Brodick
Lamlash
Whiting Bay
Kildonan
Pladda I.
Ailsa Craig
Girvan
Ballantrae
Stranraer
Portpatrick
Drummore
Mull of Galloway
Burrow Hd.
Wigtown
Whithorn
Isle of Whithorn
Glenluce
Newton Stewart
Creetown
Gatehouse
Kirkcudbright
Dundrennan
Thrieve Cas.
Kenmure Cas.
Lochmaben Cas.
Dumfries
Annan
Ecclefechan
Gretna
Longtown
Carlisle
Hawick
Jedburgh
Kelso
Coldstream
Berwick
Eyemouth
Dunbar
North Berwick
Tantallon Cas.
Bass Rock
Isle of May
Dirleton Cas.
Craigmillar Cas.
Borthwick Cas.
Crichton Cas.
Hailes Cas.
Fast Cas.
Carberry Ho.
Niddry Cas.
Linlithgow Pal.
Blackness Cas.
Bothwell Cas.
Hamilton Cas.
Douglas Cas.
Craignethan Cas.
Nisbet Cas.
Melrose Abbey
Dryburgh Abbey
Roxburgh Cas.
Cessford Cas.
Hermitage Cas.
Drumlanrig Cas.
Tibbers Cas.
Caerlaverock Cas.
Sweetheart Abbey
Dundrennan Abbey
Threave Cas.
Kenmure Cas.
Lochmaben

indicated a preference for a French alliance, selecting Mary, daughter of the duc de Vendôme. The pope addressed James as defender of the faith, a title Henry VIII. had forfeited. The clergy by Beaton's advice granted him a large allowance out of their revenues. These inducements and the influence of Beaton and Dunbar, the two archbishops, kept James firm in his attachment to the old church, in spite of the temptation which Henry held out in its endowments and of the satires in which Sir David Lyndsay, his old tutor, and Buchanan, the tutor of one of his bastards, exposed its abuses. In 1537 he went to France to see his bride, but, falling in love with Madeleine, daughter of Francis I., obtained her hand instead. After an absence of nine months he returned; but the young queen died within a few weeks after landing. The following year he married Mary, dowager duchess of Longueville, daughter of Claude of Lorraine, duke of Guise. Next year (1539) Henry made another attempt to gain James through his envoy Sir Ralph Sadler, but, though the succession to the English crown in the event of Prince Edward's death was held out as a bait, James remained unmoved. In 1540 the king made a voyage round Scotland,—the first circumnavigation of his dominions by a Scottish sovereign. The Irish are said to have offered him their crown, and the barons of the north of England, whose sympathies were Catholic, were inclined to favor him. The position was perilous for Henry, many of whose subjects still remained Catholics at heart. He made a last attempt to induce James to meet him at York, but the Scottish king would not go so far across the border. Henry now ordered the marches to be put in a state of war, and Sir James Bowes, accompanied by Angus and Sir George Douglas, crossed the border, but was defeated in Teviotdale by Huntly and Home. The duke of Norfolk advanced with a large force, and, efforts to avert war having failed, James assembled the whole Scottish army and marched to Fala on the Lammermuirs, where he was reluctantly obliged to disband his force through the refusal of the nobles to go farther; they even thought of repeating the tragedy of Lauder, but could not agree as to the victims. James raised a smaller force and gave the command of it to Oliver Sinclair, whose promotion was ill received by the barons. Their discord allowed an easy victory to Dacre, who routed them as they were passing over Solway Moss (25th November, 1542), taking Sinclair and several of the leaders prisoners. The news, brought to James at Caerlaverock, together with the disaffection of the nobles, broke his heart. A few weeks later at Falkland he heard of the birth of Mary Stuart, but the news brought him no comfort. His saying, "The crown came with a lass and will go with a lass," has passed into history, although the prophecy was not fulfilled. Outwardly his reign had been, with the exception of the closing scene, successful. He had restored order along the borders, and put down all attempts of the nobles against his person. He had maintained the church, supporting the bishops by severe laws against heresy. He had secured by his marriage the alliance of France and was on good terms with other Continental states. His powerful neighbor had not succeeded in wresting any land from Scotland. He was, like his father, a popular king, mingling with the people in their sports, and respected because of his strict administration of justice. But his foreboding was not without cause. The power of the nobles had only been restrained, not destroyed. The aristocracy had too many heads to be cut off by one or several blows. The principles of the Reformation were gradually spreading in spite of the attempts to stifle them, and the infant to whom he left the crown had to encounter rebellion at home and the hostility of England, not the less dangerous that she was heir to the English crown and its rulers veiled their hatred of her by professions of friendship. Knox describes James as "a blinded and most vicious king." Buchanan, who knew him better, is more fair, ascribing his faults to his time and bad education and doing justice to the qualities which made him loved by the people.

Mary Stuart.

Mary Stuart was deemed queen of Scotland from 14th December, 1542, till 29th July, 1567, when her son James VI. was crowned in her stead. This period of a quarter of a century is more crowded with events than any other part of the Scottish annals, except the War of Independence. It was the epoch of the Reformation, and it became a question of European as well as national importance which side Scotland would take. Closely connected with the religious question was the political, affecting the union of Scotland and England. The life of Mary, who united the personal charm of her race and its evil fortune, adds tragic interest to the national history. It falls into three parts,—from her birth to her return from France as the young widow of Francis II. in 1561; from her arrival in Scotland till her flight in 1568; and from her arrival in England till her execution in 1587; but only the second of these enters into the direct current of Scottish history. During the first Scotland was under the regency, first of Arran, then of Mary of Guise. It was rumored that Cardinal Beaton forced James V. on his deathbed to sign a will naming him regent, or had forged such a document; but the principal nobles proclaimed the earl of Arran heir-presumptive to the crown, governor of the realm, and tutor to the queen, and this was confirmed by parliament in the following spring. Beaton was thrown into prison, but soon released. The death of James suggested to Henry a new scheme for the annexation of Scotland by the marriage of the infant heiress to his son Edward, and he released the nobles taken at Solway Moss on easy terms under an assurance that they would aid him. Angus and his brother George Douglas also returned to Scotland from their long exile on the same promise. Sir Ralph Sadler, one of the ablest English residents at the Scottish court—half envoys, half spies—was sent to conduct the negotiations. Arran was tempted to favor the marriage by the offer of the princess Elizabeth for his son and the government north of the Forth. But the queen dowager, though she pretended not to be averse to it, and Beaton did all they could to counteract Henry's project. One part of it, the immediate delivery of Mary and the principal castles to the English king, was specially objected to. A mutual alliance between the two kingdoms was agreed to on 1st July, 1543, and Mary was to be sent to England when ten years old. Soon after a party of the nobles opposed to the match got possession of the young queen and removed her to Stirling. The English treaty was ratified by parliament; but Beaton and his partisans did not attend, and a few days later the regent, as Sadler expresses it, revolted to the cardinal. It was evident that the assured lords, though in English pay, were not to be relied on, and Henry resolved on war. His first act—the seizure of Scottish merchantmen in English ports—roused the patriotic feeling of Scotland. Before the close of the year the Scottish estates declared the treaty with England null and renewed the old league with France. Lord Lisle was sent with a fleet to the Firth of Forth, along with Hertford (afterwards the protector Somerset) as commander of the army, and Leith was sacked and Edinburgh burnt, though the castle held out. Lisle on his voyage home ravaged the ports of the Forth, while Hertford destroyed the towns and villages of the Lothians, aided by the English wardens, who made a raid across the border. Hertford returned the following year and destroyed the abbeys of Kelso, Jedburgh, Melrose, Dryburgh, Roxburgh, and Coldingham, besides many castles, market-towns, and villages. Such barbarous warfare renewed the memory of the War of Independence and the intense hatred of

1534-1545.

Regency of Arran.

War with Henry VIII.

England, which had greatly abated. Lennox and Glencairn alone of the nobles sided with the English, and the Reformers saw with regret the nation driven to a French alliance as at least preferable to English conquest.

Beaton at this time really governed, imposing his will on the vacillating regent and sternly repressing heresy. George Wishart, the chief preacher of the Reformers, was seized, found guilty of eighteen articles of heresy, mostly taken from Calvin, and burnt at St. Andrews. The war of religion, now openly declared, could not be carried on without bloodshed on both sides. Beaton was assassinated less than three months after Wishart's death in his own castle by Norman Leslie and other young men, some with private grievances, all desiring to avenge Wishart. The effect was adverse to the Reformers. Leslie and his associates, joined by a few others, of whom Knox was one, being shut in the castle, held it for a short time against the regent, but were forced to surrender to Strozzi, the French admiral.

Death of Wishart and Beaton.

1545–1558.

The death of Henry VIII. (1547) did not put a stop to the war with England. The protector Somerset proved to be an implacable enemy, and, partly to strengthen his position as regent, determined to strike a more signal blow. Invading Scotland simultaneously with a large fleet and army, he defeated the Scottish regent at Pinkie (18th September, 1547), took Edinburgh, and placed garrisons in several castles. Scotland had suffered no such reverse since Flodden. The progress of the capital was thrown back at least a century; scarcely a building remains prior to the date of his savage raids. Somerset was not in a position to follow up his advantage, for he had to return home to counteract intrigues. The young queen was sent from Dumbarton in the following summer (August, 1548), to the court of France, where she was brought up with the children of Henry II. by Catherine de' Medici. Before she went a French force had been sent to Scotland, and in the camp at Haddington the estates had, by a majority led by the regent and queen dowager, agreed to Mary's betrothal to the dauphin. The regent was promised the dukedom of Chastelherault in return for his part in the treaty. For two years a fierce intermittent war continued between England and Scotland; but the former country was too much engaged in home affairs and the French war to send a large force, and the Scots recovered the places they had lost except Lauder. The issue of the French war was also adverse to the English, who were forced to agree to the treaty of Boulogne (24th March, 1550), in which Scotland was included. In September the queen dowager went to France and obtained the transfer of the regency from Arran to herself. On her return, Arran not being prepared to relinquish his office, she proved herself a skilful diplomatist, gaining over the nobles by promises and the people by abstaining from persecution of the Reformers. A single execution—that of Adam Wallace, "a simple but very zealous man for the new doctrines"—took place in 1550 under the sanction of Archbishop Hamilton, natural brother of Arran, who had succeeded Beaton; but that prelate, whose natural disposition was towards compromise, authorized a *Catechism* in 1552 which minimized the distinctions in doctrine between the church and the Reformers, and was conspicuous for omitting all reference to the supremacy of the pope. At this time a large section of the clergy and people were still wavering, and the necessity of retaining them by moderation and reform was evident. The death of Edward VI. and the accession of Mary in 1553 had an important influence on the progress of the Scottish Reformation. The Scottish Reformers who had taken refuge in England had to escape persecution by returning home or going abroad, and the powerful preaching of Harlaw, Willock, and Knox, who came to Scotland towards the end of 1555, promoted the new doctrines.

Somerset's raids.

In the spring of 1554 the queen dowager at last succeeded in obtaining from the reluctant Arran a surrender of the regency. Mary had now attained her twelfth year and a nomination by her of her mother as tutor gave the form of law to what was really the act of the queen dowager, the French king, and the nobility. The people acquiesced, for all classes were tired of a governor whose chief object was money. His actual investiture in the French dukedom removed any scruples in relinquishing a dangerous dignity. For the next six years the queen dowager was regent and conducted the government with such prudence that her real aims were only seen through by the most penetrating. Knox has been accused of a harsh opinion of her; but the upshot of her policy if successful would have been to subject Scotland to France and to that party in France so soon to be the relentless persecutors of the Reformers. She knew well how to bide her time, to yield when resistance was impolitic, to hide her real object, but this she pursued with great tenacity of purpose. A variety of circumstances favored her,—the condition of England under Mary Tudor, the ill-will Arran had incurred, the absence of any leading noble who could attempt to seize the supreme power, the safety at the French court of her daughter, in whose name she governed, and the knowledge of her adopted country acquired by long residence. Yet her first step was a mistake so serious as to have well-nigh provoked revolution. In appointments to offices she showed such preference for her own countrymen as created intense jealousy on the part of the Scottish nobility, and would probably have led to open action but for the fact that many Scotsmen got offices and pensions from the French king. The new regent applied herself at once to the perennial work of every Scottish Government, the repression of disorder in the Highlands, and first Huntly, afterwards Argyll and Athole, were sent to Argyll and the Isles; but the presence of royalty was, as had before been found, the best remedy, and she made next year a circuit in person with more success than any of her lieutenants. Under the advice of her French counsellors she now garrisoned Dunbar with French soldiers and built a fort at Eyemouth (1556). She even ventured to propose to levy a tax for the maintenance of a standing army; but the remonstrance of 300 barons, headed by Sir John Sandilands, forced her to abandon a project so fatal in that age to liberty. Next year, at the instigation of the French king, she endeavored to force the country into an English war. No time could have been worse chosen, for commissioners from England and Scotland had actually met at Carlisle to adjust differences between the two countries. The Scottish barons refused to fight, and from that date, Bishop Lesley notes, the queen regent could never agree with the nobility, and sundry of them sought by all means to raise sedition against her and the French.

Regency of Mary of Guise.

In the parliament at the close of the year commissioners were appointed to go to France for the marriage between Mary and the dauphin. Their instructions were to obtain a promise from both to observe the liberties and privileges of Scotland and its laws, and a ratification of the Act passed in 1548, when it was first proposed to send the young queen to France. The contract of marriage provided that their eldest son was to be king of France and Scotland and the eldest daughter (should there be no son) queen of Scotland, to be given in marriage by the joint consent of the king of France and the Scottish estates. In the event of her husband's death Mary was to be free to stay in France or return to Scotland. The marriage was solemnized at Notre Dame on 24th July, 1558.[1] But prior to the public contract a secret arrangement had been made, by which

Mary's marriage to the dauphin.

[1] [Burton, vol. iv. p. 7, gives the customary date of 24th April, in which Swinburne follows him. See vol. xv. p. 601; also vol. ix. p. 609.—AM. ED.]

Mary, in three several deeds, made over the kingdom of Scotland to the king of France and his heirs if she died childless, assigned to him possession of the kingdom until he was reimbursed in a million pieces of gold for her entertainment in France, and declared that, whatever documents she might afterwards sign by decree of parliament, this arrangement expressed her genuine intention. After the return of the commissioners the crown matrimonial, with the title of king, was granted by parliament to the dauphin.

Progress of Reformation.

While statesmen were occupied with the queen's marriage the Reformation had been steadily advancing. Knox labored incessantly, preaching in Edinburgh ten days in succession and making rapid visits to the central and western shires. He attracted to his side representatives of the nobility and gentry, and had much support in the towns. The earl of Glencairn, Lord Lorne, Lord James Stuart, the future regent, and the laird of Dun, John Erskine, in Angus were amongst his earliest followers, as well as many of the tradesmen and artisans. Knox now openly denounced attendance at mass as idolatrous and began to administer the Lord's Supper after the manner of the Swiss Reformers. He was summoned to Edinburgh on a charge of heresy; but, though he kept the day, the proceedings were dropped. Shortly after he was again summoned, but meanwhile had accepted a call from Geneva. In his absence he was condemned for heresy and burned in effigy at the market cross of Edinburgh. Though absent, he continued the master-spirit of the Reformation in Scotland, and as the result of his exhortations Argyll, Glencairn, Morton, Lord Lorne, and Erskine of Dun drew up a bond (3d December, 1557) to "defend the whole congregation of Christ and every member thereof . . . against Satan and all wicked power," themselves forsaking and renouncing "the congregation of Satan with all the superstition, abomination, and idolatry thereof." This was the first of many bonds or covenants in which, borrowing the old form of league amongst the Scottish nobility, the Lords of Congregation applied it to the purposes of the Reformation. They afterwards passed resolutions that prayers should be read weekly in all parishes by the curates publicly, with lessons from the Old and New Testaments, and that doctrine and the interpretation of the Scriptures should be used privately in quiet houses until God should move the prince to grant public preaching by faithful ministers. Argyll at once acted upon the resolutions and protected John Douglas, formerly a Dominican, his chaplain, who preached at Castle Campbell in spite of the remonstrance of Archbishop Hamilton. That prelate next took a fatal step. Walter Myln, parish priest of Lunan near Montrose, an old man of eighty-two, was burnt for heresy at St. Andrews (8th April, 1558). He was the last Protestant martyr in Scotland. The total number of deaths was small, it is believed twenty in all; but many people were banished or forced to leave the country and many fined, while none were allowed freedom of worship. Immediately after the death of Myln there began, says Knox, "a new fervencie amongst the whole people." Gathering courage from the popular feeling, the Lords of Congregation presented petitions in rapid succession to the regent. The first laid before her prayed "that it might be lawful to meet in public or in private for common prayer in the vulgar tongue, to interpret at such meetings hard places in Scripture, and to use that tongue in administering baptism and the Lord's Supper;" in reply permission was granted to preach in private and to administer the sacraments in the vulgar tongue. The second presented at the meeting of parliament prayed for a suspension of all Acts against heretics until a general council, that copies of the accusation and depositions should be given to all persons accused of heresy, that the accused should be allowed themselves to interpret any words charged as heretical, and should not be condemned unless found guilty of teaching contrary to Scripture. "The regent," Knox remarks, "spared not amiable looks and good words," but suffered the parliament to be dissolved (2d March, 1557) without any answer. In the spring a synod met in Edinburgh and a third petition was laid before it, praying that the canons should be enforced against clergy who led scandalous lives, that there should be preaching on every Lord's day and on holidays, that no priests should be ordained unless able to read the Catechism distinctly, that prayer should be in the vulgar tongue, that the mortuary dues and Easter offerings should be optional, and that the consistorial process should be reformed. Another point was included according to Lesley,—that bishops should be elected with the consent of the laity of the diocese and priests with that of their parishioners. The synod replied that they could not dispense with Latin in public prayer as appointed by the church, and that the canon law must be observed as to elections of bishops and priests. On other matters they were prepared to make concessions, and passed thirty-four canons in the spirit of the council of Trent directed to the due investigation and punishment of immorality of the clergy and the inspection of monasteries, better provision for preaching by bishops and priests, the remission of mortuary dues to the very poor, and the recognition of the sacrament of baptism as administered by the Reformers. A short exposition of the mass was to be published. These concessions proved the necessity for reform; but, as they were silent on the principal points of doctrine, as well as on the more radical reforms in church government, they could not be accepted. The time of compromise, if compromise had ever been practicable between Rome and Geneva, to which the Scottish Reformers adhered, was now past. Two events had occurred before the synod separated which hastened the crisis. On 17th November, 1558, the death of Mary Tudor once more placed on the English throne a sovereign inclined to favor the Reformation. In May, during the sittings of the synod, Knox returned to Scotland and the Scottish Reformers once more had a determined leader.

1557–1559.

Struggle between Congregation and Mary of Guise.

The regent issued about Easter (1559) a proclamation forbidding any one to preach or administer the sacraments without authority of the bishops. Willock and other leading preachers having disregarded it were summond to Stirling on 10th May. Their adherents assembled in great numbers, but mostly unarmed, at Perth, a town zealous for the Reformed opinions. Erskine of Dun went from there as a mediator to the regent at Stirling; she promised, but in vague terms, that she would take some better order with the ministers if their supporters did not advance. Notwithstanding they were outlawed for not appearing on the day of trial. Next day, when the news reached Perth, Knox preached his first public sermon (11th May) since his return, inveighing against "idolatory." Hardly had he ended when a priest began mass and opened the tabernacle on the high altar. A young man called out, "This is intolerable that, when God by His Word hath plainly damned idolatry, we shall stand and see it used." The priest struck the youth, who retaliated by throwing a stone, which broke an image. From this spark the fire kindled. The people destroyed the images in the church and then proceeded to sack the monasteries. The example of Perth was followed at many other places. The regent could not remain passive when the congregation was sanctioning such action. But her position was one of grave difficulty. Her main support was from France, and, though she had adherents among the Scottish nobility, Argyll and Lord James, who were still with her at Stirling, were really committed to the Congregation. What course the new queen of England would take was still uncertain. On 11th May the regent advanced towards Perth, but the arrival of Glencairn with 2500

men from the west to aid the Congregation led to a compromise, of which the terms were these: both parties were to disband their troops; Perth was to be left open to the regent, but no French troops were to come within 3 miles; the inhabitants were not to be called upon to answer for their recent conduct; and all controversies were to be reserved for parliament. The Congregation, however, remained distrustful; Knox openly preached that the treaty would only be kept till the regent and her Frenchmen became the stronger, and before leaving Perth the Lords of Congregation entered into a new bond for mutual defence. The regent entered Perth the day they left (29th May), accompanied by the duke of Chastelherault and a bodyguard of French as well as Scottish troops paid by French money. The deposition of the provost in favor of a Papist and the occupation of the town by these troops were deemed breaches of the agreement, and Argyll and Lord James now joined the Reformers and took the lead in their proceedings. Their numbers increasing, the regent felt unable to retain Perth, and quitting it marched south, followed by the army of the Congregation, to which she abandoned Stirling, Linlithgow, and Edinburgh, taking refuge at Dunbar. The only conflict was at the Muir of Cupar, where a small force sent to save St. Andrews was quickly dispersed by the superior numbers of its opponents. It was made a condition of a truce that no Frenchman should be left in Fife. The Reformers occupied Edinburgh for a few weeks, but were obliged to abandon it upon new terms of truce intended to preserve the *status quo*. Both parties were engaged in negotiations for active assistance, the one from France and the other from England. The regent had been daily expecting reinforcements, and a considerable number of troops about this time landed at Leith, which they began to fortify.

1559-1560.

In the end of June Kirkaldy of Grange began a correspondence, afterwards continued by Knox, with Cecil, Percy, and Sir Herbert Croft. Their scheme was far-reaching. The young earl of Arran, though brought up in France, had become Protestant, and if he, the heir-presumptive to the Scottish crown, were married to Elizabeth the union of the two countries would be secured along with the Reformation. This would be a counter-stroke to the union of France and Scotland under a Catholic, which almost at the moment became for a brief time an accomplished fact, by the dauphin succeeding as Francis II. to the French crown on the death of his father. The policy of the Guises, who continued to control the Government under the new king, almost forced Elizabeth in this direction. Mary quartered the arms of England with those of Scotland, implying denial of Elizabeth's right both as illegitimate and as a heretic. But Elizabeth knew the value both of her hand and of the state, which, thanks to the ability of her ministers, was daily becoming more loyal. She had special cause for hesitating to ally herself with the Lords of Congregation. Knox had offended her by his vehement *Blasts against the Regiment of Women*, which, though primarily aimed against the Catholic queens, admitted no exception in favor of a Protestant. Nor could Knox even when supplicating aid adopt the courtier's language to which Elizabeth was accustomed. She was really afraid of the revolutionary principles of some of the Reformers, which seemed to threaten the throne as well as the altar. Moreover, Arran, who came secretly to the English court, did not please her, and there was an end of the matrimonial part of the scheme. The rest of it would probably also have miscarried but for the consummate statesmanship of Cecil, who saw where the interest of England lay. In August, 1559, Sadler was sent with £3000 [$14,580] to the assistance of the Scottish Protestants. Another supply followed, but was intercepted, and in January, 1560, a treaty was agreed to at Berwick between Elizabeth and the Lords of Congregation, to whom the duke of Chastelherault had now gone over. The Scots engaged not to enter into an alliance with France, and to defend the country against French aggression. Elizabeth was to support Scotland by an army, but no place of strength was to be left in English hands. If any were taken from the French they were to be razed or retained by the Scots. The Scots were to assist England if attacked by France, and to give hostages for fulfilment of the treaty. Next spring an English army under Lord Grey crossed the Tweed (28th March, 1560), met the forces of the Congregation at Prestonpans, and invested Leith, in which the French were also blockaded by sea. The regent had taken refuge in Edinburgh castle, and here on 10th June she died of dropsy. She had been deserted gradually by almost all her Scottish adherents. The last to go was Maitland of Lethington, the most talented but also the most cunning of the Scottish statesmen. His desertion was the sign of a lost cause. Even some of the higher clergy now conformed. Lord Erskine almost alone remained faithful. The regent's own courage never failed, and, though she received a visit from the leaders of the Congregation and consented to see Willock, she died a firm Catholic. Her misfortunes and her conciliatory policy during her long struggles to maintain the French connection with Scotland have gained her a lenient judgment even from Protestants, all save Knox, whose personal animosity is palpable, though his view of her policy is correct.

Negotiations of Reformers with England.

Death of Mary of Guise.

Her death removed the chief obstacle to peace, which the English and the French courts had for some time desired, and the treaty of Edinburgh was concluded on 8th July, 1560, upon terms favorable to Scotland. The military forces of both France and England were to evacuate Scotland, except a certain number of French, who were to remain in Inchkeith and Dunbar. Leith and Eyemouth were to be dismantled; Mary and Francis were to abstain from using the arms of England. By separate articles certain concessions were granted to the nobility and people of Scotland showing the length to which the limitation of the monarchy was carried. No French or other soldiers were to be brought into the realm unless in the event of an invasion, and only with the consent of the estates. Neither peace nor war was to be made without their consent. A council of twelve (seven chosen by the king and queen and five by the estates out of twenty-four selected by the estates) were to govern the kingdom during the absence of Mary and Francis. The chief officers of the crown were to be natives. An Act of oblivion was to be passed for all Acts since 6th March, 1558. Neither the nobles nor any other persons were to assemble in arms except in cases provided by the law. The duke of Chastelherault and his son, Arran, and all other Scots were to be restored to their French estates. With matters of religion the deputies refused to deal; but envoys were to be sent to the king and queen to lay before them the state of affairs, particularly those last mentioned.

Treaty of Edinburgh.

Before parliament met an important step towards a new organization of the church was taken. Superintendents, some lay, others clerical, were appointed for Lothian, Glasgow, Fife, Angus, Mearns, Argyll, and the Isles. The principal ministers of the Congregation were planted in the chief towns,—Knox receiving Edinburgh as his charge. The convention parliament which assembled on 10th July and began its business on 1st August, 1560, was the Reformation parliament of Scotland. Like Henry VIII.'s famous parliament, its work was thorough. It not merely reformed abuses, but changed the national creed and accomplished more in one than the English parliament did in three sessions. The parliament was the most numerous yet held in Scotland, being attended not only by nearly all the nobility, but by some bishops and an unusually large number of lesser barons or landed gentry, representatives of the

Reformation parliament.

burghs. Its statutes never received the royal assent, but were confirmed by the first parliament after Mary's deposition. On 18th August the Confession of Faith received the sanction of the estates. On the 24th an Act was passed declaring that the bishop of Rome had no jurisdiction or authority within the realm. Another rescinded all Acts passed since James I. contrary to God's word; and a third prohibited the mass or baptism according to the Roman rite, and ordained strict inquisition against all persons contravening the statute. The form of church government was not explicitly altered. The archbishop of St. Andrews, and Dunkeld and Dunblane alone of the bishops, are said to have voted against the Confession, and Athole, Somerville, Caithness, and Bothwell alone of the nobles. The whole power of the state was at this time in the hands of the party of the Reformation and resistance was useless. The Confession of Faith, the corner-stone of the new policy both in church and state, was drawn up by Knox and five other ministers, but revised by the more moderate Reformers Lethington and Winram. The power of the civil magistrate was declared in terms which indicate the revision of Lethington rather than the original draft of Knox. Its language is certainly such as monarchs had been little accustomed to, though the expression is not so blunt as Knox used in preaching and conversation. Kings, princes, and magistrates in free cities are declared to be those to whom the reformation of religion "chiefly and most principally appertains." They are themselves to be judged by God, being appointed for the maintenance of the true religion and suppression of idolatry. Resistance to them, but only when vigilant in the execution of their office, is declared sinful.

The same persons who had prepared the Confession were entrusted with the composition of a code of ecclesiastical polity, and a draft, after being first laid before the convention of 1560 was submitted as revised to that of the following year. This *First Book of Discipline* was not universally approved; several of its provisions, especially those relating to church estates and their application to the support of the ministry, the relief of the poor, and the furtherance of education, were little to the taste of the nobility, and it was never sanctioned by the estates or fully acted on. Other parts of it were, however, embodied in the *Second Book of Discipline*, which became the law of the Reformed Church. It remains a memorial of the far-sighted views of Knox, its author; and the verdict of posterity has been in its favor and against the nobles who prevented its being carried out. See PRESBYTERIANISM, vol. xix. p. 699, *sq.*

The death of Francis II. (6th December, 1560) materially altered the political situation. The much feared subordination of Scotland to France was at last averted. Mary Stuart, only nineteen, was young enough to be influenced by a new husband and new responsibilities. Her character was not yet known, but her relations with Catherine de' Medici were not friendly, and there was little doubt that she would take advantage of the provision in her marriage articles and return to Scotland. Sir John Sandilands's mission to France to procure the royal sanction to the treaty of Edinburgh and the Acts of the Reformation parliament must have been unpalatable, and he was not favorably received. Before she left France Mary was visited by envoys of the opposite parties into which Scotland was divided. Lesley, official of Aberdeen, afterwards bishop of Ross, and her valiant defender, was sent by the Catholic lords and bishops with a special message from Huntly, urging her to come to Aberdeen, where an army of 20,000 men would be at her disposal. But Huntly had not proved trustworthy during the regency and Mary rejected an offer which would have plunged the kingdom in war from the moment she landed. The very day after she had seen Lesley her brother Lord James, who had been sent by the Lords of Congregation, met her at St. Dizier. She received him favorably, but declined to ratify the treaty till she consulted her council. An attempt was made to capture Mary on her way to Scotland; but sailing from Calais on 14th August, she landed at Leith on the 19th. She was accompanied by three uncles and a considerable suite, including Castelnau the historian, Brantôme the memoir writer, and the poet Chastelard.[1]

Mary's return to Scotland. 1560–1563.

On her return to Scotland Mary showed herself disposed to conciliate the Reformers provided she was allowed the exercise of her own faith. This had been guaranteed her by Lord James. His near kinship to the queen at a time when the stain of bastardy was less regarded, and his close relation with the Reformers, made him necessary to both and gave him an influence which his eminent prudence used for the good of the nation, but with an eye to his own advantage. Without thrusting himself too prominently forward, he led the privy council (ably supported by Lethington), and, without the name, was in fact prime minister. The title of Mar, and, when that was reclaimed by the heir of the Erskines, of Moray or MURRAY (*q.v.*), with its large territories, gave him the designation by which he is best known, as well as great wealth, which he dispersed by means not well explained. But the leaven of another influence than that of the statesman was now at work in Scottish politics. This was embodied in John Knox, the most representative Scotsman since Wallace. The first Sunday after Mary's arrival the mob tried to interrupt mass at Holyrood, and Moray had himself to keep the chapel door to prevent it being broken. "His best excuse was," says Knox, "that he wald stop all Scotchmen to enter into the mass." Next Sunday Knox preached in Edinburgh against idolatry. "One mass was more fearful to him," he said, "than 20,000 armed enemies." Little likely as such sentiments were to please the young queen, a meeting between her and the preacher was arranged by Moray, the only third party present. On the matter of religion he was unbending, yet not more so than Mary. His judgment of the queen's character was, "If there be not in her a proud mind, a crafty spirit, and an indurate heart against God and His truth my judgment faileth me." In 1562 Huntly, the chief Romanist in the north, who offered to have the mass said in three counties, rebelled, being indignant at the grant to Moray of an earldom whose estates he then held. Mary, accompanied by her brother, made a progress in the north, where Huntly was defeated and slain at Corrichie, his elder son being imprisoned, his second beheaded, and the lands of Huntly, of his kinsman the earl of Sutherland, and other barons of the house of Huntly forfeited. On her return to Edinburgh Mary again met Knox at Holyrood. He rebuked her for dancing and other frivolities, advised her to attend the public sermons, and told her that it was not his duty to leave his studies in order to wait at her chamber door. There were other interviews, in one of which (April, 1563) only Mary seemed to yield a little. She was anxious to use his influence to quiet a threatened rising in the west, and to heal a quarrel between her half sister the countess of Argyll and her husband. Knox promised his aid, but required in return that the penal laws should be enforced against the Papists. This Mary agreed to, and her promise was also apparently kept. Hamilton, archbishop of St. Andrews, and forty-seven other persons were prosecuted for hearing confession and celebrating the mass. Yet Knox's comment in his *History* is, "This conference we have

Knox and Mary. 1563–1567.

[1] The story of Mary Stuart, which now approaches by rapid steps its climax, has been told by Mr. Swinburne (see MARY, vol. xv. p. 601-8), and a poet may regard human character in a manner different from the historian,—interpreting motives and drawing conclusions which history, whose view is limited by evidence, cannot reach. Here only the leading facts in her personal story can be stated so far as they affect the course of Scottish history.

inserted to let the world see how Marie queen of Scotland can dissemble, and how that she could cause men to think that she bore no indignation for any controversy in religion, while that yet in her heart was nothing but venom and destruction, as short after that did appear." She was in fact corresponding with her uncle the cardinal of Lorraine, with the pope, with Philip II., testifying her steadfast attachment to Papacy and her desire to restore the Catholic faith. At a last conference Knox remonstrated against her marriage, then thought imminent, with a Papist, claiming the right of a subject "to speak out on this topic which so nearly concerned the commonwealth," remaining unmoved by the last argument of a woman, which he savagely describes as "howling and tears in greater abundance than the matter required." Nothing but perusal of the conversations can bring before us this pregnant passage of history—the abasement of the Scottish monarchy before the religious democracy—of the woman forced to dissemble and weep before the stern man believing he delivered a message from God to the head of a corrupt court. Something was allowed to Knox's sincere outspokenness. He moved men and women alike by words which, like Luther's, go straight to the realities of life. He is the typical Scottish divine framed on the model of the Hebrew prophets, and often reproduced in weaker copies. The Reformation in Scotland, in both its strength and its weakness, was his work more than that of any other man. The Presbyterian form of government, of which his friend Calvin was the author, was introduced by Knox from Geneva and continued for long to enforce discipline, first by censure and then, if need be, by excommunication and temporal punishment, entirely in his spirit.

Mary's marriage to Darnley.

Not only to Knox and the Reformers but to all classes the question of the day was the queen's marriage. Apart from her beauty, her political position rendered her hand of importance to the balance of power. It held not only the dowry of France and the possession of Scotland but a claim, which might be at any moment asserted, to the English crown. She avowed her inclination to marry, and indeed she required a man to put her in possession of her kingdom. Don Carlos, the archduke of Austria, son of Philip of Spain, Charles IX. of France, the kings of Denmark and of Sweden, the archduke Charles, second son of the emperor, were all passed in review but rejected. Elizabeth pressed the claim of her favorite Leicester,—a project supported by Cecil and Moray. In the end the fair face and fine figure of her young cousin Henry Stuart, Lord Darnley, carried the day. A party of the Scottish nobles—Athole, himself a Stuart, Morton, Crawford, Eglinton, and Cassilis—favored the alliance. David Rizzio, the queen's foreign secretary, who already had great influence with her, promoted it. But it was her own act, the most dangerous of many false steps in her life. Shortly before the marriage (29th July, 1565) Moray attempted to seize Darnley and the queen as they rode from Perth to Callendar near Falkirk. When it was accomplished he rose in arms with the duke of Chastelherault, the head of the Hamiltons, Argyll, and Rothes; but Mary with a large force pursued them from place to place in the Roundabout Raid, from the neighborhood of Edinburgh through Fife, where she levied fines, and finally to Dumfries, from which Moray fled to England. He had been secretly but not vigorously supported by Elizabeth, who, when she heard of his flight, recalled her orders to Bedford, then on the marches, to place troops at the disposal of the insurgents. Mary still retained some of the popularity of a young queen, and fostered it by an apparent desire to humor the Reformers. For the first time she attended a Protestant sermon. But the consequences of a union between a high-spirited woman, active in mind and body beyond her sex and years, with a vain and dissolute youth were soon seen. His alienation from the queen, the murder of Rizzio, with the intrigues that preceded and followed it, the rapid growth of Bothwell's influence, the pitiable vacillations of Darnley, and his murder at Kirk of Field (10th February, 1567) have been sketched in the article MARY (vol. xv. p. 602 *sq.*). The authors of the last crime were Bothwell, who devised it, and his servants, who executed it. Their confessions leave no doubt of their own guilt. Who were their accomplices has from that day to this been debated without conclusive answer. The great controversy is whether the nobles with Moray at their head had bound themselves to support Bothwell, as he and Mary afterwards declared, or whether Mary, possessed with passion for Bothwell and hate of Darnley, herself instigated her husband's murder. Some have thought both the queen and the nobles were implicated. The casket letters, alleged to have been found in a coffer that was given to Morton by Dalgleish when intrusted with it by Sir James Balfour for its delivery to Bothwell, must be left out in any fair examination of this question. The mode of their recovery and their production, first partially and secretly before Elizabeth's commissioners at York, then with apparent but not real publicity at Westminster (for Mary's counsellors were not allowed to see them), their contents, so different from her known writings, and the disappearance of the originals render their evidence inadmissible. What weighs most against Mary is her subsequent conduct, explicable only in favor of innocence if she was absolutely in Bothwell's power from the time of the murder to the defeat of Carberry,—an hypothesis not borne out by facts. Though Lennox and his wife urged that the murderers be brought to justice, there was delay till 13th April, when Bothwell was at last brought before an assize. The trial was a sham, and his acquittal on the pretence that there was no accuser could deceive no one.

Murder of Darnley.

The strange wooing which commenced when Darnley was just buried, if not before, was continued by the seizure of Mary by Bothwell near Cramond and her captivity in her own castle at Dunbar—a pretence according to her adversaries, an opportunity for an outrage from which marriage was the only escape according to her defenders—at last culminated in the marriage at six in the morning, at Holyrood, on the 15th of May, 1567. It was the month when wicked women marry, said the people, writing Ovid's line on the Tolbooth walls. Before it took place she created Bothwell duke of Orkney, and pardoned him for any violence. She also wrote in palliation of his conduct to the French king. His divorce from Lady Jane Gordon had been hurried through both the bishops' court and that of the Protestant commissaries,—in the former on the false pretence that there had been no papal dispensation for his marriage to one of near kin, and in the latter on the ground of adultery. Mary had been more than once warned of the consequences of such a marriage by Lord Herries, by the faithful Melville, and by Craig, the minister who, with the utmost reluctance, proclaimed the banns. It was an act which required no warning. She had no alternative, urge her vindicators, to save her honor, and her tears on the morning of marriage are proof that she was forced; but the more scrupulous admit she should have preferred death to union with a man she must at least have known was not clear of Darnley's murder. Her enemies said then, and historians who take their side repeat, that it was the madness of a passion she could not resist. The view most consistent with the facts seems to be that she accepted, not without fits of remorse, the service of the strongest sword at her disposal on the only terms on which she could obtain it. But, if Mary cannot be acquitted of the degree of complicity implied in accepting the consequences of the murder, many of the leading nobles were involved in equal guilt. On 19th April a bond asserting Bothwell's innocence and urg-

Mary's relations with Bothwell.

ing Mary to marry him had been signed at Ainslie's tavern, not only by Bothwell's few friends, but by "a great part of the lords." Most of those who signed had in the parliament just concluded received grants of land or remission of forfeiture, and it is urged by Mary's defenders that they were bribed to acquiesce in Bothwell's designs. When the bond was afterwards put in evidence against them their plea was that they had been forced to sign it by Bothwell. It is contended on Mary's behalf that with so many of the nobles committed to approval of the marriage she had no one on whom to rely. There is something in this argument; but it does not meet the point—Why did she rely on Bothwell? That a scheme was arranged before Darnley's murder to entrap her into this marriage, in order to pave the way for her deposition, and that the casket letters were fabricated to clench her guilt, has been suggested; but the facts necessary to prove so deep a train of conspiracy are wanting. The two Scotsmen who almost alone maintained the character of honest men, Kirkaldy of Grange and Sir James Melville, who were so far from being unfriendly to Mary that they ultimately espoused her cause, believed that she was a willing victim and threw herself into Bothwell's arms. The narrative in her own dispatch to the bishop of Dunblane does not allege that she was forced, but only that "he partlie extorted and partlie obtained our promise to take him as our husband."

The leading nobles were not disposed to accept a new master in Bothwell, whose vices, unlike those of Darnley, were coupled with a strong instead of a weak character. They kept jealous possession of the young prince, placed in the custody of Mar in Stirling; and when a muster was called to enforce order on the border, secretly collected their forces to act against instead of for the queen and her husband. Within a month of her marriage she was met at Carberry Hill, near Musselburgh (15th June, 1567), by a force of the confederate lords, headed by Morton and Glencairn, Ruthven and Lindsay. Mary, after a fruitless attempt at mediation by Du Croc, the French ambassador, and an offer equally vain by Bothwell to decide the issue by single combat, surrendered to Kirkaldy. Bothwell rode off to Dunbar with a few followers, and Mary was conducted to Morton's camp. Once in their hands, the lords treated her as a prisoner, and confined her at Lochleven Castle, where she was forced to abdicate, surrendering the crown in favor of her son and committing the regency during the minority to Moray. The young king was crowned at Stirling on 29th July. The prudent Moray, who had kept out of the way in France while these events were transacted in Scotland, now returned and was installed as regent (22d August). Mary remained prisoner in Loch Leven for nearly a year. After her escape on 2d May, 1568 the duke of Chastelherault and other Catholic nobles rallied round her standard; but on 13th May, Moray and the Protestant lords met her forces at Langside near Glasgow, and the issue of that battle forced her to fly to England, where she placed herself (19th May) in the hands of Lord Lowther, governor of Carlisle, recalling Elizabeth's promises of protection. Mary, however, found that she was really a prisoner. Like Baliol, she disappears personally from the field of Scottish history; but her life in exile, unlike his, was spent in busy plots to recover her lost throne. It became clear as time went on that she placed her whole reliance on the Catholic minority and foreign aid; even in prison she was a menace to Elizabeth and ready to plot against her as an enemy. The Protestant party increased in Scotland until it became a majority almost representative of the whole nation; even her own son when he came to hold the sceptre, little inclined as he was to accept Presbyterian principles, regarded her as a revolutionary element fortunately removed. Her knowledge of Babington's plot for the invasion of England is proved, though her assent to the death of Elizabeth is still an open question. By her will, confirmed by her last letters, she bequeathed the crown of Scotland and her claim to that of England to Philip II. The letters contain this modification only, that her son was to have an opportunity of embracing the Catholic faith under the guardianship of Philip to save his own throne. There was no such reservation as regards that of England. The Armada, from whose overthrow date the fall of Spain and the rise of Britain as the chief European power, was due to the direct instigation of Mary Stuart.

Mary a prisoner.

1567-1569.

Meantime, in Scotland, four regencies rapidly succeeded each other during the minority of James. The deaths by violence of two regents, Moray and Lennox, the suspicion of foul play in the death of the third, Mar, and the end scarcely less violent because preceded by a trial of the fourth, Morton, mark a revolutionary period and the impossibility of the attempted solution by placing the government in the hands of the most powerful noble. Hereditary royalty, not the rule of the aristocracy, was still dominant in Scottish politics and a regency was an experiment already disparaged in the preceding reigns, Moray, said Sir J. Melville, "was and is called the good regent," mingling with this praise only the slight qualification that in his later years he was apt to be led by flatterers, but testifying to his willingness to listen to Melville's own counsels. This epithet bestowed by the Protestants, whose champion he was, still adheres to him; but only partisans can justify its use. He displayed great promptness in baffling the schemes of Mary and her party, suppressed with vigor the border thieves, and ruled with a firm hand, resisting the temptation to place the crown on his own head. His name is absent from many plots of the time. He observed the forms of personal piety,—possibly shared the zeal of the Reformers, while he moderated their bigotry. But the reverse side of his character is proved by his conduct. He reaped the fruits of the conspiracies which led to Rizzio's and Darnley's murders. He amassed too great a fortune from the estates of the church to be deemed a pure reformer of its abuses. He pursued his sister with a calculated animosity which would not have spared her life had this been necessary to his end or been favored by Elizabeth. The mode of production of the casket letters and the false charges added by Buchanan, "the pen" of Moray, deprive Moray of any reasonable claim to have been an honest accuser, zealous only to detect guilt and to benefit his country. The reluctance to charge Mary with complicity in the murder of Darnley was feigned, and his object was gained when he was allowed to table the accusation without being forced to prove it. Mary remained a captive under suspicion of the gravest guilt, while Moray returned to Scotland to rule in her stead, supported by nobles who had taken part in the steps which ended in Bothwell's deed. Moray left London on 12th January, 1569. During the year between his return and his death several events occurred for which he has been censured, but which were necessary for his security—the betrayal of the duke of Norfolk and of the secret plot for the liberation of Mary to Elizabeth, the imprisonment in Loch Leven of the earl of Northumberland, who after the failure of his rising in the north of England had taken refuge in Scotland, and the charge brought against Maitland of Lethington of complicity in Darnley's murder. Lethington was committed to custody, but rescued by Kirkaldy of Grange, who held the castle of Edinburgh, and while there "the chameleon," as Buchanan named Maitland in his famous invective, contrary to the nature of that animal, gained over those in the castle, including Kirkaldy. Moray was afraid to proceed with the charge on the day of trial, and Kirkaldy and Maitland became partisans of the queen. The

Moray's character.

His regency.

1569-1575.

castle was the stronghold of the queen's party—being isolated from the town and able to hold out against the regent who governed in the name of her son. This defection was mourned over by the Reformers. Knox with the self-confidence which marked his character, sent from his deathbed to Kirkaldy a message of warning that "neither the craggy rock in which he confided, nor the carnal wisdom of the man [Maitland] whom he esteemed a demi-god, nor the assistance of strangers, should preserve him from being disgracefully dragged to ignominious punishment." It has been suspected that Maitland and Kirkaldy were cognizant of the design of Hamilton of Bothwellhaugh to murder Moray, for he had been with them in the castle. This has been ascribed to private vengeance for the ill-treatment of his wife; but the feud of the Hamiltons with the regent is the most reasonable explanation. As he rode through Linlithgow Moray was shot (23d January, 1570) from a window by Hamilton, who had made careful preparation for the murder and his own escape. Moray was buried in the south aisle of St. Giles Cathedral, Edinburgh, amid general mourning. Knox preached the sermon and Buchanan furnished the epitaph, both unstinted panegyrics. His real character is as difficult to penetrate as that of Mary. It is easy for the historian to condemn the one and praise the other according to his own religious or political creed. It is nearer truth to recognize in both the graces and talents of the Stuart race, which won devoted followers, but to acknowledge that times in which Christian divines approved of the murder of their enemies were not likely to produce a stainless heroine or faultless hero, indeed necessitated a participation in deeds which would be crimes unless they can be palliated as acts of civil war. Let us absolve, if we can, Moray and Mary of Darnley's blood. It remains indisputable that Mary approved of Moray's assassination and that Moray would have sanctioned Mary's death.

Regencies of Lennox and Mar.

Moray was succeeded in the regency by Lennox, Darnley's father, the male nearest of kin to the future sovereign, but really the nominee of Elizabeth. His brief term of office was marked by the renewal of the English war under Sussex and other generals which made the queen's cause again the more popular. Lennox, another victim of violence, was slain (3d September, 1571) in a hasty attack by one of the Hamiltons on Stirling, from which Morton, the real head of the Protestant party, who at first had been taken and threatened with the same fate, barely escaped. Mar, who had all along held the custody of the young king, was now chosen regent and held the post for a year, when he died (28th October, 1572). During his regency the civil war between the queen's and the king's party continued. An English intrigue was carried on with great mystery, and never brought to a point by Randolph and Killigrew to deliver Mary to the regent that she might be tried within her own dominions. On the death of Mar, Morton, who had been the most powerful noble during the last regency, at length reached the object of his ambition by being elected regent. On the day of Morton's election Knox died. He was "one," said Morton, "who never feared the face of man." If we condemn his violent language and bitter spirit, it is just to remember that he lived during the red heat of the struggle between Rome and the Reformation, and died before the triumph of the latter in Scotland was secure. He had felt the thongs of the galleys and narrowly escaped the stake. The massacre of St. Bartholomew spread consternation throughout Protestant Europe just before his last illness. Mary and Philip of Spain were still plotting for the destruction of all he held vital. His scheme for the reformation of the church and application of its revenues was in advance not of his own time only. He contemplated free education for children of the poor who really required such aid,—a graduated system of parish schools, burgh schools, and universities which would have forestalled the most recent educational reform. While he introduced Presbyterian government by kirk-sessions, presbyteries, synods, and general assembly and opposed even a modified Episcopacy, he saw the advantage of the superintendence of districts by the more learned and able clergy. While he insisted on the preaching of the Word and the administration of the sacraments in the vulgar tongue, his liturgy shows his favor for forms of public prayer. Knox's first wife was English, and two of his sons took orders in the Church of England. Scottish Presbyterianism had not yet been hardened by persecution into a hatred of prelacy as bitter as that of Popery. It meant separation from Rome, but inclined to union with England, and the question of the form of church government was still open.

Knox's work.

Morton, like his predecessor, favored the Episcopal order, and, acting upon a compromise agreed to at Leith, a modified Episcopacy was restored. The bishops appointed were declared subject to the king in temporal and to the church and general assembly in spiritual matters, and were to have the same jurisdiction as the superintendents. The assembly of Perth protested against the use of certain ecclesiastical titles, but passed over that of bishop. Most of the clergy sanctioned, though with reluctance, the appointment of bishops in the hope of retaining their revenues. The people called them "tulchan" bishops, from the straw counterfeit used to rob the calf of its mother's milk. Almost the whole church property remained in the hands of the landed proprietors, Moray in the first instance and afterwards Morton receiving a lion's share. Avarice was Morton's besetting sin. In other respects he was an energetic and capable ruler. He effected at Perth, with the aid of Elizabeth's envoy, a pacification with Huntly, Chastelherault, and the Catholic nobles who supported Mary. Only the castle of Edinburgh held out, and this, aided by English artillery, he succeeded in taking after a brave resistance by Kirkaldy and Lethington. Kirkaldy and his brother were executed at the cross of Edinburgh. Lethington escaped their fate in what Melville calls "the Roman manner,"—at his own hands, perhaps by poison. The death of the bravest and the ablest Scotsman of that age put an end to the last chance of Mary's restoration by native support. Morton, now without a rival, restored order in the borders, and when an encounter occurred between the English and Scottish borderers called the Raid of the Redswyre his prudence prevented it becoming a national conflict. He appointed a commission for the reform of the law,—a far-sighted scheme, often attempted but always stopping short of success, to codify the law, which several Continental states, notably Denmark, about this period engaged in. The time was not ripe for a change which, now that it is, remains unaccomplished. But while all seemed to favor Morton, there were undercurrents which combined to procure his fall. The Presbyterian clergy were alienated by his leaning to Episcopacy, and all parties in the divided church by his seizure of its estates. Andrew Melville, who had succeeded to the leadership of Knox, was more decided than Knox against any departure from the Presbyterian model, and refused to be won by a place in his household. His expensive buildings at Dalkeith, which got the name of the Lion's Den, roused the jealousy of the nobles. The arrogance of his favorites exceeded his own. The commons were disgusted by a depreciation of the coinage. The powerful earl of Argyll, incensed by the recovery from his wife, the widow of Moray, of some of the crown jewels, and Athole, a Stuart and Roman Catholic, united with Alexander Erskine, governor of Stirling, who now had the custody of the young king, in a league which received so much support that Morton bent before the storm and offered to resign.

Regency of Morton.

The king, whose education had been forced by Buchanan, now barely twelve years of age, nominally assumed the government, but was directed by a council of nobles headed by Athole as chancellor. Morton surrendered the castle of Edinburgh, the palace of Holyrood, and the royal treasures, retiring to Loch Leven, where he busied himself in laying out gardens. But his ambition could not deny itself another stroke for power. Aided by the young earl of Mar, he got possession of Stirling castle and the person of the king. Civil war was avoided only by the influence of Bowes, the English ambassador. A nominal reconciliation was effected, and a parliament at Stirling introduced a new government. Morton, who secured an indemnity, was president of the council, but Athole remained a privy councillor in an enlarged council with representatives of both parties. Shortly afterwards Athole died, of poison it was said, and suspicion pointed to Morton. His return to power was brief, and the only important event was the prosecution of the two Hamiltons, the abbots of Arbroath and Paisley, who still supported Mary and saved their lives by flight to England. The struggle with the Presbyterian clergy continued. The *Second Book of Discipline* had been presented to the king before he assumed office, and, although the general assembly in 1580 condemned Episcopacy absolutely, parliament did not sanction the condemnation. The final fall of Morton came from an opposite quarter. In September, 1579 Esmé Stuart, Lord D'Aubigny, the king's cousin, came to Scotland from France, gained the favor of James by his courtly manners, and received the lands and earldom of Lennox, the custody of Dumbarton castle, and the office of chamberlain. One of his dependants, Captain James Stuart, son of Lord Ochiltree and brother-in-law of Knox, had the daring to accuse Morton at a meeting of the council in Holyrood of complicity in the murder of Darnley, and he was at once committed to custody. Some months later Morton was condemned by an assize for having taken part in that crime, and the verdict was justified by his confession that Bothwell had revealed to him the design, although he denied participation in its execution. He was executed by the Maiden—a guillotine he had himself brought from England—on 2d June, 1581.

From December, 1580 to August, 1582 the government was in the hands of Lennox and Stuart, now captain of the guard,—a small force which the estates had reluctantly allowed the king to protect his person. Their jealously threatened but never reached an open rupture. Stuart was rewarded by the gift first of the tutory, then of the earldom of Arran in April, 1581. Lennox was created duke, a title seldom granted in Scotland. Their aim, carefully concealed by nominal adherence to the Protestant faith, appears to have been the association of Mary with her son in the government, a breach with England, the renewal of the league with France, and the restoration of the Roman Church. The nobles, bribed by office or the spoils of the church, were men of too feeble character to resist, but the Presbyterian ministers were made of stronger metal. Illegal banishment of the contumacious clergy and arbitrary orders of council were followed by a rising against Episcopacy. The proclamation of an extraordinary chamberlain air—an itinerant court of justice—to be held by Lennox at Edinburgh on 27th August precipitated the *coup d'état* of the Raid of Ruthven, which took the usual form of Scottish revolutions,—the seizure of the king and the transfer of power to his captors. When on a visit (22d August, 1582) to the earl of Gowrie, son of his mother's foe Lord Ruthven, at his castle of Hunting Tower near Perth, the earl his host, Mar, the master of Glamis, and others, taking advantage of the absence of Lennox and Arran, surrounded the castle with armed men and made James a prisoner, though still ostensibly treating him as king. Arran, returning to Perth with only two followers, was seized and put in prison. Lennox, after taking refuge in the castle of Dumbarton, fled to France, where he died in disgrace with the Catholics, because he had conformed to the Protestant doctrine.

Lennox and James Stuart regents. 1575–1585. Raid of Ruthven.

The government was for ten months in the hands of a new council, of which Gowrie as treasurer was the head. There was no parliament, but a convention at Holyrood ratified the consequences of the Raid of Ruthven. A declaration was extorted from the king condoning his capture; but James, no longer a boy, chafed under the tutelage of the Protestant nobles and the admonitions of the Protestant ministers. In June of the following year he escaped from Falkland to St. Andrews, which was held by Colonel Stewart. Arran was recalled, the Raid of Ruthven declared treason, Gowrie executed, and the chief Protestant lords banished. Melville and other ministers found it necessary to fly to England. A parliament confirmed the supremacy of Arran, who was created chancellor, and the forfeiture of the chief persons implicated in the Ruthven Raid. The king's power was declared to extend over all estates and subjects within the realm; all jurisdictions not approved by parliament and all assemblies and conventions without the king's license were discharged. A commission was granted to Patrick Adamson, archbishop of St. Andrews, and other bishops for trying ecclesiastical causes, and a form of judgment was established for depriving ministers of their benefices for worthy causes. A declaration was required to be subscribed by all beneficed men—ministers, readers, masters of colleges and schools—acknowledging their submission to the king and obedience to their ordinary bishop or superintendent appointed by him, under pain of forfeiture. A few subscribed unconditionally, others with the qualification, "according to the Word of God;" but a large number declined, and suffered the penalty. Early in 1585 Adamson issued a paper declaring the king's supremacy in matters ecclesiastical, defending the restoration of bishops, and announcing the king's intention that the bishops should hold synods twice a year, that general assemblies should be allowed provided they had his sanction, but that no jurisdiction was to be exercised by presbyteries. This document, which cut at the root of the Presbyterian system and was a formal declaration in favor of the royal supremacy and Episcopacy, was met with vehement protests by Melville and the exiled ministers.

Reaction in favor of Episcopacy.

Meantime a series of intrigues went on between the English and Scottish courts. Elizabeth, while ostensibly favoring the exiles, disliked their political principles. James and Arran, instead of leaning on the papacy as Mary did, had shown signs of accepting a solution of the problem of church government more like that of England than of Geneva. There was here ground for a compromise of the religious controversy which political reasons made so desirable. Accordingly Lord Hunsdon, a favorite courtier of Elizabeth, met Arran near Berwick in the autumn, when it was arranged that the master of Gray, then a follower of Arran and personal favorite of James, should go to London in October. At his instance Elizabeth removed the banished Scottish lords and ministers from Newcastle to London. But Gray was playing his own game, and his suggestions that these lords might return to Scotland, and that the alliance with England should be carried out by their aid and his own influence independently of Arran, were taken up by the queen, who had no personal liking for Arran, and ultimately effected. Elizabeth sent Wotton to Scotland, who won the confidence of James, to whom he promised a pension of £5000 [$24,300] a year, and while openly negotiating with Arran secretly plotted with Gray for his downfall. A mutual league between England and

James and Elizabeth. 1585–1595.

Scotland against the Catholics, called "the Bond anent the True Religion," was agreed to by a convention of estates in July, 1585.

This was a turning-point in the life of James and in the history of Scotland. The choice was made between France and England, Romanism and Protestantism. It was not likely to be reversed when with Elizabeth's declining years the crown of England was thrown into the balance. The day before the conclusion of the treaty Arran was at the request of Elizabeth's envoy put in strict ward, under the pretext that he had been privy to the death of Lord Russell, son of the earl of Bedford, in a border fray, and he only escaped at the price of his estates and honors. In November the banished lords—Angus, Mar, the master of Glamis—returned, and along with them the two Hamiltons; and, aided by Gray, they seized the person of the king, the castle of Stirling, and assumed the government. The alliance with England was finally ratified at Berwick by Randolph. James, at the instigation of Gray, wrote a harsh letter to his mother; and at the instance of Elizabeth he allowed George Douglas, who had been concerned in Darnley's murder, to return to Scotland. The exiled Protestant ministers were restored to their livings; but James was resolute in maintaining Episcopacy and enforcing the laws against all who denied the royal supremacy. Adamson was indeed forced by a general assembly to disclaim any authority as archbishop not allowed by God's Word, and an Act was passed again dividing Scotland into presbyteries, but the king refused to subject the bishops to their jurisdiction. Mary, deserted by her son, now allowed herself through her immediate confidants, especially her secretaries Nau and Curle, to take an active though secret part in the Jesuit plots which embraced both Scotland and England in their ramifications. That which had for its aim the assassination of Elizabeth was discovered by Walsingham's spies, and, though forgery was resorted to, it is difficult to doubt that Mary was cognizant of the design. The trial at Fotheringay could have but one result under a statute according to which any attempt against the queen's life was treason in the person for whom it was made as well as in the actual perpetrators. The execution (8th February, 1587) of Mary naturally roused the anger of the Catholic powers and some indignation in Scotland, which James professed to share; yet he did nothing but expostulate. In truth his own crown was threatened by the same enemies. Mary had disinherited him in favor of Philip of Spain, unless he adopted the Catholic faith. The defeat of the Spanish Armada by the sovereign and people of both countries was felt to be a providential deliverance. Nothing could have served better to efface the memory of Mary and extinguish pity for her fate. The fall of Gray, who was tried and condemned for treachery during his English embassy and for correspondence with Catholic princes, left James, now of full age, without what was almost a necessity to his weak nature,—a favorite, though Sir John Maitland, a younger brother of Lethington, was secretary and exercised the chief influence in the government. Advantage was taken of the royal majority to pass an Act annexing to the crown all church lands under certain limited reservations. But, as all prior grants to lay impropriators were saved, and the king was still allowed to grant feus of church lands, the nobles and landed gentry really profited most by this measure, which gave a parliamentary title to their estates derived from the church and the hope of future spoils. The Act was accompanied by a general revocation of all gifts made during the king's minority or by Mary after his accession. Another statute of constitutional importance renewed, and for the first time carried into effect, the law of James I. by which the lesser barons in the counties were excused from personal attendance and allowed to send representatives to parliament. This was a check on the nobles who had hitherto almost exclusively attended and ruled parliament. It was the first and only large deviation of the Scottish parliament from the feudal model of the *curia regis*.

Majority of James.

Projects for the king's marriage had been on foot at an earlier period; but at last the choice fell upon Anne of Denmark. Elizabeth opposed the match; but James, perhaps tempted by the offer to surrender the Danish claim to Orkney and Shetland, perhaps also not unwilling to show he could choose for himself, was married to Anne by proxy. Anne set sail for Scotland, but was driven back by a storm. Accordingly James himself went to claim his bride, when the actual marriage was at once celebrated at Copenhagen, where he spent the winter. It was a political advantage both to the king and Scotland to form a connection with a kingdom which, though small, stood comparatively high at that time in Europe, and was completely independent both of England and of France. After the king's return the Presbyterian party was in the ascendant. It has been doubted whether the favor shown to it by James at this time was genuine, but without reason. He had been married, and the queen was crowned, by Robert Bruce, a leading minister, for whom he had a personal liking. Shortly before going to Denmark James had published a tract interpreting the Apocalypse in the well-known Protestant sense. Notwithstanding the failure of the Armada, the air was still full of Jesuit intrigues and Spanish plots. At no moment of his life was James less inclined towards the English form of the Reformation, which he described in a celebrated speech as retaining the superstition of the mass "without the liftings." A severe blow was given to Episcopacy in Scotland by Archbishop Adamson shortly before his death retracting in a published confession his writings against Presbyterianism. In 1592 parliament, led according to James Melville by Maitland, now Lord Thirlestane and chancellor, reëstablished Presbyterian church government. General assemblies were to meet once a year, and provincial assemblies or synods, presbyteries, and sessions were confirmed. The Act of 1584 conferring jurisdiction on bishops was rescinded, but there was no formal abrogation of the office. The assembly had asked for the repeal of the Act of Annexation of 1587, but this was not conceded. The landed interests were too powerful to allow of the Reformed Church receiving the patrimony of its predecessor. Shortly after the termination of the parliament the discovery of the plot of "the Spanish blanks" showed that the danger of a Catholic rising and foreign invasion was real. The conspiracy proved abortive, and two of its chief promoters (Huntly and Erroll) left Scotland; on their return three years later they publicly renounced Catholicism and conformed to the Protestant faith.

Reëstablishment of Presbyterianism.

From the king's majority to his accession to the English throne, his relations to the nobles on the one hand and to the Presbyterian party led by the ministers on the other require to be kept in view as giving the key to a singularly confused and changing course of events. After the death of Thirlestane in 1595, the king had to rely on his own counsel, of the value of which he had an overweening opinion. He had studied the theory of kingcraft and wrote the *Basilicon Doron* expounding it. He fancied that he really governed, while he was in fact drawn this way or that by the contending forces which emerged in this revolutionary epoch. In spite of occasional displays of resolution, his character was at bottom weak. It was the destiny which conducted him to the English throne that saved him from the dangers of his situation in Scotland. A nobleman, who, although only connected by his mother with Mary's Bothwell, seemed to inherit the reckless daring of his predecessor in the title, thrice attempted and

Relations between church and state.

once for a short time succeeded in seizing the royal person and assuming the reins of government. But James, who was not without adroitness in baffling plotters by arts similar to their own, escaped from his custody. Towards the Catholic lords his policy was not to proceed to extremities, but to keep them in hand as a counterpoise to the extreme Protestant party. He prudently allowed the finances to be managed after Thirlestane's death by a committee, called from its number the Octavians, on which both Catholics and Protestants acted,—Seton, afterwards Lord Dunfermline, the president of the sessions, and Lindsay of Balcarres being the leading members. With their advice James set himself against any measures which the Protestant ministers proposed for the restoration or increase of the revenues of the church. It was this critical point of money, the assertion of the royal supremacy in spiritual matters, and the favor the king showed to the Catholics which led to the quarrel between him and the ministers. At a convention of the estates at Falkland and then more strongly as one of a deputation sent by the ministers from Cupar, Andrew Melville, in the spirit and manner of Knox, made his well-known speech to "God's silly vassal" on the two kingdoms and the two kings. Although James, frightened by this vehement language, made promises that he would do nothing for the Catholic lords till they had made terms with the church, it was impossible that a quarrel, whose roots were so deep, as to the limits of the royal authority and jurisdiction in matters ecclesiastical could be appeased. Neither party to it could see how far each overstepped the bounds of reason. The king was blind to the right of freedom of conscience which Protestantism had established as one of its first principles. Melville and the ministers were equally blind to the impossibility of any form of monarchy yielding to the claim that the members of an ecclesiastical assembly should use the name of Christ and the theory of His headship over the church to give themselves absolute power to define its relations to the state. Other occasions quickly arose for renewing the controversy. A violent sermon by Black at St. Andrews gave a favorable opportunity to James of invoking the jurisdiction of the privy council, and the preacher was banished north of the Tay. Soon afterwards a demand made on the king in consequence of a sermon of another minister, Balcanquhal, and a speech of Bruce, the king's former favorite, that he should dismiss the Octavians, led to a tumult in Edinburgh, which gave James a pretext for leaving the town and removing the courts of justice to Linlithgow. Supported by the nobles, he returned on New Year's Day, 1597, received the submission of the town, levying a severe fine before he would restore its privileges as a corporation and withholding from it the right of electing its own magistrates or ministers without the royal consent. Emboldened by this success, James now addressed himself to the difficult problem of church and state. He did not yet feel strong enough to restore Episcopacy, perhaps had not quite determined on that course. The ingenious scheme due to Lindsay of Balcarres was fallen on of introducing representatives of the church into parliament without naming them bishops. This would have the twofold effect of diminishing the authority of the general assemblies and of conferring on parliament a competency to deal with matters ecclesiastical. Parliament in 1597 passed an Act that all ministers promoted to prelacies (*i.e.*, bishoprics or abbacies) should have seats in parliament, and remitted to the king with the general assembly to determine as to the office of such persons in the spiritual policy and government of the kirk. Accordingly James summoned successive assemblies at Perth and Dundee, where there were two sessions in 1597, and finally at Montrose in 1600, selecting those towns in order to procure a good attendance from the north, always more favorable to royalty and Episcopacy and less under the influence of the Edinburgh clergy. By this and other manœuvres he obtained some concessions, but not all that he desired (see PRESBYTERIANISM, vol. xix. pp. 701–2). It was the Gowrie conspiracy (5th August, 1600) whose failure gave him the courage and the ground for finally abandoning the Presbyterians and casting in his lot with the bishops. Repeated investigations at the time and since cannot be said to have completely cleared up the mystery of this outrage. The most probable solution was afforded by the discovery several years afterwards of a correspondence between Gowrie and Logan of Restalrig which pointed to the seizure of the person rather than the murder of James as the object of the plot. More important than this object, which failed, was the sequel. The Ruthvens, who were chiefly implicated, were amongst the most prominent of the Protestant nobility, and the Presbyterian ministers with few exceptions refused to accept James's own account of what had happened, confirmed though it was by depositions of various noblemen who were with the king at the time. They even insinuated that the plot had not been by but against Gowrie at the king's instance. Although James by arguments and threats at last extorted an acknowledgment of the truth of his account from all the ministers except Bruce, who was deprived of his benefice and banished for his contumacy, the insult and the injurious suspicions were never forgiven.

The Octavians.

Gowrie conspiracy.

In October, with the consent of the convention of estates, he appointed three bishops to vacant sees, and they sat in parliament, though as yet without any place in the government of the church, which was still Presbyterian, and with no sanction of course from the assembly or the ministers. James had to assume the English crown before Episcopacy could really be restored. This crisis of his career was not long delayed. Already Elizabeth's death was being calculated on, and her courtiers from Cecil downwards were contending for the favor of her heir. She died on 24th March, 1603, and James was at once proclaimed her successor in accordance with her own declaration that no minor person should ascend her throne but her cousin the king of Scots. Leaving Edinburgh on 5th April, James reached London on 6th May, being everywhere received with acclamation by the people. Thus peacefully at a memorable epoch in the history of Europe was accomplished the union of South and North Britain. Often attempted in vain by conquest, it was now attained in a manner soothing the pride of the smaller country, without at first exciting the jealousy of the larger, whose interest was, as Henry VII. prophesied, sure to predominate. To James it was a welcome change from nobles who had threatened his liberty and life, and from ministers who withstood his will and showed little respect for his person or office, to the courtier statesmen of England trained by the Tudors to reverence the monarch as all but absolute, and a clergy bound to recognize him as their head. To Scotland, a poor country, and its inhabitants, poor also but enterprising and eager for new careers, it opened prospects of national prosperity which, though not at once, were ultimately realized. It was an immediate gain that border wars and English and French intrigues were at an end. This more than counterbalanced the loss of the court, a loss which probably favored the independent development of the nation. For the present no change was made in its constitution, its church, or its laws. The Reformation had continued the work of the War of Independence. Scotland no longer consisted only of the prelates, the nobles, and the landed gentry. The commons, imperfectly represented in parliament by the burghs, not yet wealthy enough to be powerful, had found a voice in the assemblies of the church and leaders in its ministers and elders.

Union of English and Scottish crowns.

Advantages to Scotland.

1597–1603.

1603–1618.

Superstition did not fall with the fall of the church of Rome nor license with the decline of the nobility. Rather, both took new forms of extreme virulence and threatened to impede the national progress; but both were exposed to the light of public discussion and the growth of public opinion. The contact with the more cultured south was of immense value. Scotland, now beginning to use in the services of the church, in the proceedings of the courts, and in printed books the vulgar tongue, which differed only as a dialect from that of England, was admitted to the freedom of the noblest language and literature in Europe, then in its prime. The arts which increase the convenience and pleasure of daily life spread northward with the increase of wealth. Science, starting on a new method taught by the great English philosopher, was introduced and after a time eagerly prosecuted. Commerce, for which the Scots had a natural aptness, found new fields. And all these benefits were procured without any sacrifice of the independent spirit which had been derived from their forefathers. Even the separate intercourse with the Continent—with France, Germany, Holland, and Scandinavia—from which Scotland had already received so much advantage, though not quite so intimate with France as before, continued. But before the blessings of the union could be fully realized a century was to intervene which at times seemed to hide if not to bury them,—a century of civil war and religious controversy. At the moment when James ascended the throne and proclaimed the virtues of peace it required no far-sighted observer to discern elements of discord which might at any moment burst in storm. To hold Papal Ireland, Episcopal England, and Presbyterian Scotland united under one sceptre was a task of infinite difficulty, not lessened because in each there was a minority who dissented strongly from the prevailing opinion as to church government and doctrine. The sudden separation from Rome gave birth to every variety of religious opinion, and Scotland became even more than England a land of sects. The constitution of the civil government was a problem not yet solved. In England the Tudor sovereigns had sapped the principles of the parliamentary constitution established in the times of the Plantagenets, and fortunately recorded in writings which could not be forgotten. In Scotland such principles had never yet been practically adopted. Ireland was ruled as a dependency on the principle of subjection.

1603–1621.

At this point in the treatment of some historians the history of Scotland ends. Juster views now prevail. Neither the union of crowns nor of parliaments really closes the separate record of a nation which retained separate laws, a separate church, a separate system of education, and a well-marked diversity of character. But a great part of the subsequent history of Scotland is necessarily included in that of Great Britain, and has been treated under ENGLAND (*q.v.*). Considerations of space and proportion make it necessary that what remains should be told even more rapidly than the narrative of what preceded the accession of James to the English throne. James during the first half of his reign as sovereign of Great Britain allowed himself to be mainly guided by Robert Cecil, Lord Salisbury, the son of Burghley, an hereditary statesman of great ability as an administrator. But on two subjects closely connected with Scotland the king had decided opinions of his own. He desired to see Scotland bound to England, not merely by the union of the crowns, but by a union of the parliaments and laws, and if not an immediate an ultimate union of the churches. He was equally determined that the church in both countries should combine a moderate Protestant doctrine—a *via media* between Rome and Geneva—with Episcopal government. Both desires were founded on prudent policy and might possibly have been accomplished by a stronger and wiser monarch. But the former was opposed by the jealousy of England and the pride of Scotland. The latter could not be accomplished in Scotland without force, so deep were the roots which Presbyterianism had struck. James attempted to carry both measures in a manner calculated to raise rather than to overcome opposition. The union scheme was brought before his first English parliament, and commissioners were appointed to treat with the Scottish commissioners nominated somewhat reluctantly by the parliament of Perth. The commissioners met, but differences at once emerged on the topics of freedom of trade between the two countries, to which the English were averse, and the acceptance of the laws of England, which the Scots objected to. Two important points were carried by a declaration of the law rather than agreement of the commissioners,—that subjects born in either country after the accession (*post nati*) should have the full privileges of subjects and not be deemed aliens, and that those born before should be capable of denization and so of inheriting or acquiring land in England, though not of political rights or offices. The English parliament of 1607, however, refused to sustain the decision of the Exchequer Chamber in favor of the *post nati*, although it consented to abolish the laws which treated Scotland as an enemy's country and made arrangements for the extradition of criminals. The religious or ecclesiastical question was first brought to a point in England at the Hampton Court conference, which met on 14th January, 1604, in which trifling concessions were made to the Puritans, chiefly as to the observance of Sunday and the removal of the Apocrypha from the Authorized Version. In Scotland Episcopacy was restored by a series of steps which were gradual only for the purpose of overcoming opposition, not because James hesitated as to the end in view. At length the parliament of 1612 repeated the Act of 1592, so that Episcopacy was now once more established in Scotland by law, but contrary to the wish of the majority of the nation and under circumstances which made it the symbol of absolute government. While thus resolute in favor of Episcopacy, James showed no sign of leaning to the Roman Church, although efforts to convert him had been made at an earlier period in Scotland. The Armada, now followed by the Gunpowder Plot, convinced him that he had nothing to hope for from the Papists but open war or secret conspiracy.

James's desire for political union.

Reëstablishment of Episcopacy.

After the death of Cecil James gave way to that influence of favorites to which he had shown himself prone in his younger years; but in the affairs of Scotland, which produced much trouble and little profit, Somerset and Buckingham took no interest and James was his own master. After an absence of fourteen years he visited his native country. He had promised to return every three years, but the business and pleasures of the English court detained him. His main object was to carry out still further the uniformity of the church, in which the bishops had not succeeded in establishing the same service as in England. This object was apparently attained in 1618 by the adoption of the Five Articles of Perth (see vol. xix., p. 702), but at the cost of sowing the seed of religious war. From this time to James's death little occurred worthy of note in the history of Scotland. A parliament in 1621, held under the Marquis of Hamilton as commissioner, confirmed the Five Articles, though by a majority that is narrow when the power of the king in a Scottish parliament is kept in view, and only on an assurance from the commissioner that no further ecclesiastical innovations would be proposed. It also introduced a new mode of electing the Lords of the Articles, which practically gave the whole influence to the bishops, the nominees of the crown. As this body prepared the entire business of a parliament in which there was no power of bringing in Bills by private members,

Five Articles of Perth.

this was a long step in the direction of absolute government. James, in fact, declared in one of his speeches to the English parliament that, according to the Scottish constitution, he was master of its whole proceedings, with the absolute power of initiative as well as of veto. His declaration was an exaggeration, for there were well-known precedents of the estates passing laws without the royal assent; but the Scottish constitution was in a fluid state without the guarantee of written charters or clearly defined rules as to the refusal of supplies, and above all without an independent House of Commons to represent the wishes of the people and demand redress for their grievances. The only part of the policy of James on which it is possible to look back with satisfaction was that which concerned colonization, then called "plantation." This gave an outlet to the increasing population, while it advanced the civilization of the countries to which the settlers went. The earliest of these schemes, the "plantation" of the Hebrides by a number of gentlemen of Fife, called "undertakers," had comparatively little effect, but apart from it, some progress was made in introducing order and law in the Highlands and islands, where the people were still in a semi-barbarous condition. More important was the plantation of Ulster, chiefly by Scottish farmers, whose descendants still retain a Scottish dialect and a Presbyterian church. But as an augury of the future the colonization of Nova Scotia, though attempted in an arbitrary manner was of the greatest consequence. It was a commencement of the great migration to the New World across the Atlantic, and to the other colonial possessions of Great Britain, in which, equally to their own profit and that of the empire, the Scottish nation in the two following centuries was to play so great a part. On 22d March,[1] 1625, James died, leaving to his son Charles a burden of government heavier than when he had himself undertaken it. His apparent success in carrying to a further point the absolute and arbitrary principles of the Tudor sovereigns scarcely concealed the real failure. Ireland, with difficulty kept down, was not really subdued. The parliament of England had given unmistakable signs that it was only waiting an opportunity to restore the constitution on the old basis. The religious and political instincts of the Scottish nation, suppressed by force were gathering strength to reassert themselves if necessary by revolutionary methods. An exhausted exchequer, which James had attempted to fill by monopolies, and by the sale of offices and honors and so-called benevolences, added to the other difficulties of carrying on the government, but was fortunately, as in the time of the Plantagenents, to afford the occasion for maintaining the constitutional struggle.

Colonization.

8. *Period of Civil Wars, Charles I. to Revolution.*—Eight years after his accession Charles I. revisited Scotland (1633). During these he had pursued his father's policy. No Scottish parliament sat, though a nominal one was adjourned annually between 1628 and 1633. No general assembly met, but the restoration of Episcopacy and the uniformity of the churches were steadily prosecuted by royal influence and the exercise of the royal prerogative. In spite of the opposition of a convention of the estates, which nearly ended in bloodshed, the king carried out the resumption of tithes for the benefit of the clergy from their lay impropriators. The revocation in 1625 of all grants in prejudice of the crown, whether before or after the Act of Annexation of 1587, was superseded by a new measure, ratified by parliament in 1633, declaring the terms on which the tithes might still be acquired and valued by the heritors. Few measures have been of greater importance in their bearing on Scottish history. The revocation alienated the nobles and landed gentry, who dreaded that when so much had been, still more might be, taken from their profits in the Reformation. The new valuation left the parochial clergy in the position of a poor class, with interests antagonistic to the gentry, whose income was diminished whenever the ministers attemped to raise their scanty stipends. The loyalty for which the Scots had been distinguished had received a shock by the removal of the court, and this was a second and more serious blow. Yet when Charles came to Edinburgh and received the crown at Holyrood (18th June, 1633) he was well received. The disaffection still lay beneath the surface. Although the Five Articles of Perth were not rigidly enforced, all the court could do was done to introduce the most obnoxious,—the practice of kneeling at the communion, which Presbyterians deemed a relic of the mass. The question of a liturgy was not allowed to rest. It was brought before the Scottish Bishops in 1629; their draft was submitted to Laud, who, detecting in it Low Church doctrine as to baptism and traces of Knox's *Book of Common Order*, refused his approval and advocated the introduction of the English Prayer Book, by which uniformity would be secured. Though this was not yet attempted, Charles took the same view as the zealous and ambitious churchman, who was now his guide in ecclesiastical matters. When he came to Scotland Laud was in his suite, and the coronation was conducted with a ritual which "had great fear of inbringing of Popery." Edinburgh was created a bishopric. The parliament over which Charles presided passed thirty-one Acts, "not three of which," says a contemporary, but were most "hurtful to the liberty of the subject." One in particular declared in a large sense the royal prerogative, and by an ill-omened conjunction gave the king power to regulate the apparel of churchmen. It was disputed in parliament whether this Act was carried, but the presence of the king, who took notes of the votes, overawed opposition. About a year after Charles left Scotland the trial of Lord Balmerino, which grew out of the Acts of this parliament gave the first impulse to the Scottish revolution. That nobleman, who had possessed a copy of a petition protesting against the Acts then carried, was tried under the old Acts against leasing-making or sedition and condemned by a majority of one upon a single charge,—that of not revealing the petition and its author (March, 1635). Although Charles respited the capital sentence, the condemnation deeply stirred the people, who saw almost the only mode of constitutional redress, that by petition, declared illegal and an act capable of innocent interpretation treated as a heinous crime. Before the trial the appointment of Spottiswoode as chancellor, the first ecclesiastic who held the office since the Reformation, and the admission of nine bishops to the privy council, increased the disaffection. In 1636 the *Book of Canons*, ratified by the king the year before, was published at Aberdeen, containing the most distinct assertion of the royal supremacy and a complete Episcopal organization.

1621-1637.

Ecclesiastical enactments.

At last on Sunday, 23d July, 1637, the much-dreaded liturgy, the use of which had been enjoined by the *Canons* and announced on the preceding Sunday, was introduced in the service of St. Giles Cathedral, Edinburgh. For the most part a transcript of the English Prayer Book, it deviated slightly in the direction of the Roman ritual. Its use provoked an uproar, of which the stool flung at the dean by a woman, Jenny Geddes or Anne Mein, was the symbol, and brought the service to a close,—Lindsay, the bishop, being with difficulty saved from the violence of the mob. A similar riot took place in Greyfriars church, where the bishop of Argyll attempted to use the book. There had been no such tumult since the Reformation. The privy council ar-

Introduction of liturgy.

1637-1643.

[1] [Hume (*History of Scotland*, Boston, 1849, vol. iv. p. 493), says he died on the 27th March, and Burton follows him, as does Gardiner in his *History of England*. The date here and in vol. xiii. p. 569 are discrepant and original.—AM. ED.]

rested a few rioters, but suspended the use of the service book until the king's pleasure was known, and when Laud at the king's request wrote that its use should be continued no one dared to read it in Edinburgh or throughout Scotland except in a few cathedrals. Meantime numerous supplications against it and the *Canons*, joined with accusations against the bishops, were sent to Charles. His only answer was the removal of the courts and privy council to Linlithgow and an order to all ministers who signed the supplications to leave Edinburgh. There followed fresh supplications and protests, in which some of the nobility, especially Rothes, Balmerino, Loudon, Montrose, and a prominent lawyer, Johnston of Warriston, joined with the ministers. Hope, the king's advocate, secretly favored them. Traquair, a leading member of the privy council, went to London to press on Charles and Laud the gravity of the situation; but, though ambiguous concessions were made, the king and his advisers were determined to insist on the service book. In a proclamation issued at Stirling (20th February, 1638) the king assumed the responsibility of its introduction; but the opposition was too powerful to be put down by words. Its organization, begun by commissioners headed by Rothes, continued in committees of the nobles, lesser barons, ministers and burghs, was now called "the Tables" from those in the Parliament House, where they sat sometimes separately, sometimes collectively, and formed a standing assembly which defied the king's council. The Covenant, prepared by Alexander Henderson, leader of the ministers, and Johnston of Warriston, was revised by Rothes, Loudon, and Balmerino, and accepted by upwards of two hundred ministers who had gathered in Edinburgh. It was signed at Greyfriars church on 1st March, 1638, first by many of the nobles and gentry, then by three hundred ministers and a great multitude of the people. Copies were at once despatched throughout the country, and with few exceptions, chiefly in St. Andrews and Aberdeen, it was accepted by all ranks and classes. Its form was suggested by the bonds for material aid of which Mary's reign had given so many examples, but the new name pointed to a Biblical origin, and the parties were not the nobles and their retainers but God and His people. While nominally professing respect for the royal office, it was entered into, as it anxiously reiterated, for "the defence of the true religion (as reformed from Popery) and the liberties and laws of the kingdom." The spirit in which it was signed was that of a religious revival. Many subscribed with tears on their cheeks, and it was commonly reported that some signed with their blood. Charles could not relish a movement which opposed his deepest convictions as to church government and under the form of respect repudiated his supremacy; but, destitute of power to coerce the Covenanters, he was compelled to temporize. Hamilton as his commissioner offered to withdraw the service book and *Book of Canons*, to give up the Court of High Commission, and to allow the Articles of Perth to remain in abeyance. A new confession called the "negative," framed on that of 1580, and a new covenant called the "king's," on the model of one drawn in 1590, which bound the signers only to stand by the king in suppressing Papists and promoting the true religion, were devised, but failed to satisfy even the least zealous Covenanters.

The Covenant.

An assembly at last met in Glasgow, over which Hamilton presided, with faint hope that matters might still be accommodated. Hamilton had orders to dissolve it if it proved to be intractable. The members had been chosen by the influence of the Tables, according to a mode invented in 1597. Three ministers represented each presbytery and an elder the laity of the district. The burghs also sent representatives. The Covenanters had declared their intention of prosecuting the bishops, and a libel laid before the presbytery of Edinburgh was read in the churches. Charles on his side announced that he challenged the mode of election and would not allow the prosecutions. He was already preparing for war. At the first sitting Alexander Henderson was chosen moderator, and Johnston of Warriston clerk. In spite of the commissioner's attempt to raise the question of the validity of elections, the assembly declared itself duly constituted. A letter from the bishops was read declining its jurisdiction, and the commissioner, while offering redress of grievances and that bishops should be responsible to future assemblies of clergy, declared that the present assembly was illegal in respect of the admission of lay representatives. Discussion was useless between a commissioner and an assembly whose power to act he denied. He accordingly dissolved it in the name of the king and left Glasgow; but this only stimulated its members. It annulled the pretended assemblies between 1606 and 1628, condemned the service book, *Book of Canons*, *Book of Ordinances*, and the High Commission Court, deposed the bishops on separate libels which set forth various acts of immorality or crime, many of which were false, declared Episcopacy to have been abjured in 1580, and condemned the Five Articles of Perth. It concluded its month's labors by restoring Presbyterian church government.

Assembly of Glasgow.

The distance from such an assembly to the field of arms was short, and on 7th June, 1639, the army of the Covenanters under Alexander Leslie, a general trained in the service of Gustavus Adolphus, met the royal troops led by the king at Dunse Law. Charles, though slightly superior in numbers, had an undisciplined army and no money to maintain it, while Leslie had trained officers and troops animated by religious zeal. Their colors were stamped with the royal arms, and the motto "For Christ's Crown and Covenant" in golden letters. Councils of war as well as religious meetings were held daily, and the militant fervor of the Covenanting troops steadily rose. Charles declined to engage such an army and general, and by the Pacification of Berwick (18th June) both parties agreed to disband, and Charles to issue a declaration that all ecclesiastical matters should be regulated by assemblies, and all civil by parliament and other legal courts. On 1st August a free general assembly was to be held at Edinburgh, and on the 20th a free parliament in which an Act of Oblivion was to be passed. The assembly met as appointed and, without explicitly conforming, reënacted the principal resolutions of that of Glasgow, and declared that the Covenant should be subscribed by every one in office and authority. Before it separated it condemned the *Large Declaration*, a pamphlet by Balcanquhal, dean of Durham, published in the king's name, which gave an adverse narrative of recent events in Scotland. The parliament effected little legislation, but showed its disposition by abolishing Episcopacy and reforming the election of the Lords of the Articles, of whom eight were henceforth to be chosen by the nobles, lesser barons, and burghs respectively. The predominance of the king and the church was thus removed from the body which initiated all legislation. Charles had beforehand determined not to sanction the abolition of Episcopacy, and the parliament was prematurely adjourned (14th November) without the royal assent to its Acts. It was evident that the struggle between the king and the Scots would be renewed, and both parties reluctantly had recourse to allies whose choice showed their sense of the crisis. Charles summoned an English parliament; but the three weeks' session of the Short Parliament was spent in a vain attempt to obtain redress for its own grievances. It separated without granting supplies, and the king had to depend on private loans. The Scots negotiated with the French king; but Richelieu prevented the unnatural alliance of the Catholic king and the Covenanters. The Scots took the

Appeal to arms.

first step in the war. The army under Leslie crossed the Tweed and, forcing the passage of the Tyne at Newburn, occupied Newcastle. Charles, who had his headquarters at York, paralyzed by the want of money and new demands to summon an English parliament, was driven to accept a truce at Ripon (2d September, 1640), under which the Scottish army was to receive a subsidy to relieve the northern counties from contributions. Parliament was summoned to Westminster for 3d November; but its first act was the impeachment of Strafford. Until a pledge was given by his death that Charles would recognize the limits of monarchy, the Parliamentary leaders thought it safer that the Scots should hold the north of England. Peace was concluded by the Act immediately following that of Strafford's attainder, by which £300,000 [$1,458,000] was ordered to be raised as "friendly assistance and relief promised to our brethren in Scotland."

Charles's concessions to the Scots.

The king now made up his mind to revisit Scotland, hoping there to find a way out of his English troubles. He had received a letter from MONTROSE (*q.v.*), urging him to come and gain the Scots by a moderate policy. He came to Edinburgh early in August, 1641, and a parliament met under his presidency, when he not only ratified the Acts substituting a Presbyterian for the Episcopal form of church government but sanctioned important reforms. The Lords of the Articles were in future to be elected by each of the three estates separately, the burghs taking the place of the bishops; the Court of High Commission was abolished; arbitrary proclamations were prohibited; the officers of state and the judges were to be chosen with the advice of parliament; and, following an English Bill, parliament was to meet every third year. During his stay in Scotland occurred "the Incident,"—still spoken of as mysterious by historians, some of whom liken it to the English incident of the arrest of the five members. Argyll and Hamilton had led the party which carried all the measures of this parliament. Montrose had been committed to the castle by the estates before the arrival of Charles on a charge of plotting against Argyll by false accusations to the king. From his prison he renewed his charges against both Argyll and Hamilton, whom he accused of treason. Charles about this time unwisely attended parliament with an unusual guard of 500 men, which gave Hamilton and Argyll a pretext for asserting that their lives were in danger and to quit Edinburgh. They soon returned and a favorable committee of investigation let the matter drop. Argyll was now more powerful than ever. In November the king returned to London, which became during the next year the centre of the events which led to the Civil War.

Civil War.

The progress of the Civil War belongs to English history. Here only the part taken by the Scots can be stated. They were now courted by king and Parliament alike. The campaign of 1642–43 under Essex proved indecisive, and the Parliament sent commissioners headed by Sir Henry Vane to Edinburgh in the autumn of 1643, who agreed to the "Solemn League and Covenant," already accepted by the Scottish assembly and parliament, and now ratified by the English parliament and the assembly of divines at Westminster. This memorable document, whose name showed its descent from the National Covenant, bound the parties to it "to preserve the Reformed Church in Scotland and effect the reformation of that in England and Ireland in doctrine, worship, discipline, and government according to the Word of God and the example of the best Reformed Churches." But the alliance with the Scottish Covenanters did not produce the advantage expected from it. The victory of Marston Moor was due to Cromwell and his Ironsides, who were Puritans and Independents. The Scots, who formed the centre of the Parliamentary army, were repulsed. In the autumn, although the Scots took Newcastle, the king gained ground in the west, where Essex, the general who represented the Presbyterians, narrowly escaped capture. Next year Montrose, in the brilliant campaign on which his military fame rests, made a formidable diversion in the Highlands. With dazzling rapidity, at first supported only by a handful of followers, but gathering numbers with success, he erected the royal standard in Dumfries; then, passing to the Highlands, after the victory of Tippermuir he took Perth, and defeated Lord Lewis Gordon at the bridge of Dee. Next, after ravaging the county of Argyll, he marched to Inverness, but returned to defeat Argyll at Inverlochy, won further victories at Auldearn near Nairn and Alford on the Don, and by that of Kilsyth appeared to have recovered Scotland for Charles. The fruit of all these victories was lost by his defeat at Philiphaugh (13th September, 1644) by Leslie. Meantime Charles had lost the battle of Naseby, and next year was forced to take refuge at Newark with Leslie, whom he had created earl of Leven. As the result of his surrender he ordered Montrose, who was again raising the Royalists in the Highlands, to lay down his arms; and the Scottish army in England, no longer on good terms with the Parliament, returned to Newcastle, that, being nearer home, it might dictate the terms of its services. Here it remained eight months, during which a strenuous attempt was made to force Charles to accept the Covenant. Alexander Henderson argued the matter with him in a singularly temperate correspondence. But the king was bound to Episcopacy by hereditary sentiment and personal conviction. Another negotiation was going on at the same time between the Scottish army and the English Parliament for arrears of pay. On 30th January, 1646, they surrendered the king to the English commissioners, the question of pay having been settled by the receipt of £200,000 [$972,000] a few days before and a like sum a few days after that date. There was no express condition which bound the two circumstances together, but their concurrence cannot have been accidental.

Charles I.'s negotiations with the Scots.

In his captivity Charles renewed his negotiations with the Scottish estates, over which Hamilton had now acquired influence, and a compromise was at last agreed to at Newport in the Isle of Wight by which he promised to confirm the League and Covenant by Act of Parliament, to establish Presbyterianism and the Westminster Confession, which as well as the Directory had been adopted by the Scottish parliament for three years. After that period it was to be fixed by the king and parliament what form of church government was most agreeable to the Word of God, and this after consultation with the assembly was to be established. The Scots consented that in the meantime the Covenant should not be enforced on those who had conscientious scruples, and that the king might continue to use the English service. The Covenanters who accepted these terms, and who formed the most moderate section, received the name of Engagers. Relying on the promised support from Scotland, Charles rejected the proposals of the English Parliament. That body had now broken with the army, in which the Independents and Cromwell were fast acquiring supremacy. Their division afforded an opportunity for renewing the war, and Hamilton invaded England in the following year, but was routed at Preston (17th August, 1648) by Cromwell. A party led by Argyll had opposed the compromise with Charles effected by Hamilton. They were chiefly strong in the southwest, and in the autumn of this year a band of them raised by Lord Eglinton marched to Edinburgh and were met by Argyll, who put himself at their head. Their numbers had risen to 6000, a sufficient force to give them supreme influence over the Government. It was from this—the "Whiggamore" raid—that the name of Whigs took its rise. The meeting of estates now resolved to re-

1643–1647.

1648–1654.

new the Solemn League and Covenant, and by an Act called the Act of Classes removed from the courts and all places of public trust those who had accepted the "late unlawful engagement." The English Parliament at this point took an exactly opposite course and showed signs of conciliation with the king; but the frustration of its action by the energetic policy of Cromwell was quickly followed by the trial and execution of the king. Hamilton, who had been taken after Preston, soon after shared the same fate.

Charles II.'s acceptance of Covenant.

The death of Charles altered in a moment the relations between England and Scotland. In the former Cromwell became all powerful, while in the latter the moderate Presbyterians attached to the principle of monarchy and the hereditary line at once proclaimed Charles II. Charles II. had been brought up with different views of royalty from those of the Covenanters, and Scotland was not prepared to accept a king except on its own terms. A commission from the estates and from the assembly was at once sent (March, 1649) to The Hague, where the young king was. Charles promised to maintain the government of Scotland in church and state as settled by law, and particularly the Covenant, Confession of Faith, and Presbyterian system, but declared that he could not impose the Solemn League and Covenant on England and Ireland without the consent of their parliaments. The commissioners returned dissatisfied with this answer and with the presence at court of Montrose, by whom it had probably been framed. But in October Ormonde's Irish expedition failed, and Cromwell, already master of England, had reduced Ireland by force of arms; both parties felt inclined to renew the treaty. At length it was agreed that Charles should be accepted as king on condition of his subscribing the Covenant, establishing Presbyterian church government and worship, sanctioning the Acts of Parliament passed in his absence, and putting in force the law against Catholics. In return he stipulated for the free exercise of his royal authority, the security of his person, and the aid of a Scottish army. The treaty was closed in these terms on 9th May, 1650, and early in June Charles set sail for Scotland. On the voyage he was forced to consent to further conditions which the Scottish parliament ordered the commissioners to impose, in particular to exclude from his court all persons within the first and second classes of the Acts of 1646 and 1649, and to keep the duke of Hamilton, brother of the late duke, and certain other persons out of Scotland. On Sunday, 23d June, at the mouth of the Spey he subscribed the Covenant and landed. While Charles was negotiating with the commissioners, the expedition of Montrose, which he had encouraged but afterwards disowned, had come to an end by the capture of its gallant leader in Caithness. He was executed in Edinburgh a month before Charles reached Scotland.

Cromwell's invasion of Scotland.

Alarmed at the prospect of another Scottish invasion, Cromwell with wonderful rapidity transferred his forces from Ireland, and within a month after Charles landed crossed the Tweed and advanced to Edinburgh. Baffled in all attempts against the town by the tactics of David Leslie, the nephew of Leven, he was forced from want of supplies to retire. His retreat was nearly cut off, but he gained an unexpected victory at Dunbar (3d September, 1650) over that able general, who had been induced by the over-confidence of the ministers in his camp to descend from the Doon Hill and attack the English on level ground. So complete was the defeat that the south of Scotland fell into Cromwell's hands. Meantime Charles had attempted to escape from the restraints of the Presbyterian camp by "the Start," as it was called, from Perth to Clova, where he hoped to raise the loyal Highlanders; but, not getting the support expected, he returned. In the beginning of next year, after renewing his subscription to the Covenant and submitting to the imposition of a day of fasting and humiliation on account of the sins of his family, he was crowned at Scone on 1st January, 1651. Argyll, still the leader of the Covenanters, placed the crown on his head, a circumstance which he recalled when he lost his own. The invasion of England was now determined on,[1] and, Cromwell having been unable to intercept the royal army, it advanced as far as Worcester. Here, after effecting a junction with Fleetwood, Cromwell with a much smaller force routed the king's army on the anniversary of Dunbar. Charles had a hairbreadth escape from capture, and after many adventures crossed from Brighton to France. The last great battle of the Civil War placed England in the hands of the army and its general.

Monk's administration.

Scotland offered more resistance; but Monk, whom Cromwell had left in command, stormed Dundee and terrified the other towns into submission. Although a nominal union was proclaimed and Scotland was allowed members in the English parliament, it was really governed as a conquered country. In 1653 the general assembly was summarily dissolved by Colonel Cotterel. Next year Monk was sent by the Protector to quell a Royalist rising, which, first under the earl of Glencairn and afterwards under Middleton, a soldier of fortune, began to show head in the Highlands. Monk, as usual, carried out effectually the work he was sent for and, partly by an indemnity which many leading Royalists accepted and partly by the defeat of Middleton at Lochgarry (25th July, 1654), reduced the Highlands. He also dispersed the general assembly, which made another attempt to sit. Strong forts were built at Leith, Ayr, Inverness, and Glasgow, and Monk with an army of 10,000 men garrisoned the country.

Protectorate of Scotland.

A council of state, containing only two Scottish members, was appointed, but matters of importance were referred to Cromwell and his English council. The administration of justice was committed to four English and three Scottish judges in place of the Court of Session, with the view of introducing English law. The use of Latin in legal writs was abolished. A sequestration court to deal with the forfeited estates sat at Leith. A separate commission was issued for the administration of criminal justice, and theft and highway robbery were stringently inquired into and punished. In the church the Presbyterian form of service and the system of presbyteries and synods were allowed to continue, but the stipends of ministers depended on their being approved by a commission appointed by Cromwell. Justices of the peace were introduced for local business. Free trade and an improved postal system between the two countries were established. The universities were visited. In all departments of government there was vigor and the spirit of reform, so that it was admitted even by opponents that the eight years of Cromwell's usurpation were a period of peace and prosperity. There was undoubtedly one exception. The taxation was severe.

[1] With the view of procuring forces for the expedition, a reconciliation was effected between the Royalists and the more moderate Covenanters by a resolution to the effect that all persons not excommunicated should be allowed to serve in the army. This new party, now called "Resolutioners," was practically the same as that formerly known as the "Engagers." A minority, on the other hand, became known as the "Protestors" or "Remonstrants" (compare vol. xix. p. 703). This division of the Covenanters into a moderate and an extreme section continued throughout the whole of the 17th century. The Engagers and Resolutioners were the ancestors of the Established Presbyterian Church; the Protestors or Remonstrants of the Seceders* or Dissenting churches, each of which maintained with unabated confidence, however small its numbers, that it was the true church of Scotland, the only church really faithful to the Covenant and Christ as the head of the church. Both parties for long regarded Episcopalians and Romanists alike as "malignants," standing without the pale of the church, with whom no compromise could be made.

* [Not to be confounded with the Seceders of 1733 to whom the term is strictly applied. It refers to the Covenanters or Reformed Presbyterians, with whom the later Seceders affiliated.—AM. ED.]

A land-tax of £10,000 [$48,600] a month, afterwards reduced to £6000 [$29,160], and levied upon the valued rent under a valuation of Charles, far exceeded any subsidy before granted to the crown. Customs and also excise duties, recently introduced from England, were diligently levied; so also were the rents of the crown and bishops' lands. Altogether it was estimated that a revenue of £143,000 [$694,980] was collected in Scotland. But this had to be supplemented by an equal sum from England to meet an expenditure of £286,000 [$1,389,960]. As nearly the whole was spent in Scotland and the burden of taxation fell on the upper classes, the nation generally did not feel it so much as might have been expected. It was a maxim of Cromwell's policy to improve the condition of the commons, and in one of his last speeches he claimed in memorable words to have effected this in Scotland. In this respect the Commonwealth and protectorate continued the political effect of the Reformation. The commonalty for the first time since the War of Independence acquired a consciousness of its existence and hope for the future. Cromwell, like former powerful rulers, aimed at uniting Scotland with England, but his proposals in this direction were premature. To Barebones's Parliament (1653), which met after the dissolution of the Long Parliament, five Scottish members were summoned, there being 134 from England, Wales, and Ireland. By the Instrument of Government and an ordinance following on it, Scotland was granted 30, while England had 400 members; but only 20 Scottish attended the parliament of 1654, and care was taken by Monk that they should be men attached to Cromwell's interest. When in his second parliament in 1656 he tried the experiment of a House of Lords, three Scotsmen were summoned, the quota of members to the Commons remaining as before. Cromwell's idea of a parliament was an assembly to ratify, not to discuss, his measures, and this, like his other parliaments, was speedily dissolved. Had it continued the Scottish representatives would have had little weight. Scotland continued to be governed by the council of state. On the death of the Protector his son Richard was proclaimed his successor in Scotland as well as in England, and 30 members were again returned to the new parliament, which, however, was almost immediately afterwards dissolved. The Restoration soon followed, though in Scotland there was no need of it, for Charles II. was already king. However beneficial the rule of Cromwell may be deemed, it had a fatal defect in the eyes of a people proud of their freedom. It was imposed and maintained by force. His death and the restoration of the ancient line of kings were looked on as a deliverance from oppression.

Union of Scottish and English parliaments.

The hopes of the Scots from Charles II. were doomed to speedy disappointment. So far from being grateful for the support they had given him in adversity, he looked back with disgust, as his grandfather had done, on the time when he was under the yoke of the Presbyterian ministers. Cromwell had shown the possibility of governing Scotland by military force and of raising a considerable revenue from it, and Charles took advantage of both lessons. From this date rather than from the earlier or later union Scottish history assumes a provincial character. Scotland was governed without regard to its interest or wishes according to the royal pleasure or the advice of the nobles who for the time had the ear of the king. The power of the clergy had been broken by Cromwell's policy and their own divisions. The party of the Resolutioners or moderate Presbyterians, some of whom now leant to Episcopacy, and the party of the Remonstrants were still irreconcilable, and their mutual hatred rendered the task of government easier. The burghs were not yet sufficiently organized to be a power in the state, and the nobles again resumed their old position as leaders with no rivals, for the bishops were shorn of their revenues and dependent on royal favor. For the first two years after the Restoration the government of Scotland was in the hands of Middleton, who had been created an earl. The measures of retaliation were few but signal. Argyll was tried and beheaded on a charge of treason, which could not have been established but for the treachery of Monk, who gave up private letters written to him when they both were supporting the Commonwealth. Guthrie, a leading minister of the Remonstrants, was hanged. Johnston of Warriston, two years later, was brought back from France and executed. No hesitation was shown as to the mode of governing Scotland. Parliament, under the presidency of Middleton, passed the Rescissory Act, annulling the Acts of all parliaments since 1640, declaring the Covenant no longer binding, and imposing an oath on all persons in office, not only of allegiance but of acknowledgment of the royal prerogative restored in all its fulness over all persons and in all causes. In August Lauderdale, who acted as secretary for Scotland in London, wrote to the privy council announcing the royal intention to restore Episcopacy, and, regardless of his oath, Charles sanctioned this by the first Act of the parliament of 1662. James Sharp, minister of Crail, who had been sent on behalf of the Resolutioners to Charles before his return, allowed himself to be easily converted to Episcopacy and was rewarded by his appointment as archbishop of St. Andrews; his example was followed by other ministers of the same party. But the majority and all the Remonstrants stood firm; 350 were deprived of their livings, each of which became a centre of disaffection towards the Government, while their attachment to the Covenant was every day strengthened by persecution. The Covenant and Solemn League and Covenant were declared unlawful oaths, and all persons speaking or writing against the royal supremacy in matters ecclesiastical were incapacitated from office. Middleton had the immediate responsibility for these measures, and the condemnation and forfeiture of the new earl of Argyll, whose estates he coveted, under the old law against leasing-making increased the hatred with which he was regarded. His fall was due to an attempt to supplant his rival Lauderdale by the Act of Billeting, under which the Scottish parliament named by ballot twelve persons with Lauderdale at their head as incapable of holding public office. This and other Acts were carried out without the previous consent of Charles; Lauderdale persuaded Charles that his personal authority was in danger, and Middleton was called to court and sent as governor to Tangier, where he soon after died. The earl of Rothes was now appointed commissioner, but the chief influence was in the hands of Lauderdale, who continued to act as Scottish secretary in London.

Restoration.

Government of Middleton.

Restoration of Episcopacy.

The change in its rulers brought no relief to Scotland. The declaration that the Covenants were illegal oaths was re-enacted and imposed on all persons in office who had not yet taken it. The old mode of electing the Lords of the Articles, which placed the election in the hands of the bishops, the nominees of the king, was restored. Sharp, not warned by the fate of Laud, procured the restoration of the Court of High Commission to enforce the laws against ecclesiastical offenders. Fines were imposed on all who absented themselves from their parish churches or attended the sermons of the deposed ministers. Sir James Turner was sent by the privy council to the western shires to prevent conventicles and field preaching and to enforce the law as to conformity; and his exactions, with the burden of maintaining his soldiers, quartered upon all persons suspected of favoring the ousted ministers, led to risings in Gallo-

1654–1664.

Severe treatment of Covenanters.

1664–1681.

way, Clydesdale, and Ayr. With their ministers and a few of the gentry at their head, the Covenanters marched to Edinburgh, but were defeated at Rullion Green in the Pentlands by Dalziel, a Scottish officer whom Charles had recalled from the service of the czar. The executions which followed, and especially that of Hugh M'Kail, a young and enthusiastic preacher, sank deeply into the spirit of the people. He was the first martyr of the Covenant, as Wishart had been of the Reformation. The use of torture, before this rare, now became frequent, and bonds of law-burrows were wrested from their original use to compel the principal landowners to be sureties for the peace of the whole district. Large fines continued to be extorted from all persons who refused to conform to the ecclesiastical laws. Next year a change in the Scottish administration, the cause of which is not well explained, but which was probably due to the fall of Clarendon and the rise of the Cabal ministry, led to a milder but undecided policy in Scotland. Lauderdale, one of the Cabal, still directed Scottish affairs, but Rothes and Sharp were treated as responsible for the rising in the west and suspended. An indemnity was offered to all who would appear before the council and subscribe bonds to keep the peace. A rash attempt to assassinate Sharp in Edinburgh prevented this policy from being adhered to in 1668, but it was renewed in the following year. An indulgence was granted which allowed the deposed ministers who had lived peaceably to return to their manses and glebes, and to receive such a stipend as the privy council might allow. The grace of this concession was undone by a severe Act against conventicles. It favored a conciliatory policy that schemes for union were in the air. Leighton, the good bishop of Dunblane, proposed a union of the churches upon the basis that the bishops were no longer to exercise jurisdiction, but to act only as perpetual moderators of presbyteries, subject to censure by the synods, and that ministers should be ordained by the bishops, but with consent of the presbyters. There was a meeting at Holyrood with some of the leading ministers, but they would listen to no compromise. The name of bishop was hateful, whatever were his functions. It may be doubted whether Charles and his English advisers would have submitted to a curtailment of the bishop's office and dignity. The subject of the union of the kingdoms was again brought forward in the parliament of 1669, to which Lauderdale was sent as commissioner; and though it was not well received commissioners were appointed in the following year, who went to London in autumn to discuss with English commissioners certain specified points proposed by the king. After several meetings the conference broke up in consequence of a demand by the Scottish members that Scotland should have the same number of members in the united as in its own parliament. The arbitrary government, favored by the want of a settled constitution in Scotland, was more to the taste of the king and his advisers. Lauderdale openly boasted, as James VI. had done, that nothing could be proposed in the Scottish parliament except what the king through the Lords of the Articles approved. The "indulgence" entirely failed of the desired effect. The ministers who took advantage of it were despised by the people, who continued to attend the conventicles. In 1672 an Act was passed punishing preachers at such conventicles with death, and imposing fines, imprisonment, and exile for having children baptized by deprived ministers and for absence for three Sundays from the parish church. In 1675 letters of intercommuning were issued against about a hundred of those who attended the conventicles, both ministers and laymen, forbidding their friends and relations to have any dealings with them under the same penalties as if they had themselves been present at the conventicles. In 1678 Mitchell, a fanatical preacher, who had ten years before attempted the life of Sharp and mortally wounded the bishop of Orkney, was tried and executed. The feeling of the times, and the cruel manner in which a confession had been wrung from him by torture, led to his being regarded as a martyr. Prior to this year 17,000 persons had suffered fines or imprisonment for attending conventicles. A host of 10,000 men, chiefly Highlanders, was quartered in the western shires in order to force the landowners who favored the Covenanters to enter into bonds of law-burrows.

Policy of indulgence.

It appears to have been the design of Lauderdale, who still governed Scotland absolutely through the privy council (no parliament having been summoned since 1674), to force the Scots to rebel. "When I was once saying to him," relates Burnet, "'Was that a time to drive them into a rebellion?' 'Yes,' said he, 'would to God they would rebel, that he might bring over an army of Irish Papists to cut their throats.'" One part of his wish was speedily fulfilled. In 1679 the rebellion so long smouldering broke out. The murder of Sharp (3d May) by Hackston of Rathillet and a small band of Covenanters was followed by a still more stringent proclamation against field conventicles, which were declared treasonable, and the possession of arms was prohibited. This severity provoked a rising in the west. A small party led by Hamilton, a youth educated by Bishop Burnet at Glasgow, who had joined the Covenanters, burnt at Rutherglen the statutes and acts of privy council on the anniversary of the Restoration, and being allowed to gather numbers defeated Graham of Claverhouse at Loudon Hill (1st June). The Duke of Monmouth, the favorite natural son of Charles, sent with troops from England to suppress the rising, gained an easy victory at Bothwell Bridge (22d June). His desire was to follow it up by a policy of clemency, and a new indulgence was issued, but its effect was counteracted by Lauderdale. All officers, ministers, and landowners, as well as those who had taken part in the rising and did not surrender within a short space, were excepted from the indulgence. Several preachers were executed and many persons sent to the colonies, while fines and forfeitures multiplied. A new and fiercer phase of the rebellion was originated by Cargill and Cameron, two preachers who escaped at Bothwell Bridge, and, assembling their followers at Sanquhar, published a declaration renouncing allegiance to Charles as a perjured king. They were soon surprised and Cameron was killed, but Cargill continued to animate his followers, called the "Society Men" or "Cameronians," by his preaching, and at a Conventicle at Torwood, in Ayrshire, excommunicated the king, the duke of York, Lauderdale, and Rothes.

Rising of 1679.

The duke of York, who had become a Roman Catholic during his residence abroad, was now sent to Scotland, partly to avoid the discussion raised by his conversion as to his exclusion from the succession. During a short stay of three months he astonished the Scots by the mildness of his administration, but on his return in the following year he revealed his true character. The privy council renewed its proclamations against conventicles and increased the fines, which were levied by the sheriff or other magistrate under the pain of liability if they were remiss in their exaction. Military commissions were issued to Claverhouse and other officers in the southern and western shires empowering them to quarter their troops on recusants and administer martial law. Torture was freely resorted to by the privy council and the duke himself took pleasure in witnessing it. A parliament summoned in 1681, after passing a general Act against Popery to lull suspicion, proceeded to declare the succession to be in the ordinary line of blood and unalterable on account of difference of religion by any future law. The Test Act was then carried, not without many attempts to modify it. Its ambiguous and con-

Continuance of severities.

tradictory clauses make it an admirable instrument of tyranny, a shelter for the lax and a terror to the upright conscience. It was at once enforced, and Argyll, who declared he took it only so far as it was consistent with itself and the Protestant religion, was tried and condemned to death for treason, but escaped from prison to Holland. Dalrymple, the president of the Court of Session, and many leading Presbyterian ministers and gentry followed his example, and found a hospitable refuge in the republic which first acknowledged toleration in religion. They there met a similar band of English exiles. The next two years were spent in plots, of which the centre was in Holland, with branches in London and Edinburgh. The failure of the Rye House Plot in 1683 led to the execution of Russell and Sidney and the arrest of Spence, a retainer of Argyll, Carstares, Baillie of Jerviswood, and Campbell of Cessnock. Against Campbell the proof of complicity failed, and Spence and Carstares, though cruelly tortured, revealed nothing of moment. Baillie, however, was condemned and executed upon slender proof. The Cameronians, who kept alive in remote districts the spirit of rebellion, were treated with ruthless cruelty. Although doubt has been cast on the death of Brown the carrier, shot down in cold blood by Claverhouse, and the Wigtown martyrs, two poor women tied to a stake and drowned in the Bay of Luce, the account of Wodrow has, after a keen discussion, been sustained as accurate. The conduct of the Government in Scotland gained for this period the name of the "Killing Times."

Killing Times.

The short reign of James VII. is the saddest period in the history of Scotland. He succeeded in the brief space of three years in fanning the revolutionary elements in both England and Scotland into a flame which he was powerless to quench. He declined to take the Scottish coronation oath, which contained a declaration in favor of the church then established. A submissive parliament held (28th April, 1685) under the duke of Queensberry as commissioner not only overlooked this but expressed its loyalty in terms acknowledging the king's absolute supremacy. The excise was granted to the crown forever and the land tax to James for life. The law against conventicles was even extended to those held in houses, if five persons besides the family attended domestic worship; while, if the meeting was outside the house, at the door or windows, it was to be deemed a field conventicle, punishable by death. The class of persons subject to the test was enlarged. Undeterred or provoked by these terrors of the law, Argyll made a descent upon the western Highlands and tried to raise his clansmen, but being badly supported by the officers under him, his troops were dispersed and he himself taken prisoner, when he was brought to Edinburgh, condemned, and executed under his former sentence. Next year Perth the lord chancellor, Melfort his brother, and the earl of Moray became converts to the Popish faith. The duke of Queensberry, who did not follow their example, was enabled only by the most servile submission in other points to the royal wishes to save himself and his party in the privy council from dismissal. James sent a letter to parliament offering free trade with England and an indemnity for political offences, in return for which it was required that the Catholics should be released from the test and the penal laws. But the estates refused to be bribed. Even the Lords of the Articles declined to propose a repeal of the Test Act. The burghs almost for the first time in a Scottish parliament showed their independence. The refractory parliament was at once adjourned and soon after dissolved, and James had recourse in Scotland as in England to the dispensing power. Under a pretended prerogative he issued a proclamation through the privy council, granting a full indulgence to the Romanists, and by another deprived the burghs of the right of electing magistrates. A more limited toleration was granted to Quakers and Presbyterians, by which they were allowed to worship according to their consciences in private houses. This was followed by a second and third indulgence, which at last gave full liberty of worship to the Presbyterians and was accepted by most of their ministers; but the laws against field conventicles continued to be enforced. In February, 1688, Renwick was executed under them at Edinburgh. A band of his followers, including women and children, were marched north and imprisoned with great cruelty in Dunnottar.

James VII.

1681–1689.

Meantime the rapid series of events which led to the Revolution in England had reached its climax in the trial and acquittal of the seven bishops. William of Orange, who had long watched the progress of his father-in-law's tyranny, saw that the moment had come when almost all classes in England as well as Scotland would welcome him as a deliverer. But the Revolution was differently received in each part of the United Kingdom. In England there was practically no opposition; in Catholic Ireland it was established by force. Scotland was divided. The Catholics, chiefly in the Highlands, and the Episcopalians led by their bishops adhered to James and formed the Jacobite party, which kept up for half a century a struggle for the principle of legitimacy. The Presbyterians—probably the most numerous, certainly the most powerful party, especially in the Lowlands and burghs—supported the new settlement, which for the first time gave Scotland a constitutional or limited monarchy. Shortly before his flight James had summoned his Scottish troops to England; but Douglas, brother of the duke of Queensberry, their commander-in-chief, went over to William. Claverhouse, now Viscount Dundee, the second in command, who had the spirit of his kinsman Montrose, after in vain urging James to fight for his crown, returned to Scotland, followed by some thirty horsemen. In Edinburgh the duke of Gordon still held the castle for James, while the convention parliament, presided over by the duke of Hamilton, was debating on what terms the crown should be offered to William. Dundee passed through Edinburgh unmolested, and encouraged Gordon to hold out, while he himself gathered the Highland chiefs round his standard at Lochaber. Mackay, a favorite general of William, sent to oppose him, was defeated at Killiecrankie (29th[1] July, 1689), where the spirited leadership of Dundee and the dash of the Highlanders' attack gained the day; but success was turned into defeat by a bullet which killed Dundee almost at the moment of victory. No successor appeared to take his place and keep the chiefs of the clans together. The Cameronians, organized into a regiment under Cleland, repulsed Cannon, the commander of the Highland army, at Dunkeld, and the success of Livingston, who defeated the remnant under Cameron and Buchan at the Haughs of Cromdale on the Spey, ended the short and desultory war. The castle of Edinburgh had been surrendered a month before the battle of Killiecrankie. Three forts, at Fort William, Fort Augustus, and Inverness, sufficed to keep the Highlands from rising for the next two reigns.

Revolution of William III.

Pacification of the Highlands.

Meantime the convention parliament in Edinburgh had carried the necessary measures for the transfer of the government of Scotland to William and Mary. It declared in bolder terms than the English parliament that James had forfeited the crown and that the throne was vacant. The fifteen articles which contained the reasons for this resolution were included in a Declaration and Claim of Right,—a parallel to the English Declaration and Bill of Rights. Besides the declarations against the Papists with which it

1689–1705.

William III's acceptance of Scottish crown.

[1] [Article DUNDEE, vol. vii. p. 465, dates the battle on 27th July, as do Burton and Macaulay.—AM. ED.]

commenced—that no Papist could be king or queen, that proclamations allowing mass to be said, Jesuit schools and colleges to be erected, and Popish books to be printed were contrary to law—it detailed each of the unconstitutional acts of James and pronounced it contrary to law. This formidable list included imposing oaths without the authority of parliament; grants without the consent of parliament; employing officers of the army as judges throughout the kingdom; imposing exorbitant fines; imprisoning persons without expressing the reason, and delaying trials; forfeiture upon insufficient grounds, especially that of Argyll; the nomination by the king of the magistrates of burghs; sending of royal letters to courts of justice with reference to pending cases; granting protections for debt; forcing the lieges to depone against themselves in capital crimes; the use of torture without evidence in ordinary crimes; quartering of an army in time of peace upon any part of the kingdom; the use of law-burrows at the king's instance; putting garrisons in private houses in time of peace without the consent of the owners and of parliament; and fining husbands for their wives. It closed with asserting that Prelacy and the superiority of any office in the church above presbyters were insupportable grievances and ought to be abolished, and that it was the right and privilege of subjects to protest to parliament for "remeid" of law and to petition the king, and that for redress of grievances it was necessary parliament should frequently be called, with freedom of speech secured to members. As a conclusion from these premises the estates resolved that William and Mary should be declared king and queen of Scotland during their lives, but with the right of exercising regal power in William alone as long as he lived. After their death the crown was to pass to the heirs of the queen's body, and failing her to Anne of Denmark and her heirs, failing whom to the heirs of William. Commissioners were despatched to London to present the declaration and statement of grievances and take the royal oath to the acceptance of the crown on their terms. This was done at Whitehall in the following March (1689); but William, before taking the oath, required an assurance that persecution for religious opinion was not intended and made a declaration in favor of toleration.

His government of Scotland.

By desire of William the convention was superseded by a parliament which met in June; but, with the exception of an Act abolishing Prelacy, it transacted no business of importance. The parliament of 1690 was more fruitful. It abolished the committee of the Articles, which had become an abuse inconsistent with the freedom of parliament, and, while it retained a committee on motions and overtures in its place, declared that the estates might deal with any matter without referring it to this committee. The Act of Supremacy was rescinded. The Presbyterian ministers deposed since 1661 were restored and the Westminster Confession approved, though not imposed as a test except on professors. With more difficulty a solution was found for the question of church government. The Presbyterian Church was reëstablished with the Confession as its formula, and patronage was placed in the heritors and elders with a small compensation to the patrons. These prudent measures were due to the influence of Carstares, the chief adviser of William in Scottish ecclesiastical matters. He was not so well advised in the conduct of the civil government by the master of Stair, who became sole secretary for Scotland. The proclamation for calling out the militia may have been a necessary precaution, but it raised much opposition amongst the landed gentry, and the militia was not then embodied. The massacre of the Macdonalds at Glencoe by Campbell of Glenlyon was contrary to the spirit of the indemnity offered to the Highlanders. While the treachery with which it was executed may be attributed to Glenlyon, it was too plainly proved before the committee of inquiry which the Scottish parliament insisted on that it had been designed by Stair and Breadalbane, and, now that the whole documents have been published, it is also proved that it had been sanctioned by William. It was intended to strike terror: but its partial success was dearly bought, for it kept alive the Jacobite disaffection and gained for it much sympathy. The unfair treatment of the Scots in the matters of free trade and navigation, in which the new Government appeared to follow the policy of Charles rather than that of Cromwell, and acted with an exclusive regard to the prejudices and supposed interests of England, reached a climax in the abandonment of the Scottish settlement at Darien when attacked by the Spaniards. The over-sanguine hopes of Paterson and the Scottish colonists and capitalists who supported his enterprise, so suddenly transformed into a financial disaster overwhelming to a poor country, accompanied by the loss of many lives, embittered the classes on which the Revolution settlement mainly depended for its support. It was the anxious wish of William to have effected the legislative union; but, although he twice attempted it, the last time a month before his death, the temper of the English parliament and of the Scottish people appeared to give small chance of its realization.

Glencoe.

Darien.

9. *The Union and its Consequences.*—The reign of Anne, so far as it relates to Scotland, centred in the accomplishment of the union. In spite of the disparity of numbers, both nations now met to treat on equal terms. Still there were grave difficulties, and it required all the wisdom of the ministers of the early years of Anne, aided by the glory of Marlborough's arms, to overcome national prejudices and secure an object plainly for the benefit of both. The memories of Glencoe and Darien and the refusal of equal rights of trade, led the Scottish parliament, the year after Anne's accession, to pass an Act of Security, by which, if the queen died without issue, the Scottish estates were to name a successor from the Protestant descendants of the royal line; but the successor to the English crown was expressly excluded unless there were "such conditions of government settled and enacted as may secure the honor and sovereignty of the crown and kingdom, the freedom, frequency, and power of parliament, the religious freedom and trade of the nation from English or any foreign influence." Political economy had not yet taught the reciprocal advantage of free trade, and the English jealousy of Scottish traders was intense. An incident about this time warned the English ministers that Scotland might easily revert to its old attitude of enmity. A Scottish ship of the African or Darien Company having been seized in the Thames at the suit of the English East India Company, the "Worcester," an English East Indiaman, was taken in the Forth by way of retaliation, and Green, its captain, with two other officers, was executed at Leith on a charge of piracy insufficiently proved. An attempt had been already made to complete the union by a commission, which sat from 10th November, 1702, to 3d February, 1705; but this miscarried through the refusal to grant free trade between the kingdoms. But again in 1705 the English parliament sanctioned the appointment of other commissioners, and new officers of state were nominated for Scotland with the express purpose of pressing the scheme forward in the Scottish parliament. Though opposed on contrary grounds by the Jacobites and the party of Fletcher of Salton, the Scottish ministry of Queensberry succeeded, by the aid of a third party nicknamed the "Squadrone Volante," in getting the consent of parliament to the appointment of commissioners by the crown. The Act expressly excepted the church from the matters with which the commission was to deal. The commissioners, thirty-one from each country, met at Whitehall on 16th April and con-

Union of parliaments.

cluded their sittings on 23d July. The nomination by the crown had secured persons anxious to accomplish the union; experience had disclosed the cause of former failures, and the commissioners were guided by the statesmanship of Somers. It had been recognized from the first that the only settlement of the ecclesiastical question possible was to leave to each country its own church. It was wisely decided to treat the law and the courts in the same manner. These two subjects being removed from the scope of the treaty narrowed the debates to four main points,—the succession, trade, taxation, and the composition of the future parliament. The Scottish commissioners yielded on the first, the English on the second, and the remaining two were adjusted by a skilful compromise.

Terms of treaty of union.

The chief articles of the treaty were the settlement of both crowns according to the English Act of Succession on Anne and her descendants, and failing them on the electress Sophia and the Hanoverian line; the establishment of free trade between England and Scotland, and the admission of the Scots to equal privileges as regards trade with other countries; the national debt and taxation were adjusted by the imposition on Scotland of a moderate share (£48,000 or $233,280) of the land-tax, of which England was still to bear £200,000 [$972,000], and there was to be a uniform rate of custom and excise, Scotland being compensated by an equivalent of about £400,000 [$1,944,000] for becoming liable to a proportion of the English national debt, which already amounted to £16,000,000 [$77,760,000]; forty-five representatives of Scotland were to be admitted to the House of Commons and sixteen elected peers to the House of Lords. Although the terms were on the whole favorable to Scotland, their announcement was received with dissatisfaction, especially in Edinburgh. The loss was immediate, from the abolition of an independent parliament, the reduction of the capital to a provincial town, and the increase of taxation to pay the growing national debt. The gain was in the future and in part doubtful. No one contemplated the rapid and enormous extension of trade. A proud people was unwilling to admit the advantage consequent upon free intercourse with a country in which wealth and civilization were more widespread. It had a natural attachment to its own institutions, though these were less popular than the English. It feared that, notwithstanding the most solemn guarantee, neither its church nor its laws could resist the influence of a country so much larger and more populous, in which henceforth was to be the sole seat of government, and that much of its wealth and talent would be attracted to the south and become English. The last parliament of Scotland was preceded by a stormy agitation against the union, and began its session with numerous addresses praying that the treaty should not be ratified, while none were presented in its favor. The popular feeling was embodied in the speeches of Lord Belhaven from a sentimental and patriotic point of view, and of Fletcher of Salton, who represented the democratic or republican element latent in a portion of the nation. But common sense aided by ministerial influence prevailed. The vote on the first article was prudently taken with a proviso that it was to be dependent on the rest being carried, but it really decided the fate of the measure. The Government commanded a large majority of the peers, perhaps more amenable to influence. They were accused by the Jacobites of being bribed, but the sums received in name of payment of arrears of pension and of debts were too small to justify the charge. The lesser barons or county members and the representatives of the burghs were nearly equally divided; but there was a majority of four of each of these estates in favor of the article. The whole estates voted together and the total majority was thirty-five. This was increased when the last vote was taken to 41, the numbers being 110 for and 69 against, and the Act of Ratification to take effect from 1st May, 1707, was carried. The Presbyterian Church received an additional guarantee in an Act passed for "securing the Protestant religion and the Presbyterian Establishment."

Its unpopularity in Scotland.

1705–1709.

In the English parliament there was less serious opposition, proceeding chiefly from the High Church party, which was conciliated by an Act for the security of the Church of England. On 6th March, 1707, the Scottish and English Acts ratifying the union received the royal assent.

Two Acts of the British parliament naturally followed the Act of Union. The Scottish privy council was abolished in 1708. A secretary of state for Scotland continued until 1746 to manage the Scottish department in London; but the lord advocate, the adviser of the crown on all legal matters both in London and Edinburgh, gradually acquired a large, and after the suppression of the office of the Scottish secretary a paramount influence in purely Scottish affairs, though he was nominally a subordinate of the home secretary.[1] In 1709 the law of treason was assimilated to that of England, being made more definite and less liable to extension by construction in the criminal courts. In the later years of Anne, when after the fall of Marlborough power passed from the Whig to the Tory party, two statutes were passed of a different character. Patronage was restored in the Presbyterian Church notwithstanding the protests of the assembly, and proved a fertile source of discord. A limited toleration Act in favor of the Episcopalians, permitting them to worship in private chapels, was opposed by the Presbyterians but carried.

Legislation consequent on union.

With the union of the parliaments Scotland lost its legislative independence. Its representation in the British parliament for more than a century, based on the freehold franchise in the counties and in the burghs controlled by town councils, which were close corporations, was a representation of special classes and interests rather than of the nation. It almost appeared as if the prophecy of Belhaven would be accomplished and there would be an end of an old song. But Scottish history was not destined yet to end. The character of the people, though their language and manners gradually became more like those of England, remained distinct. They retained a separate church and clergy. Independent courts and a more cosmopolitan system of law opened a liberal profession and afforded a liberal education to youthful ambition. A national system of parish schools, burgh schools, and universities, though inadequately endowed and far from reaching the ideal of Knox and Melville, gave opportunities to the lower as well as the higher classes of receiving at a small cost an education suited for practical uses and the business of everyday life. The Scot had been from the earliest times more inclined to travel, to migrate, to colonize than the Englishman, not that he had a less fervent love of home, but a soil comparatively poor made it necessary for many to seek their fortune abroad. This tendency which had led Scottish monks, soldiers, and professors to embrace foreign service, now found new openings in trade, commerce, colonial enterprise in America, the East and the West Indies, in the southern hemisphere and the exploration of unknown parts of the globe. Accustomed to poverty, Scottish emigrants acquired habits of frugality, industry, and perseverance, and were rewarded by success in most of their undertakings. Nor, if war be regarded as necessary to the continued existence of a nation, was it altogether absent, but the cause with which the name of Scotland became identified was the losing one. The two rebellions proved the devoted loyalty which still attached many of the Highland clans,

Other results of union to Scotland.

[1] In 1885 a secretary for Scotland was again appointed with a separate office at Dover House, London.

the Catholics, and some of the Episcopalians to the descendants of the Stuarts. But that in 1715, preceded by an abortive attempt in 1708, was put down by a single battle; Sheriffmuir, if it could scarcely be claimed as a victory by Argyll, led to the speedy dispersal of the clans which had gathered round the standard of Mar. Thirty years later the romantic rising of the Highlanders under the Young Pretender found the Government unprepared. Once more for a brief space Holyrood was a royal court. The defeat of Cope at Prestonpans and the rapid march of the Scottish army, slightly reinforced by Catholics from the northern and midland shires of England, to Derby, by which it cut off the duke of Newcastle's forces from the capital, made London tremble. Divided counsels, the absence of any able leader, and the smallness of their number (not more than 5000) prevented the daring policy of attacking London, which Charles himself favored, and a retreat was determined on. It was skilfully effected, and on 26th December, the little army, which had left Edinburgh on 31st October and reached Derby on 4th December, arrived in Glasgow. It was not favorably received, the southwest of Scotland being the district least inclined to the Stuarts, and it marched on Stirling to assist Lord John Drummond and Lord Strathallan, who had commenced its siege, which General Hawley threatened to raise. His defeat at Falkirk was the last success of the Jacobites. The Duke of Cumberland was sent to command the royal forces, and Charles Edward was forced by Lord George Murray and the Highland chiefs to abandon the siege of Stirling and retreat to Inverness. He was at once pursued by the duke, and his defeat at Culloden (16th April, 1746) scattered his followers and compelled him to seek safety in flight to the Hebrides, from which, after five months' wanderings, he escaped to France. The last rebellion within Great Britain was put down with severity. Many soldiers taken in arms were shot and no consideration was shown to the wounded. The chief officers and even some privates taken prisoners were tried and executed at various places in the north of England. The earls of Cromarty and Kilmarnock and Lord Balmerino were reserved for the judgment of their peers in London, and having pleaded guilty were beheaded at Tower Hill. The crafty Lovat, who had avoided appearing in arms, but was really at the bottom of the rising, though he pretended to serve both sides, was the last to suffer. An Act of indemnity was passed a few weeks after his execution. But effective measures were taken to prevent any renewal of the rebellion. The estates and titles of all who had been privy to it were forfeited. An Act was passed prohibiting the use of arms and the Highland dress; and the abolition of the military tenure of ward-holding, unfortunately preserved at the union, rooted out the remnants of feudal and military power till then left in the hands of the nobles and chiefs. These changes in the law had the willing consent of the Lowland and burghal population in Scotland, to whom the lawless and freebooting habits of the Highlanders had been a cause of frequent loss and constant alarm. Somewhat later the masterly policy of Pitt enlisted the Scottish Celts in the service of the crown by forming the Highland regiments. The recollection of Glencoe and Culloden was forgotten after the common victories of the British arms in India, the Peninsula, and Waterloo. In one direction the Jacobite cause survived its defeat. Poetry seized on its romantic incidents, idealized the young prince who at least tried to win his father's crown, satirized the foreign and German, the Whig and Covenanting, elements opposed to the Stuart restoration, and substituted loyalty for patriotism. Self-sacrifice and devotion to a cause believed right, though deserted by fortune (qualities rare amongst the mass of any nation), dignified the Jacobites like the cavaliers with some of the nobler traits of chivalry, and the Jacobite ballads have their place in literature as one of the last expiring notes of mediæval romance. Music and tradition fortunately preserved their charm before the cold hand of history traced the sad end of Charles Edward, the pensioner of foreign courts, wasting his declining years in ignoble pleasures. It might be hard to say whether the first Hanoverians or the last Stuarts least deserved that men should fight and die for them; but the former represented order, progress, civil and religious liberty; the latter were identified with the decaying legend of the divine right of kings and the claim of the Roman Church not merely to exclusive orthodoxy but to temporal power and jurisdiction inconsistent with the independence of nations and freedom of conscience. Although a larger minority in Scotland than in England clung to the traditions of the past, an overwhelming majority of the nation, including all its progressive elements, were in favor of the new constitution and the change of dynasty.

Jacobite rebellions.

During the remaining half of the 18th century and the commencement of the 19th a period of prosperity was enjoyed by Scotland, and the good effects of the union, intercepted by the rebellions, became visible. The Scottish nation, without losing its individuality, was stimulated by contact and friendly rivalry with its English neighbor in the arts of peace. It advanced in intellectual as well as material respects more than in any part of its previous history. It became, through commerce, manufactures, and improved agriculture, a comparatively rich instead of a poor country. Skilful engineering made the Clyde a successful competitor with the Thames and the Mersey, and Glasgow became one of the most populous cities in Great Britain. The industrial arts made rapid progress, and the fine arts began to flourish. The art of saving capital and using it as a source of credit was reduced to a system. Banks, not unknown in other countries and at an earlier date, are in their modern form a Scottish invention. Besides those which sprang up in Scotland itself, the national banks of England and France owed their origin to two Scotchmen. A safe system of life insurance represented the provident habits and business talents of the nation. Adam Smith shares with the French economists the honor of founding political economy as the science of the wealth of nations. Mental philosophy became a favorite study, and a distinctively Scottish school produced thinkers who deeply influenced the later systems of the Continent. The history not of Scotland only but of England and some portions of that of Europe were written by Scotsmen in works equal to any existing before Gibbon. The dawn of the scientific era of the 19th century was foreshadowed by Scottish men of science, the founders of modern geology, chemistry, anatomy, physiology, and the practice of medicine. In Scotland was made the first of the great line of discoveries in the practical application of science by the use of steam as a motive-power. The same period—so varied were its talents—gave birth to two Scottish poets, of world-wide fame. Burns expressed the feelings and aspirations of the people; Scott described both in verse and prose their history and the picturesque scenes in which it had been transacted. During the last half-century the material progress continued, but the intellectual was too brilliant to last. The preponderating influence of England even threatened to extinguish native Scottish genius by centralizing the political and social life of the island in the English capital. Only two changes of importance occurred. The political institutions of Scotland were reformed by a series of Acts which placed the franchise on a broader basis and made the representation of the people real. The Established Church, already weakened by secessions, was further divided by a disruption largely due to the ignorance of political leaders as to the deep-seated aversion of the nation to any interference with the independence of the church, especially in matters of patronage. Educational reform has also in recent years raised the standard of the universities and schools without injuring their popular character. While it would be incorrect to say that Scotland has had no independent history since the union, that history must be chiefly read in the annals of its church, its law, and its literature. Its political existence has been absorbed in that of Great Britain. (Æ. M.)

Progress during 19th century.

PART II.—PHYSICAL FEATURES.

Scotland forms the northern portion of Great Britain and is divided from England by the rivers Sark, Liddell, and Kershope (an affluent of the Liddell), the Cheviot Hills, the river Tweed, and the liberties of Berwick. The mainland lies between 58° 40′ 30″ (at Dunnet Head, Caithness) and 54° 38′ N. lat. (Mull of Galloway) and 1° 45′ 30″ (Peterhead) and 6° 14′ W. long. (Ardnamurchan Point, Argyllshire). Including the islands, the extreme N. lat. is 60° 51′ 30″ (Outsack, Shetland) and the extreme W. long. 8° 35′ 30″ (St. Kilda). Its greatest length from north to south, from Duruess in Sutherland to Burrow Head in Wigtownshire, is 272 miles, and the greatest breadth from east to west, from Peterhead in Aberdeenshire to Applecross in Ross-shire, is 155, while the narrowest part, from Grangemouth in Stirlingshire to Bowling in Dumbartonshire, is ouly 30¼ miles wide. The total area in 1881, according to the Ordnance Survey, was 19,777,490 acres or 30,902 square miles,—the area of foreshore being 310,413 acres or 485 square miles, of water 403,846 acres or 631 square miles, and of land-surface 19,063,231 acres or 29,786 square miles. But of the water area the acreage included under lakes and rivers respectively has not been ascertained. Plate VII.

GEOLOGY.

In the article GEOLOGY (vol. x.) descriptions will be found of most of the geological formations of Scotland. All that need therefore be inserted here is a succinct summary of these formations with references to the pages of that article where fuller details are given.

The oldest rocks of Scotland and of the British Islands, known as Archæan, consist chiefly of gneiss (Fundamental, Lewisian, Hebridian), which varies from a coarsely crystalline granitoid mass to fine schist. The coarse varieties are most abundant, intermingled with bands of hornblende-rock, hornblende-schist, pegmatite, eurite, mica-schist, sericite-schist, and other schistose accompaniments. In a few places limestone has been observed. No trace of any organism has ever been detected in any of these rocks. Over wide areas, particularly on the mainland, the bands of gneiss have a general northwest trend and undulate in frequent plications with variable inclination to northeast and southwest. The largest tract of Archæan rock is that which forms almost the whole of the Outer Hebrides, from Barra Head to the Butt of Lewis. Other areas more or less widely separated from each other run down the western parts of Sutherland and Ross, and are probably continued at least as far as the Island of Rum. How far Archæan rocks reappear to the east of this western belt has not yet been ascertained. Archæan rocks.

Above the Archæan gneiss lies a series of red and chocolate-colored sandstones, conglomerates, and breccias (Cambrian or Torridon sandstone), which form a number of detached areas from Cape Wrath down the seaboard of Sutherland and Ross, across Skye, and as far as the Island of Rum (GEOLOGY, vol. x. p. 292). They rise into prominent pyramidal mountains, which, as the stratification is usually almost horizontal, present in their terraced sides a singular contrast to the neighboring heights, composed of highly plicated crystalline schists. In the Torridon district these sandstones can be seen towering bed above bed to a height of about 4000 feet, and their thickness is still greater. They have not yet yielded any recognizable fossil; their geological age is accordingly doubtful, though from their relation to the overlying fossiliferous rocks and from their own lithological characters they have with much probability been classed with the Cambrian system of Wales. They are not met with anywhere else in Scotland than in the northwest Highlands. Cambrian sandstone.

Rocks belonging to the Silurian system occur in two distinct regions and in two very strongly contrasted conditions. They constitute nearly the whole of the southern uplands (GEOLOGY, vol. x. pp. 294–5, 299). In that belt of country they consist for the most part of graywacke, grit, shale, and other sedimentary rocks, but in the southwest of Ayrshire they include some thick lenticular bands of limestone. They have been thrown into many plications, the long axes of which run in a general northeasterly direction. It is this structure which has determined the trend of the southern uplands. The plications of the Highlands and the chief dislocations of the country have followed the same general direction, and hence the parallelism and northeasterly trend of the main topographical features. Abundant fossils in certain parts of the Silurian rocks have shown that representatives of both the Lower and Upper divisions are present. By far the larger part of the uplands belongs to the former. The Upper Silurian shales and sandstones appear only along the northern and southern margins. Silurian system.

In the northwest highlands the Cambrian red sandstones are overlain unconformably by several hundred feet of white quartzite with annelid tubes, followed by fossiliferous limestones and shales (GEOLOGY, vol. x. p. 295). The abundant fossils in these strata prove them to be of Lower Silurian age. It was believed by Murchison that, as these Silurian strata dip conformably below various schists which spread eastwards into the rest of the Highlands, they demonstrate the crystalline rocks of the Highlands to be of later than Silurian age. Recently, however, the structure of Sutherland has been investigated anew with minute care and the result is to show that the schists believed to overlie the Silurian strata conformably have been really pushed over them and consist in part of the Archæan gneiss. It has been ascertained that from the mouth of Loch Erriboll on the north coast of Sutherland southwards to the Isle of Skye, a distance of more than 100 miles, a gigantic system of earth-movements has taken place, whereby the Silurian, Cambrian, and Archæan rocks have been crumpled, inverted, dislocated, and have pushed over each other. In some places the horizontal displacement of these shifted masses has been not less than 10 miles. So intense has been the shearing of the rocks that their original structure has in many places been entirely destroyed. They have acquired a new schistosity, which is in a general sense parallel with the bedding of the Siluriau rocks to the west of the line of disturbance. Hence the apparent conformability of the schists overlying these rocks. The total thickness of recognizable Silurian strata is about 2000 feet. The rocks that overlie them to the east of the line of disturbance in Sutherland and Ross are fine flaggy schists, quite unlike any part of the Archæan gneiss and often strangely suggestive of altered sandstones. What are their true age and history remains still to be determined. There can be no doubt, however, that they have acquired their present schistosity since the Lower Siluriau period, and hence that the present condition of the metamorphic rocks of the central Highlands does not go back to Archæan time. That portions of the Archæan series may have been pushed up in different parts of the Highlands is quite conceivable. But that much of the Highlands consists of altered sedimentary rocks like those of the Silurian uplands admits of no question. The solution of this difficult but interesting problem has the most important bearing upon the theory of metamorphism, but it can only be attained by patient and laborious mapping of the ground such as is being prosecuted by the Geological Survey.

As Scotland is the typical European region for the Old Red Sandstone a full account of this series of rocks has already been given in the article GEOLOGY (vol. x. pp. 303–4, 305). These rocks are grouped in two divisions, Lower and Upper, both of which appear to have been deposited in lakes. The Lower, with its abundant intercalated lavas and tuffs, extends continuously as a broad belt along the northern margin of the midland valley, reappears in detached tracts along the southern border, is found again on the south side of the uplands in Berwickshire and the Cheviot Hills, occupies a tract of Lorne in Argyllshire, and on the north side of the Highlands underlies most of the low ground on both sides of the Moray Firth, stretches across Caithness and through nearly the whole of the Orkney Islands, and is prolonged into Shetland. The Upper Old Red Sandstone covers a more restricted space in most of the areas just mentioned, its chief development being on the flanks of the northeastern part of the southern uplands, where it spreads out over the Lammermuir Hills and the valleys of Berwickshire and Roxburghshire. Old Red Sandstone.

The areas occupied by Carboniferous rocks are almost entirely restricted to the midland valley, but they are also to be found skirting the southern uplands from the mouth of the Tweed to that of the Nith. The subdivisions of this important system, its coal-fields and igneous rocks, have been described in the article GEOLOGY (vol. x. pp. 307, 308, 309). Carboniferous.

Rocks assignable to the Permian system occupy only a few small areas in Scotland. Extending from Cumberland under the Solway Firth, they fill up the valley of the Nith for a few miles north of Dumfries, and, reappearing again in the same valley a little farther north, run up the narrow valley of the Carron Water to the Lowther Hills. Other detached tracts of similar rocks cover a considerable space in Annandale, one Permian.

of them ascending the deep defile at the head of that valley. Another isolated patch occurs among the Lead Hills; and lastly, a considerable space in the heart of the Ayrshire coal-field is occupied by Permian rocks. Throughout these separate basins the prevailing rock is a red sandstone, varied in the narrow valleys with intercalated masses of breccia (GEOLOGY, vol. x. p. 311). There can be no doubt that the valleys in which these patches of red rocks lie already existed in Permian time. They seem then to have been occupied by small lakes or inlets, not unlike fjords. Numerous amphibian tracks have been found in the red sandstone of Annandale and also near Dumfries, but no other traces of the life of the time. One of the most interesting features of the Scottish development of the Permian system is the occurrence of intercalated bands of contemporaneously erupted volcanic rocks in the Carron Water, Nithsdale, and Ayrshire. The actual vents which were the sites of the small volcanoes still remain distinct, and the erupted lavas form high ground in the middle of Ayrshire.

Triassic.

The Triassic system appears to be only feebly represented in Scotland. To this division of the geological record are assigned the yellow sandstones of Elgin, which have yielded remains of reptiles, but which at the same time cannot be satisfactorily separated from similar underlying strata which contain Upper Old Red Sandstone fishes. There occur also below the Lias on some parts of the west coast unfossiliferous red sandstones, conglomerates, and breccias which may possibly belong to the same system. These rocks attain their greatest thickness at Gruinard Bay on the west coast of Ross, where they must be several hundred feet thick. On the east side of the country, where so many fragments of the Secondary rocks occur as boulders in the glacial deposits, a large mass of strata was formerly exposed at Linksfield near Elgin containing fossils which appear to show it to belong to the Rhætic beds at the top of the Trias. But it was not in place, and was almost certainly a mass transported by ice. Rhætic strata no doubt exist *in situ* at no great distance under the North Sea.

Jurassic.

The Jurassic system is well represented on both sides of the Highlands. Along the east coast of Sutherland good sections are exposed showing the succession of strata. Among these the Lower and Middle Lias can be identified by their fossils. The Lower Oolite is distinguished by the occurrence in it of some coal-seams, one of which, 3½ feet in thickness, has been worked at Brora. The Middle Oolite consists mostly of sandstones with bands of shale and limestones and includes fossils which indicate the English horizons from the Kellaways Rock up to the Coral Rag. The lower part of the Kimmeridge Clay is probably represented by sandstones and conglomerates, forming the highest beds of the series in Sutherland. On the west side of the Highlands Jurassic rocks are found in many detached areas from the Shiant Isles to the southern shores of Mull. Over much of this region they owe their preservation in great measure to the mass of lavas poured over them in Tertiary time. They have been uncovered, indeed, only at a comparatively recent geological date. They comprise a consecutive series of deposits from the bottom of the Lias up to the Oxford Clay. The Lower Middle and Upper Lias consist chiefly of shales and shelly limestones, with some sandstones, well seen along the shores of Broadford Bay in Skye and in some of the adjacent islands. The Lower Oolites are made up of sandstones and shales with some limestones, and are overlaid by several hundred feet of an estuarine series of deposits consisting chiefly of thick white sandstones, below and above which lie shales and shelly limestones. These rocks form a prominent feature underneath the basalt terraces of the east side of Skye, Raasay, and Eigg. They form the highest members of the Jurassic series, representing probably some part of the Oxford clay. The next Secondary rocks (Cretaceous) succeed them unconformably.

Cretaceous.

Rocks belonging to the Cretaceous system undoubtedly at one time covered considerable areas on both sides of the Highlands, but they have been entirely stripped off the eastern side, while on the western they have been reduced to a few fragmentary patches, which have no doubt survived because of the overlying sheets of basalt that have protected them. Some greenish sandstones containing recognizable and characteristic fossils are the equivalents of the Upper Greensand of the south of England. These rocks are found on the south and west coasts of Mull and on the west coast of Argyllshire. They are covered by white sandstones and these by white chalk and marly beds, which represent the Upper Chalk of England. Enormous numbers of flints and also less abundant fragments of chalk are found in glacial deposits bordering the Moray Firth. These transported relics show that the Chalk must once have been in place at no great distance, if indeed it did not actually occupy part of Aberdeenshire and the neighboring counties.

Basaltic plateaus.

Above the highest Secondary rocks on the west coast come terraced plateaus of basalt, which spread out over wide areas in Skye, Eigg, Mull, and Morven, and form most of the smaller islets of the chain of the Inner Hebrides (GEOLOGY, vol. x. p. 322). These plateaus are composed of nearly horizontal sheets of basalt—columnar, amorphous, or amygdaloidal—which in Mull attain a thickness of more than 3000 feet. They are prolonged southward into Antrim (Ireland), where similar basalts overlying Secondary strata cover a large territory. Occasional beds of tuff are intercalated among these lavas, and likewise seams of fine clay or shale which have preserved the remains of numerous land-plants. The presence of these fossils indicates that the eruptions were subaerial, and a comparison of them with those elsewhere found among older Tertiary strata shows that they probably belong to what is now called the Oligocene stage of the Tertiary series of formations, and therefore that the basalt eruptions took place in early Tertiary time. The volcanic episode to which these plateaus owe their origin was one of the most important in the geological history of Great Britain. It appears to have resembled in its main features those remarkable outpourings of basalt which have deluged so many thousand square miles of the western territories of the United States. The eruptions were connected with innumerable fissures up which the basalt rose and from numerous points on which it flowed out at the surface. These fissures with the basalt that solidified in them now form the vast assemblage of dykes which cross Scotland, the north of England, and the north of Ireland (GEOLOGY, vol. x. pp. 276–7). That the volcanic period was a prolonged one is shown by the great denudation of the plateaus before the last eruptions took place. In the Isle of Eigg, for example, the basalts had already been deeply eroded by river-action and into the river-course a current of glassy lava (pitch-stone) flowed. Denudation has continued active ever since, and now, owing to greater hardness and consequent power of resistance, the glassy lava stands up as the prominent and picturesque ridge of the Scuir, while the basalts which formerly rose high above it have been worn down into terraced declivities that slope away from it to the sea. A remarkable feature in the volcanic phenomena was the disruption of the basaltic plateaus by large bosses of gabbro and of various granitoid rocks. These intrusive masses now tower into conspicuous groups of hills,—the Coolins in Skye, the mountains of Rum and Mull, and the rugged heights of Ardnamurchan.

Youngest formations.

Under the post-tertiary division come the records of the Ice Age, when Scotland was buried under sheets of ice which ground down, striated, and polished the harder rocks over the whole country and left behind them the widespread accumulations of clay, gravel, and sand known as glacial deposits. The nature of the evidence and the deductions drawn from it have been already stated (GEOLOGY, vol. x. pp. 325–7). The youngest geological formations are the raised beaches, river-terraces, lake-deposits, peat-mosses, and other accumulations, which are related to the present configuration of the country and contain remains of the plants and animals still living on its surface (GEOLOGY, vol. x. pp. 228, 254, 327–8).

PHYSICAL FEATURES.

The physical features of Scotland may be best realized by regarding the country as composed of three distinct belts of territory, differing from each other in their geological structure and consequently presenting striking contrasts in their scenery.

The Highlands.

1. The Highlands, for convenience of description, are here regarded as embracing all that part of the country which lies west and north of a line drawn along the Firth of Clyde, and thence diagonally in a northeasterly direction from the mouth of the river Clyde to the east coast at Stonehaven. Nearly the whole of this region is high ground, deeply trenched with valleys and penetrated by long arms of the sea. The only considerable area of lowland lies in the northeastern counties, embracing the eastern part of Aberdeenshire and the northern parts of Banff, Elgin, and Nairn. Along both sides of the Moray Firth a strip of lower land intervenes between the foot of the hills and the sea, while farther north the county of Caithness is one wide plain, which is prolonged into the Orkney Islands. Seen from beyond its southern margin, the area of the Highlands presents a well-defined chain of hills, which rise abruptly from the plains of the Lowlands. This is best observed in Strath-

more, but it is also conspicuous in the estuary of the Clyde, where the low hills on the south contrast well with the broken line of rugged mountains to the north. From any of the islands of the chain of the Inner Hebrides the Highlands along their western sea-front rise as a vast rampart, indented by many winding fjords and rising up to a singularly uniform general level, which sinks here and there and allows glimpses to be had of still higher summits in the interior. The northern margin is hardly less striking when looked at from the Moray Firth, or from the plains of Caithness or Orkney.

Highland mountains.

From a commanding summit in the interior the Highlands are seen to differ from a mountain chain such as the Alps, not merely in their inferior elevation, but essentially in their configuration and structure. They are made up of a succession of more or less nearly parallel confluent ridges, which have, on the whole, a trend from northeast to southwest. These ridges are separated by longitudinal valleys, and each of them is likewise furrowed by transverse valleys. The portions of ridge thus isolated rise into what are termed mountains. But all the loftier eminences in the Highlands are only higher parts of ridges along which their geological structure is prolonged. It is singular to observe how the general average of level of the summits of the ridges is maintained. From some points of view a mountain may appear to tower above all the surrounding country, but, looked at from a sufficient distance to take in its environment, it may be found not to rise much above the general uniformity of elevation. There are no gigantic dominant masses that must obviously be due to some special terrestrial disturbance. A few apparent exceptions to this statement rise along the western seaboard of Sutherland, in Skye, and elsewhere, but an examination of their structure at once explains the reason of their prominence and confirms the rule.

Surface of Highlands.

The general surface of the Highlands is rugged. The rocks project in innumerable bosses and crags, which roughen the sides and crests of the ridges. The forms and colors of these roughnesses depend on the nature of the rock underneath. Where the latter is hard and jointed, weathering into large quadrangular blocks, the hills are more especially distinguished for the gnarled bossy character of their declivities, as may be seen in Ben Ledi and the chain of heights to the northeast of it formed of massive grits and mica-schists. Where, on the other hand, the rock decays into smaller débris, the hills are apt to assume smoother contours, as in the slate hills that run from the Kyles of Bute to Loch Lomond. Wherever any mass of rock occurs differing much from those around it in its power of resisting decomposition, it affects the scenery, rising into a prominence where it is durable, or sinking into lower ground where it is not. This relation between relative destructibility and external configuration is traceable in every part of Scotland, and indeed may be regarded as the law that has mainly determined the present topography of the country.

Two regions of Highlands.

The Highlands are separated into two completely disconnected and in some respects contrasted regions by the remarkable line of the Great Glen, which runs from Loch Linnhe to Inverness. In the northern portion the highest ground rises along the west coast, mounting steeply from the sea to an average height of perhaps between 2000 and 3000 feet. The watershed consequently keeps close to the Atlantic seaboard, indeed in some places it is not more than a mile and a half distant from the beach. From these heights, which catch the first downpour of the western rains, the ground falls eastwards, but with numerous heights that prolong the mountainous character, to the edge of the North Sea and the line of the Great Glen. The best conception of the difference in the general level on the two sides of the watershed may be obtained by observing the contrast between the lengths of their streams. On the western side the drainage is poured into the Atlantic Ocean after flowing only a few miles, while on the eastern side it has to run at least 30 or 40. At the head of Loch Nevis the western stream is only 3 miles long; that which starts from the eastern side has a course of some 18 to the Great Glen. Throughout the northern or northwestern region a general uniformity of feature characterizes the scenery, betokening even at a distance the general monotony in the structure of the underlying schists. But the sameness is relieved along the western coast of Sutherland and Ross by singular groups of cones and stacks (to be afterwards referred to), and farther south by the terraced plateaus and abrupt conical hills of Skye, Rum, and Mull. The valleys run for the most part in a northwest and southeast direction, and this is also generally true of the sea lochs.

The southeastern region of the Highlands, being more diversified in geological structure, presents greater contrasts of scenery. In the first place, its valleys chiefly run in a southwest and northeast direction and so also do most of the lakes and sea lochs. This feature is strikingly exhibited in the western part of Argyllshire. But there are also numerous and important transverse valleys, of which that of the Garry and Tay is the most conspicuous example. Again, the watershed in this region is arranged somewhat differently. It first strikes eastward round the head of Loch Laggan and then swings southward, pursuing a sinuous course till it emerges from the Highlands on the east side of Loch Lomond. But the streams flowing westward are still short, while those that run northeast and east have long courses and drain wide tracts of high ground. The Tay in particular pours a larger body of water into the sea than any other river in Great Britian. Moreover, the occurrence of many bosses of granite and other eruptive rocks gives rise to various interruptions in the monotonous scenery of the crystalline schists which constitute the greater part of the country. But a marked contrast may be traced between the configuration of the northeastern district and the other parts of this region. In that area the Grampians rise into wide flat-topped heights or elevated moors often over 3000 and sometimes exceeding 4000 feet in height and bounded by steep declivities or not infrequently by precipices. Seen from an eminence on their surface, these plateaus look like fragments of an original broad tableland, which has been trenched into segments by the formation of the transverse and longitudinal valleys. Farther to the southwest in Perthshire, Inverness-shire, and Argyllshire, they give place to the ordinary hummocky crested ridges of Highland scenery, some summits on which, however, exceed 4000 feet in elevation. For the probable meaning of this transition from broad flat-topped heights to narrow crests and isolated peaks, see below (p. 546).

Besides the principal tracts of low ground in the Highlands already referred to, there occur numerous long but narrow strips of flat land in the more important valleys. Each strath and glen is usually provided with a floor of detritus which, spread out between the bases of the bounding hills, has been levelled into meadow-land by the rivers, and furnishes as a rule the only arable ground in each district.

Southern uplands.

2. The southern uplands form the most southerly of the three transverse belts in Scottish topography. Extending from St. Patrick's Channel to St. Abb's Head, they constitute a well-defined belt of hilly ground, but present a striking contrast to the scenery of the Highlands. The rocks which underlie them consist almost wholly of Silurian grits, graywackes, and shales, which have been greatly plicated, the general axis of the folds running parallel with that of the whole belt, or from southwest to northeast. These uplands, though much less elevated than the Highlands (their highest point is not more than 2764 feet above the sea), rise with scarcely less abruptness above the lower tracts that bound them. Their northwestern margin for the most part springs boldly above the fields and moorlands of the midland valley, and its boundary for long distances continues remarkably straight. Their southern and southeastern limits are in general less prominently defined, except to the west of the Nith, where they plunge into the sea. Between the Solway Firth and the Cheviot Hills they pass under a line of high and picturesque escarpments which runs from Birrenswark in a northeast direction. In Berwickshire, however, they again tower boldly above the plain of the Merse. These uplands are distinguished above all by the smoothness of their surface. They may be regarded as a rolling tableland or moorland, traversed by innumerable valleys which with gentle verdant declivities conduct the drainage to the sea. This character is impressively seen from the heights of Tweedsmuir. Wide mossy moors, lying 2000 feet or more above the sea and sometimes level as a racecourse, spread out on all sides. Their continuity, however, is interrupted by numerous intervening valleys which separate them into detached flat-topped hills. Unlike the Highlands, these southern heights comparatively seldom present precipices of naked rock. Where the rock projects it more usually appears in low crags and knolls, from which long trails of gray or purple débris descend the slopes till they are lost among the grass. Hence, besides being smooth, the uplands are preëminently verdant. They form indeed excellent pasture-land, while the alluvial flats in the valleys and even some of the lower slopes of the hills are fitted for corn and green crops.

This uniformity of external aspect is doubtless traceable to the prevalence of the same kind of rocks and the same geological structure. The Silurian graywackes and shales that underlie almost the whole of these uplands weather

generally into small angular débris, and at a tolerably uniform rate of disintegration. But slight differences may readily be detected even where no feature interferes in a marked way with the general monotony. The bands of massive grit and coarse graywacke, for example, break up into larger blocks and from their greater hardness are apt to project above the general surface of the other and softer rocks. Hence their line of trend, which like that of all the other strata is in a northeasterly direction, may be followed from hill to hill even at a distance by their more craggy contours. Only in the higher tracts of these uplands are any rugged features to be seen that remind one of the more savage character of Highland scenery. In the heights of Hartfell (2651 feet) and Whitecomb (2695), whence the Clyde, Tweed, Annan, and Moffat Water descend, the high moorlands have been scarped into gloomy corries, with crags and talus-slopes, which form a series of landscapes all the more striking from the abrupt and unexpected contrast they present to everything around them. In Galloway, also, the highest portions of the uplands have acquired a ruggedness and wildness more like those of the Highlands than any other district in the south of Scotland. For this, however, there is an obvious geological reason. In that region the Silurian rocks have been invaded by large bosses of granite and have undergone a variable amount of metamorphism which has in some places altered them into hard crystalline schists. These various rocky masses, presenting great differences in their powers of resisting decay, have yielded unequally to disintegration: the harder portions project in rocky knolls, crags, and cliffs, while the softer parts have been worn down into more flowing outlines. The highest summit in the south of Scotland—Merrick (2764 feet)—consists of Silurian strata much altered by proximity to the granite, while the rest of the more prominent heights (all in Kirkcudbrightshire)—Rinns of Kells (2668 feet), Cairnsmore of Carsphairn (2612), and Cairnsmore of Fleet (2331)—are formed of granite.

Their geological structure.

The watershed of the southern uplands is of much interest in relation to their geological history. It runs from the month of Loch Ryan in a sinuous northeasterly direction, keeping near the northern limits of the region till it reaches the basin of the Nith, where it quits the uplands altogether, descends into the lowlands of Ayrshire, and, after circling round the headwaters of the Nith, strikes southeastwards across half the breadth of the uplands, then sweeps north and eastwards between the basins of the Clyde, Tweed, and Annan, and then through the moors that surround the sources of the Ettrick, Teviot, and Jed, into the Cheviot Hills. Here again the longest slope is on the east side, where the Tweed bears the whole drainage of that side into the sea. Although the rocks throughout the southern uplands have a persistent northeast and southwest strike, and though this trend is apparent in the bands of more rugged hills that mark the outcrop of hard grits and graywackes, nevertheless geological structure has been much less effective in determining the lines of ridge and valley than in the Highlands. On the southern side of the watershed, in Dumfriesshire and Galloway, the valleys run generally transversely from northwest to southeast. But in the eastern half of the uplands the valleys do not appear to have any relation to the geological structure of the ground underneath.

Water-shed of southern uplands.

3. Between the two belts of high ground lie the broad lowlands of central Scotland, on the midland valley, bounded on the north side by the range of heights that extends from the mouth of the Clyde to Stonehaven, on the south side by the pastoral uplands that stretch from Girvan to Dunbar. The simplest conception of the general aspect and structure of this important part of the kingdom is obtained by regarding it as a long trough of younger rocks let down by parallel dislocations between the older masses of the high grounds to the south and north. The lowest of these younger rocks are the various sedimentary and volcanic members of the Old Red Sandstone. These are covered by the successive formations of the Carboniferous system. The total thickness of both these groups of rock cannot be less than 30,000 feet, and, as most of them bear evidence of having been deposited in shallow water, it is manifest that they could only have been accumulated during a prolonged period of depression. The question arises whether this depression affected only the area of the midland valley itself, or whether it extended also over the regions to the north and south. Materials do not yet exist for a definite answer to this question; but so far as the evidence now before us goes there is ground for the inference that, while the depression had its maximum along the line of the lowlands, it also involved some portion at least of the high grounds on either side. In other words, the Old Red Sandstone and Carboniferous rocks, though chiefly accumulated in the broad lowland valley, crept also over some part at least of the hills on either side, where a few outlines are left to tell of their former extension. The central Lowlands of Scotland are thus of great geological antiquity. During and since the deposition of the rocks that underlie them the tract has been the scene of repeated terrestrial disturbances. Long dislocations, running like the ridges of the Highlands and the southern uplands from southwest to northeast, have sharply defined its northern and southern margins. By other fractures and unequal movements of upheaval or depression portions of the older rocks have been brought up within the bounds of the younger, and areas of the younger have been enclosed by the older. On the whole, these terrestrial disturbances have followed the same prevalent northeasterly trend, and hence a general tendency may be observed among the main ridges and valleys to run in that direction. The chains of the Ochil, Sidlaw, Pentland, Renfrew, Campsie, and Fintry Hills, and the valleys of Strathmore, Firth of Tay, and the basin of Midlothian, may be cited as examples. But, undoubtedly, the dominant cause in the determination of the topographical prominences and depressions of the district has been the relative hardness and softness of the rocks. Almost the whole of the eminences in the Lowlands consist of hard igneous rocks, forming not only chains of hills like those just referred to and others in Ayrshire and Lanarkshire, but isolated crags and hills like those of Stirling Castle, Edinburgh Castle, and others conspicuous in the scenery of Fife and the Lothians.

Central lowlands.

Of the three chief valleys in the central Lowlands two, those of the Tay and the Forth, descend from the Highlands, and one, that of the Clyde, from the southern uplands. Though on the whole transverse, these depressions furnish another notable example of that independence of geological structure already mentioned.

We now proceed to consider the leading physical features of the country with especial reference to their distinctive aspects and their respective modes of origin. Though an eminently hilly country, Scotland is not dominated by any leading mountain chain on which all the other topographical features are dependent. Its leading features are not the monotonous ridges of the high grounds but the valleys that have been opened through them. If these valleys were filled up, the high grounds would once more become what they probably were at first, elevated plains or plateaus, with no strongly marked features,—no eminences rising much above nor hollows sinking much below the general surface.

Valleys.—Even apart from any knowledge of their origin, the valleys of the country are thus seen to be its fundamental topographical element, and to deserve the first consideration in any attempt to describe and explain its physical features. The longitudinal valleys, which run in the same general direction as the ridges—that is, northeast and southwest—have had their trend defined by geological structure, such as a line of dislocation (the Great Glen), or the plications of the rocks (Lochs Ericht, Tay and Awe, and most of the sea lochs of Argyllshire). The transverse valleys run northwest or southeast and are for the most part independent of geological structure. The valley of the Garry and Tay crosses the strike of all the Highland rocks, traverses the great fault on the Highland border, and finally breaks through the chain of the Ochil Hills at Perth. The valley of the Clyde crosses the strike of the Silurian plications in the southern uplands, the boundary fault, and the ridges of the Old Red Sandstone, and pursues its northwesterly course across the abundant and often powerful dislocations of the Carboniferous system.

Valleys.

That valleys are essentially due to erosion and not to dislocation or subsidence of the earth's surface is a fact which has now been demonstrated by so overwhelming a mass of evidence from all parts of the globe that it may be accepted as one of the axioms of geology. The plications of the earth's crust which folded the rocks of the Highlands and southern uplands not improbably upraised above the sea a series of longitudinal ridges having a general northeasterly direction. The earliest rain that fell upon these ridges would run off them, first in transverse watercourses down each short slope and then in longitudinal depressions wherever such had been formed during the terrestrial disturbance. Once chosen, the pathways of the streams would be gradually deepened and widened into valleys. Hence the valleys are of higher antiquity than the mountains that rise from them. The mountains in fact have emerged out of the original bulk of the land in proportion as the valleys have been excavated. The denudation would continue so long

Origin of Scottish valleys.

as the ground stood above the level of the sea; but there have been prolonged periods of depression, when the ground, instead of being eroded, lay below the sea-level and was buried sometimes under thousands of feet of accumulated sediment, which completely filled up and obliterated the previous drainage-lines. When the land reappeared a new and independent series of valleys would at once begin to be eroded; and the subsequent degradation of these overlying sediments might reveal portions of the older topography, as in the case of the Great Glen, Lauderdale, and other ancient valleys. But the new drainage-lines have usually little or no reference to the old ones. Determined by the inequalities of surface of the overlying mantle of sedimentary material, they would be wholly independent of the geological structure of the rocks lying below that mantle. Slowly sinking deeper and deeper into the land, they might eventually reach the older rocks, but they would keep in these the lines of valley that they had followed in the overlying deposits. In process of time the whole of these deposits might be denuded from the area. The valleys would then be seen running in utter disregard of the geological structure of the rocks around them, and there might even remain no trace of the younger formations on which they began and which guided their excavation. This is probably the explanation of the striking independence of geological structure exhibited by the Tweed and the Nith.

General characteristics.

Among the valleys of Scotland certain prevailing characteristics have been recognized in the popular names bestowed upon them. "Straths" are broad expanses of low ground between bounding hills usually traversed by one main stream and its tributaries,—Strath Tay, Strath Spey, Strath Conon. The name, however, has also been applied to wide tracts of lowland which embrace portions of several valleys, but are defined by lines of heights on either side; the best example is afforded by Strathmore—the "great strath"—between the southern margin of the Highlands and the line of the Ochil and Sidlaw Hills. This long and wide depression, though it looks like one great valley, strictly speaking, includes portions of the valleys of the Tay, Isla, North Esk, and South Esk, all of which cross it. Elsewhere in central Scotland such a wide depression is known as a "howe," as in the Howe of Fife between the Ochil and Lomond Hills. A "glen" is usually a narrower and steeper-sided valley than a strath, though the names have not always been applied with discrimination. Most of the Highland valleys are true glens. The hills rise rapidly on either side, sometimes in grassy slopes, sometimes in rocky bosses and precipitous cliffs, while the bottom is occupied by a flat platform of alluvium through which a stream meanders. Frequently the bottom of some part of the valley is occupied by a lake. In the south of Scotland the larger streams flow in wide open valleys called "dales," as in Clydesdale, Tweeddale, Teviotdale, Liddisdale, Eskdale, Nithsdale. The strips of alluvial land bordering a river are known as "haughs," and where in estuaries they expand into wide plains they are termed "carses." The carses of the Forth extend seawards as far as Borrowstounness and consist chiefly of raised beaches. The Carse of Gowrie is the strip of low ground intervening between the Firth of Tay and the line of hills that stretches from Perth to Dundee.

River-gorges.

River-gorges are characteristic features in many of the valleys of Scotland. In the Old Red Sandstone they are particularly prominent where that formation has lain in the pathway of the streams sweeping down from the Highlands. In the basin of the Moray Firth some fine examples may be seen on the Nairn and Findhorn, while on the west side of the Cromarty Firth some of the small streams descending from the high grounds of the east of Ross-shire have cut out defiles in the conglomerate, remarkable for their depth and narrowness. On the south side of the Highlands still more notable instances of true "cañons" in the Old Red Sandstone are to be seen where the Ericht, Isla, and North Esk enter that formation. The well-known gorge in which the Falls of Clyde are situated is the best example in the midland valley.[1]

Flat-topped mountains.

Types of Mountain and Hill.—While the topography of the country is essentially the result of prolonged denudation, we may reasonably infer that the oldest surfaces likely to be in any measure preserved or indicated are portions of some of the platforms of erosion which have successively been produced by the wearing away of the land down to the sea-level. Relics of these platforms seem to be recognizable both in the Highlands and among the southern uplands. Allusion has already been made to the remarkable flat-topped moorlands which in the eastern Grampians reach heights of 3000 to 4000 feet above the sea. Their most familiar example perhaps is the top of Lochnagar, where, when the level of 3500 feet has been gained, the traveller finds himself on a broad undulating moor, more than a mile and a half long, sloping gently southwards towards Glen Muick and terminating on the north at the edge of a range of granite precipices. The top of Ben Macdui stands upon nearly a square mile of moor exceeding 4000 feet in elevation. These mountains lie within granite areas; but not less striking examples may be found among the schists. The mountains at the head of Glen Esk and Glen Isla, for instance, sweep upward into a broad moor some 3000 feet above the sea, the more prominent parts of which have received special names,—Driesh, Mayar, Tom Buidhe, Tolmount, Cairn na Glasha. It would hardly be an exaggeration to say that there is more level ground on the tops of these mountains than in areas of corresponding size in the valleys below. That these high plateaus are planes of erosion is shown by their independence of geological structure, the upturned edges of the vertical and contorted schists having been abruptly shorn off and the granite having been wasted and levelled along its exposed surface. They look like fragments of the original tableland of erosion out of which the present valley-systems of the Highlands have been carved. Among the southern uplands traces of a similar tableland of erosion are in many places to be detected. The top of Broad Law in Peeblesshire, for example, is a level moor comprising between 300 and 400 acres above the contour line of 2500 feet and lying upon the upturned edges of the greatly denuded Silurian grits and shales. An instructive example of the similar destruction of a much younger platform is to be found in the terraced plateaus of Skye, Eigg, Canna, Muck, Mull, and Morven, which are portions of what was probably originally a continuous plain of basalt. Though dating back only to older Tertiary time, this plain has been so deeply trenched by the forces of denudation that it has been reduced to mere scattered fragments. Thousands of feet of basalt have been worn away from many parts of its surface; deep and wide valleys have been carved out of it; and so enormously has it been wasted that it has been almost entirely stripped from wide tracts which it formerly covered and where only scattered outliers remain to prove that it once existed.

It is a curious fact, to which allusion has already been made, that broad flat-topped mountains are chiefly to be found in the eastern parts of the country. Traced westwards these forms gradually give place to narrow ridges and crests. No contrast, for instance, can be greater than that between the wide elevated moors of the eastern Grampians, and the crested ridges of western Inverness-shire and Argyllshire—Loch Hourn, Glen Nevis, Glencoe—or that between the broad uplands of Peeblesshire and the precipitous heights of Galloway. No satisfactory reason for these contrasts can be found in geological structure alone. Perhaps the key to them is to be sought mainly in differences of rainfall. The western mountains, exposed to the fierce dash of the Atlantic rains, sustain the heaviest and most constant precipitation. Their sides are seamed with torrents which tear down the solid rock and sweep its detritus into the glens and sea lochs. The eastern heights, on the other hand, experience a less rainfall and consequently a diminished rate of erosion. There is no reason to doubt that the present preponderance of rainfall in the west has persisted for an enormous duration of time.

Regarding the existing flat-topped heights among the eastern Grampians as representing what may have been the general character of the surface out of which the present Highlands have been carved, we can trace every step in the gradual obliteration of the tableland and in the formation of the most rugged and individualized forms of isolated mountain. In fact, in journeying westwards across the tops of the highland mountains we pass, as it were, over successive stages in the history of the origin of Highland scenery. The oldest types of form lie on the east side and the newest on the west. From the larger fragments of the denuded tableland we advance to ridges with narrow tops, which pass by degrees into sharp rugged crests. The ridges, too, are more and more trenched until they become groups of detached hills or mountains. In the progress of this erosion full scope has been afforded for the modification of form produced by variations in geological structure. Each ridge and mountain has been cut into its shape by denudation, but its actual outlines have been determined by the nature of the rocks and the manner in which they have yielded to decay. Every distinct variety of rock has impressed its own characters upon the landscapes in which it plays a part. Hence, amid the mo-

[1] For the principal rivers, the Tay, Spey, Forth, Clyde, and Tweed, see the separate articles, and for the Dee (Aberdeen, Kirkcudbright), etc., see articles on the respective counties.

notonous succession of ridge beyond ridge and valley after valley, considerable diversity of detail has resulted from the varying composition and grouping of the rocks.

The process by which the ancient tablelands of the country have been trenched into the present system of valleys and confluent ridges is most instructively displayed among the higher mountains, where erosion proceeds at an accelerated pace. The long "screes" or talus-slopes at the foot of every crag and cliff bear witness to the continual waste of the mountain sides. The headwaters of a river cut into the slopes of the parent hill. Each valley is consequently lengthened at the expense of the mountain from which it descends. Where a number of small torrents converge in a steep mountain recess, they cut out a crescent-shaped hollow or half-cauldron, which in the Scottish Highlands is known as a "corry." Whether the convergent action of the streams has been the sole agency concerned in the erosion of these striking concavities, or whether snow and glacier-ice may have had a share in the task, is a question that cannot at present be satisfactorily solved. No feature in Highland scenery is more characteristic than the corries, and in none can the influence of geological structure be more instructively seen. Usually the upper part of a corry is formed by a crescent of naked rock, from which long trails of débris descend to the bottom of the hollow. Every distinct variety of rock has its own type of corry, the peculiarities being marked both in the details of the upper cliffs and crags and in the amount, form, and color of the screes. The Scottish corries have been occupied by glaciers. Hence their bottoms are generally well ice-worn or strewn over with moraine stuff. Not infrequently also a small tarn fills up the bottom, ponded back by a moraine. It is in these localities that we can best observe the last relics left by the retreat of the glaciers that once overspread the country. Among these high grounds also the gradual narrowing of ridges into sharp, narrow, knife-edged crests and the lowering of these into cols or passes can be admirably studied. Where two glens begin opposite to each other on the same ridge, their corries are gradually cut back until only a sharp crest separates them. This crest, attacked on each front and along the summit, is lowered with comparative rapidity, until in the end merely a low col or pass may separate the heads of the two glens. The various stages in this kind of demolition are best seen where the underlying rock is of granite or some similar material which possesses considerable toughness, while at the same time it is apt to be split and splintered by means of its numerous transverse joints. The granite mountains of Arran furnish excellent illustrations.

Corries and glens.

Where a rock yields with considerable uniformity in all directions to the attacks of the weather it is apt to assume conical forms in the progress of denudation. Sometimes this uniformity is attained by a general disintegration of the rock into fine débris, which rolls down the slopes in long screes. In other cases it is secured by the intersection of joints, whereby a rock, in itself hard and durable, is divided into small angular blocks, which are separated by the action of the elements and slide down the declivities. In many instances the beginning of the formation of a cone may be detected on ridges which have been deeply trenched by valleys. The smaller isolated portions, attacked on all sides, have broken up under the influence of the weather. Layer after layer has been stripped from their sides, and the flat or rounded top has been narrowed until it has now become the apex of a cone. The mountain Schiehallien (3547 feet) is a noble instance of a cone not yet freed from its parent ridge. Occasionally a ridge has been carved into a series of cones united at their bases, as in the chain of the Pentland Hills. A further stage in denudation brings us to isolated groups of cones completely separated from the rest of the rocks among which they once lay buried. Such groups may be carved out of a continuous band of rock which extends into the regions beyond. The Paps of Jura, for instance, rise out of a long belt of quartzite which stretches through the islands of Isla, Jura, and Scarba. In many cases, however, the groups point to the existence of some boss of rock of greater durability than those in the immediate neighborhood, as in the Cuchullins and Red Hills of Skye and the group of granite cones of Ben Loyal, Sutherland. The most impressive form of solitary cone is that wherein after vast denudation a thick overlying formation has been reduced to a single outlier, such as Morven in Caithness and the two Ben Griams in Sutherland, and still more strikingly the pyramids of red sandstone on the western margin of Sutherland and Ross-shire. The horizontal stratification of some of these masses gives them a curiously architectural aspect, which is further increased by the effect of the numerous vertical joints by which the rock is cleft into buttresses and recesses along the fronts of the precipices and into pinnacles and finials along the summits. Solitary or grouped pyramids of red sandstone, rising to heights of between 3000 and 4000 feet above the sea, are mere remnants of a once continuous sheet of red sandstone that spread far and wide over the western Highlands.

Formation of mountain cones.

Stratified rocks when they have not been much disturbed from their original approximate horizontality weather into what are called "escarpments,"—lines of cliff or steep bank marking the edge or outcrop of harder bands which lie upon softer or more easily eroded layers. Such cliffs may run for many miles across a country, rising one above another into lofty terraced hills. In Scotland the rocks have for the most part been so dislocated and disturbed as to prevent the formation of continuous escarpments, and this interesting form of rock-scenery is consequently almost entirely absent, except locally and for the most part on a comparatively small scale. The most extensive Scottish escarpments are found among the igneous rocks. Where lava has been piled up in successive nearly horizontal sheets, with occasional layers of tuff or other softer rock between them, it offers conditions peculiarly favorable for the formation of escarpments. In the wide basalt plateaus of the Inner Hebrides these conditions have been manifested on a great scale. The Carboniferous lavas of the Campsie and Fintry Hills and of the south of Dumfriesshire and Roxburghshire likewise rise in lines of bold escarpment.

Escarpments.

Lakes.—These important features in the landscapes of Scotland present the general characters of the water-basins so profusely scattered over the northern parts of Europe and North America. They may be classified in four groups, each of which has its own peculiar scenery and a distinct mode of origin—(1) glen lakes, (2) rock-tarns, (3) moraine-tarns, (4) lakes of the plains.

(1) Glen lakes are those which occupy portions of glens. They are depressions in the valleys, not due to mere local heaping up of detritus, but true rock-basins, often of great depth. Much discussion has arisen as to their mode of origin. They have been regarded as caused by special subsidence of their areas, open fissures of the ground, general depression of the central part of each mountain district from which they radiate, and by the erosive action of glacier ice. That they are not open fissures and cannot be explained by any general subsidence of a neighboring region is now generally admitted. That glaciers have occupied the glens where these lakes exist and have worn down the rocks along the sides and bottom cannot be doubted, but whether the ice would be capable of eroding hollows so deep as many of these lakes is a question which has been answered with equal confidence affirmatively and negatively. On the other hand, to suppose that each of these hollows has been caused by a special local subsidence would involve a complex series of subterranean disturbances, for which some better evidence than the mere existence of the basins is required. Under any circumstances it is quite certain that the lakes must be of recent geological date. Any such basins belonging to the time of the plication of the crystalline schists would have been filled up and effaced long ago. So rapid is the infilling by the torrents which sweep down detritus from the surrounding heights that the present lakes are being visibly diminished, and they cannot, therefore, be of high geological antiquity. It is worthy of remark that the glen lakes are almost wholly confined to the western half of the Highlands, where they form the largest sheets of fresh water. Hardly any lakes are to be seen east of a line drawn from Inverness to Perth. West of that line, however, they abound in both the longitudinal and the transverse valleys. The most remarkable line of them is that which fills up so much of the Great Glen. Loch Ness, the largest, is upwards of 20 miles long, about 1½ miles broad, and not less than 774 feet deep in the deepest part. This great depression exceeds the general depth reached by the floor of the North Sea between Great Britain and the opposite shores of the Continent. Other important longitudinal lakes are Lochs Tay, Awe, Ericht, and Shiel. The most picturesque glen lakes, however, lie in transverse valleys, which being cut across the strike of the rocks present greater variety, and usually also more abruptness of outline. Lochs Lomond, Katrine, and Lubnaig in the southern Highlands, and Lochs Maree and More in the north are conspicuous examples.

Glen lakes.

(2) Rock-tarns are small lakes lying in rock-basins on the sides of mountains or the summits of ridges, and on rocky plateaus or plains. Unlike the glen lakes, they have no necessary dependence upon lines of valleys. On the contrary, they are scattered as it were broadcast over the districts in

Rock-tarns.

which they occur, and are by far the most abundant of all the lakes of the country. Dispersed over all parts of the western Highlands, they are most numerous in the north-west, especially in the Outer Hebrides and in the west of Ross-shire and Sutherland. The surface of the Archæan gneiss is so thickly sprinkled with them that many tracts consist almost as much of water as of land. They almost invariably lie on strongly ice-worn platforms of rock. Their sides and the rocky islets which diversify their surface have been powerfully glaciated. They cannot be due to either fracture or subsidence, but are obviously hollows produced by erosion. They have accordingly with much probability been assigned to the gouging action of the sheets of land-ice by which the general glaciation of the country was effected. In the southern uplands, owing probably to the greater softness and uniformity of texture among the rocks, rock-tarns are comparatively infrequent, except in Galloway, where the protrusion of granite and its associated metamorphism have given riso to conditions of rock-structure more like those of the Highlands. Over the rocky hill-ranges of the central Lowlands rock-tarns occasionally make their appearance.

(3) Moraine-tarns—small sheets of water ponded back by some of the last moraines shed by the retreating glaciers—are confined to the more mountainous tracts. Among the southern uplands many beautiful examples may be seen, probably the best knowu and certainly one of thc most picturesque being the wild lonely Loch Skene lying in the recess of Whitecomb at the head of the Moffat Water. Others are sprinkled over the higher parts of the valleys in Galloway. None occur in the central Lowlands. In the Highlands they may be couuted by hundreds, nestling in the bottoms of the corries. In the northwesteru couuties, where the glaciers continued longest to descend to the sea-level, lakes retained by moraine-barriers may be found very little above the sea. Moraine-tarns.

(4) The lakes of the plains lie in hollows of the glacial detritus which is strewn so thickly over the lower grounds. As these hollows were caused by original irregular deposition rather than by erosion, they have no intimate relation to the present draiuage-lines of the country. The lakes vary in size from mere pools up to wide sheets of water several square miles iu area. As a rule they are shallow in proportion to their extent of surface. Though still sufficiently numerous in the Lowlands, they were once greatly more so, for, partly from natural causes and partly by artificial means, they have been made to disappear. The largest sheets of fresh water in the midland valley are of this class, as Loch Leven and the Lake of Menteith. Lakes of the plains.

Coast-Line.—The eastern and western seaboards of Scotland present a singular contrast. The former is indented by a series of broad arms of the sea, but is otherwise tolerably unbroken. The land slopes gently down to the margin of the sea or to the edge of cliffs that have been cut back by the waves. The shores are for the most part low, with few islands in front of them, and cultivation comes down to the tide-line. The western side of the country, on the contrary, is from end to end intersected with long narrow sea lochs or fjords. The land shelves down rapidly into the sea and is frouted by chains and groups of islands. This contrast has sometimes been erroneously referred to greater erosion by the waves on the western than on the eastern coast. The true explanation, however, must be sought in the geological structure of the land. The west side of Scotlaud, as we have seen, has been more deeply eroded than the eastern. The glens are more numerous there and on the whole deeper and narrower. Many of them are prolonged under the sea; in other words, the narrow deep fjords which wind so far into the land are seaward continuations of the glens which emerge from their upper ends. The presence of the sea in these fjords is an accident. If they could be raised out of the sea they would become glens, with lakes filling up their deeper portions. That this has really been their history can hardly admit of question. They are submerged land-valleys, and as they run down the whole western coast they show that side of the country to have subsided to a considerable depth beneath its former level. Thc Scottish sea lochs must be viewed in connection with those of western Ireland and of Norway. The whole of this northwestern coast-liue of Europe bears witness to recent submergence. The bed of the North Sea, which at no distant date in geological history was a land surface across which plants and animals migrated freely into Great Britain, sank beneath the sea-level, while the Atlantic advauced upon the westeru margiu of the continent and filled the seaward ends of what had previously been valleys open to thc sun. Not improbably the amount of subsidence was greater towards the west. Coast-line.

Nearly the whole coast-line of Scotland is rocky. On the east side of the country, indeed, the shores of the estuaries are generally low, but the land between the mouths of these inlets is more or less precipitous. On the west side the coast is for the most part either a steep rocky declivity or a sea-wall, though strips of lower ground are found in the bays. The sea-cliffs everywhere vary in their characters according to the nature of the rock out of which they have been carved. At Cape Wrath precipices nearly 300 feet high have been cut out of the Archæan gneiss. The varying texture of this rock, its irregular foliation and jointing, and its ramifying veins of pegmatite conspire to give it very unequal powers of resistance in different parts of its mass. Consequently it projects in irregular bastions and buttresses and retires into deep recesses and tunnels, showing everywhere a ruggedness of aspect which is eminently characterestic. In striking contrast to these precipices are those of the Cambrian red sandstone a few miles to the east. Vast vertical walls of rock shoot up from the waves to a height of 600 feet, cut by their perpendicular joints into quadrangular piers and projections, some of which even stand out alone as cathedral-like islets in front of the main cliff. The sombre coloring is relieved by lines of vegetation along the edges of the nearly flat beds which project like vast cornices and serve as nesting-places for crowds of sea-fowl. On the west side of the country the most notable cliffs south from those of Cape Wrath and the Cambrian sandstones of Sutherland are to be found among the basaltic islands, particularly in Skye, where a magnificent range of precipices rising to 1000 feet bounds the western coast-line. The highest cliffs in the country are found among the Shetland and Orkney Islands. The sea-wall of Foula, one of the Shetland group, and the western front of Hoy in Orkney rise like walls to heights of 1100 to 1200 feet above the waves that tunnel their base. Caithness is one wide moor, terminating almost everywhere in a range of sea-precipices of Old Red Sandstone. Along the eastern coast-line most of the cliffs are formed of rocks belonging to the same formation. Beginning at Stonehaven, an almost unbroken line of precipice varying up to 200 feet in height runs southward to the mouth of the estuary of the Tay. The southern uplands plunge abruptly into the sea near St. Abb's Head in a noble range of precipices 300 to 500 feet in height, and on the western side the same high grounds terminate in a long broken line of sea-wall, which begins at the mouth of Loch Ryan, extends to the Mull of Galloway, and reappears again in the southern headlands of Wigtown and Kirkcudbright. One of the most picturesque features of the Scottish sea-cliffs is the numerous "stacks" or columns of rock which, during the demolition and recession of the precipices, have been isolated and left standing amidst the waves. These remnants attain their most colossal size and height on the cliffs of Old Red Sandstone. Thus the Old Man of Hoy in Orkney is a huge column of yellow sandstone between 400 and 500 feet high, forming a conspicuous landmark in the north. The coast of Caithness abounds in outstanding pillars and obelisks of flagstoue.

The low shores on the west coast are not infrequently occupied by sand-dunes. Such accumulations fringe the western margin of the North and South Uist, and are found in many bays from the north of Sutherland to the coast of Ayrshire. They are more abundant on the east coast, especially on the shores of Aberdeenshire, between the mouths of the two Esks, on both sides of the mouth of the Firth of Tay, aud at various places in the Firth of Forth. Raised sea-beaches likewise play a part in the coast scenery of the country. These alluvial terraces form a strip of low fertile land between the edge of the sea and the rising ground of the interior, and among the western fjords sometimes supply the only arable soil in their neighborhood, their flat green surfaces presenting a strong contrast to the brown and barren moors that rise from them. Most of the seaport towns of the country stand upon platforms of raised beach. Considerable deposits of mud, silt, and sand are accumulating in most of the estuaries. In the Tay, Forth, and Clyde, where important harbors are situated, considerable expense is involved in dredging to remove the sediment continually brought down from the land and carried backward and forward by the tides. Wide alluvial flats are there exposed at low water.

While no islands except mere solitary rocks like May Island, the Bass Rock, and Inchkeith diversify the eastern seaboard, the western side of Scotland presents a vast number, varying in size from such extensive tracts as Skye down to the smallest sea-stack or skerry. Looked at in the broadest way, these numerous islands may be regarded as belonging to two groups or series,—the Outer and the Inner Hebrides. The Outer Hebrides, extending from Barra Head to the Butt of Islands.

Lewis, consist of a continuous chain of islands composed (with the exception of a small tract in the east of Lewis) entirely of Archæan rocks. Most of the ground is low, rocky, and plentifully dotted over with lakes; but it rises into mountainous heights in Harris, some of the summits attaining elevations of 2600 feet. The general trend of this long belt of islands is north-northeast. The Inner Hebrides form a much less definite group. They may be regarded as beginning with the Shiant Isles in the Minch and stretching to the southern headlands of Isla, the most important members being Skye, Mull, Isla, Jura, Rum, Eigg, Coll, Tiree, and Colonsay. The irregularity of this fringe of islands has no doubt been in chief measure brought about by its remarkable diversity of geological structure. Archæan gneiss, Cambrian sandstone, Silurian quartzite, limestone, and schist, Jurassic sandstone and limestone, Cretaceous sandstone, and Tertiary basalts, gabbros, and granitic rocks all enter into the composition of the islands.

Within the limits of this article it is only possible to allude to some of the more important influences of the topography on the history of the inhabitants. How powerfully the configuration of the country affects the climate is shown in the remarkable difference between the rainfall of the mountainous west and of the lowland east. This difference has necessarily affected the character and employments of the people, leading to the development of agriculture on the one side and the raising of sheep and cattle on the other. The fertile low grounds on the east have offered facilities for the invasions of Romans, Norsemen, and English, while the mountainous fastnesses of the interior and the west have served as secure retreats for the older Celtic population. While, therefore, Teutonic people have spread over the one area, the earlier race has to this day maintained its ground in the other. Not only the external configuration but the internal geological structure of the country has profoundly influenced the progress of the inhabitants. In the Highlands no mineral wealth has been discovered to stimulate the industry of the natives or to attract the labor and capital of strangers. These tracts remain still as of old sparsely inhabited and given over to the breeding of stock and the pursuit of game. In the Lowlands, on the other hand, rich stores of coal, iron, lime, and other minerals have been found. The coal-fields have gradually drawn to them an ever-increasing share of the population. Villages and towns have there sprung recently into existence and have rapidly increased in size. Manufactures have been developed and commerce has advanced with accelerated pace. Other influences have of course contributed largely to the development of the country, but among them all the chief place must undoubtedly be assigned to that fortunate geological structure which, amid the revolutions of the past, has preserved in the centre of Scotland those fields of coal and ironstone which are the foundations of the national industry. (A. GE.)

Influences of topography on inhabitants.

Climate.—In considering the climate of Scotland the first place must be assigned to the temperature of the various districts during the months of the year, it being this which gives the chief characteristics of climate and not the mean temperature of the whole year. Thus, while the annual temperatures of the west and east coasts are nearly equal, the summer and winter temperatures are very different. At Portree (on east coast of Skye) the mean temperatures of January and July are 39° and 56.8°, whereas at Perth they are 37.5° and 59.0°. The prominent feature of the isothermals of the winter months is their north and south direction, thus pointing not to the sun but to the warm waters of the Atlantic as the more powerful influence in determining the Scottish climate at this season through the agency of the prevailing westerly winds. The Atlantic is in truth a vast repository of heat, in which the higher temperature of summer and that of more southern latitudes are treasured up against the rigors of winter; and in exceptionally cold seasons the ocean protects all places in its more immediate neighborhood against the severe frosts which occur in inland situations. While this influence of the ocean is felt at all seasons, it is most strikingly seen in winter; and it is more decided in proportion as the locality is surrounded by the warm waters of the Atlantic. At Edinburgh the temperature is 27.0° and at Lerwick 32.5° higher than would otherwise be the case; in other words, but for the ameliorating influence of the Atlantic the temperature of Edinburgh in mid-winter would only be 12.5° and of Lerwick 7.5°, or such winters as characterize the climates of Greenland and Iceland. The influence of the North Sea is similarly apparent, but in a less degree. Along the whole of the eastern coast, from the Pentland Firth southwards, temperature is higher than what is found a little inland to the west. The lowest temperature yet observed in the British Isles was —16.0°, which occurred near Kelso in December, 1879. In summer, everywhere, latitude for latitude, temperature is lower in the west than in the east and inland situations. In winter the inland climates are the coldest, but in summer the warmest. The course of the isothermal lines at this season is very instructive. Thus the line of 59° passes from the Solway directly northwards to the north of Perthshire and thence curves round eastwards to near Stonehaven. From Teviotdale to the Grampians temperature falls only one degree; but for the same distance farther northwards it falls three degrees. The isothermal of 56° marks off the districts where the finer cereals are most successfully raised. This distribution of the temperature shows that the influence of the Atlantic in moderating the heat of summer is very great and is felt a long way into the interior of the country. On the other hand, the high lands of western districts by robbing the westerly winds of their moisture, and thus clearing the skies of eastern districts, exercise an equally striking effect in the opposite direction,—in raising the temperature.

Climate.

There is nearly twice as much wind from the southwest as from the northeast, but the proportions vary greatly in different months. The southwest prevails most from July to October, and again from December to February; accordingly in these months the rainfall is heaviest. These are the summer and winter portions of the year, and an important result of the prevalence of these winds, with their accompanying rains, which are coincident with the annual extremes of temperature, is to imprint a more strictly insular character on the Scottish climate, by moderating the heat of summer and the cold of winter. The northeast winds acquire their greatest frequency from March to June and in November, which are accordingly the driest portions of the year.

The mountainous regions of Scotland are mostly massed in the west and lie generally north and south, or approximately perpendicular to the rain-bringing winds from the Atlantic. Hence the westerly winds are turned out of their horizontal course, and, being thrust up into the higher regions of the atmosphere, their temperature is lowered, when the vapor is condensed into cloud and deposits in rain the water they can no longer hold in suspension. Thus the climates of the west are essentially wet. On the other hand, the climates of the east are dry, because the surface is lower and more level; and the breezes borne thither from the west, being robbed of most of their superabundant moisture in crossing the western hills, are therefore drier and precipitate a greatly diminished rainfall. It thus happens that the driest climates in the east are those which have to southwestwards the broadest extent of mountainous ground, and that the wettest eastern climates are those which are least protected by high lands on the west. The breakdown of the watershed between the Firths of Clyde and Forth exposes southern Perthshire, the counties of Clackmannan and Kinross, and nearly the whole of Fife to the clouds and rains of the west, and their climates are consequently wetter than those of any other of the eastern slopes of the country. The driest climates of the east, on the other hand, are in Tweeddale about Kelso and Jedburgh, the low grounds of East Lothian, and those on the Moray Firth from Elgin round to Dornoch. In these districts the annual rainfall for the twenty-four years ending 1883 was about 26 inches, whereas over extensive breadths in the west it exceeds 100 inches, in Glencroe being nearly 130 inches and on the top of Ben Nevis 150 inches. (A. B.)

PART III.—STATISTICS.

Population; Vital and Social Statistics.—At the end of the 15th century it is supposed that the population of Scotland did not exceed 500,000,—Edinburgh having about 20,000 inhabitants, followed by Perth with about 9000, and Aberdeen, Dundee, and St. Andrews each with about 4000. By the time of the Union in 1707 it is supposed to have reached 1,000,000, while according to the returns furnished by the clergy to Dr. Webster in 1755 it was 1,265,380. At the time of the first Government census in 1801 it had reached 1,608,420. The increase through all the succeeding decades has been continuous, though fluctuating in amount, and in 1881 it had

Population.

reached 3,735,573 (males 1,799,475, females 1,936,098),—an increase within the eighty years of 132 per cent. During the same period the population of England and Wales had increased 192 per cent., while the population of Ireland, owing to a rapid decrease since 1841, does not now differ greatly from what it was at the beginning of the century. The following table (I.) gives the areas of the various counties and of the whole of Scotland, the population in 1871 and 1881, the number of persons to the square mile of land-surface in the latter year, and the increase or decrease per cent. between 1871 and 1881:

Counties.	Area in Acres.	Population.		Pop. per Sq. Mile, 1881.	Increase or Decrease per cent. 1871-1881.
		1871.	1881.		
Aberdeen	1,262,098	244,603	267,990	137	+ 9.56
Argyll	2,134,274	75,679	76,468	24	+ 1.04
Ayr	735,262	200,809	217,519	193	+ 8.32
Banff	413,791	62,023	62,736	98	+ 1.15
Berwick	297,161	36,486	35,392	77	— 3.00
Bute	143,997	16,977	17,657	81	+ 4.00
Caithness	448,867	39,992	38,865	57	— 2.82
Clackmannan	31,876	23,747	25,680	539	+ 8.14
Dumbarton	172,677	58,857	75,333	312	+27.99
Dumfries	705,946	74,808	76,140	72	+ 1.78
Edinburgh	234,926	328,379	389,164	1075	+18.51
Elgin or Moray	312,346	43,128	43,788	92	+ 1.53
Fife	328,427	160,735	171,931	349	+ 6.96
Forfar	569,851	237,567	266,360	304	+12.12
Haddington	179,142	37,771	38,502	142	+ 1.94
Inverness	2,767,078	88,015	90,454	22	+ 2.77
Kincardine	248,195	34,630	34,464	90	— 0.48
Kinross	49,812	7,198	6,697	92	— 6.96
Kirkcudbright	610,343	41,859	42,127	47	+ 0.64
Lanark	568,868	765,339	904,412	1026	+18.17
Linlithgow	81,113	40,965	43,510	363	+ 6.21
Nairn	127,906	10,225	10,455	58	+ 2.25
Orkney and Shetland	638,332	62,882	61,749	Orkney 85 Shetland 54	+ 2.46 — 6.02
Peebles	227,869	12,330	13,822	39	+12.10
Perth	1,664,690	127,768	129,007	51	+ 0.97
Renfrew	162,428	216,947	263,374	1075	+21.40
Ross and Cromarty	2,078,896	80,955	78,547	25	— 2.97
Roxburgh	428,464	49,407	53,442	80	+ 8.17
Selkirk	166,524	18,572	25,564	99	+37.65
Stirling	298,579	98,218	112,443	251	+14.48
Sutherland	1,359,846	24,317	23,370	12	— 3.89
Wigtown	327,906	38,830	38,611	79	— 0.56
Total	19,777,490	3,360,018	3,735,573	125	+11.18

Table II. (see below) affords a comparison of the numbers of the population in 1861, 1871, and 1881 as grouped in towns, villages, and rural districts. The returns do not afford a means of comparison between earlier years than those given. A striking fact deserving of mention is that in every county in Scotland the population increased between 1801 and 1841, the increase being more than 10 per cent. in each county, with the exception of Argyll, Perth, and Sutherland. The census returns for these years do not supply materials for an accurate estimate as to the increase of the purely rural or agricultural population, but it must have been considerable. Between 1841 and 1881 the following counties declined in population: Argyll, Inverness, Kinross, Perth, Ross and Cromarty, Sutherland, and Wigtown,—all chiefly agricultural, and five of them in the Highlands, where much of the land was held by crofters. Only one county, Kinross, has a smaller population in 1881 than in 1801. Between 1851 and 1881 the island population, chiefly crofters, decreased by 4866, and the rural population between 1861 and 1881 by 125,583. In the following Highland counties the diminution in rural population between 1861 and 1881 was as follows: Argyll from 60,109 to 46,081, Caithness from 28,279 to 24,309, Inverness from 74,439 to 67,355, Perth from 69,480 to 57,016, Ross and Cromarty from 59,147 to 49,882, and Sutherland from 21,560 to 18,696. In the total population of Scotland the rate of increase was considerably less between 1841 and 1881 than during the first forty years of the century,—42.5 to 62.9 per cent. The rates per cent. of increase in the several decades from 1801 have been as follows: 12.27, 15.82, 13.04, 10.82, 10.25, 6, 9.72, and 11.18. The high rate of increase between 1871 and 1881 was due to an exceptional briskness of trade, and unless it has been maintained (which is not probable) the estimate of the registrar-general, which makes the population in 1885 number 3,907,736, must be regarded as much too sanguine. Table III. (see below) gives the population of the eight largest towns of Scotland at decennial periods since 1801. It is a curious fact that each of these towns has maintained its place in the "eight," although several towns now tread closely on the heels of Perth, whose rate of progress with that of Paisley has lagged greatly behind that of the other six.

Distribution of population.

While in England and Wales the number of persons to the square mile in 1881 was 452 and in Ireland 159, in Scotland the number was only 125. The small density of Scotland is due chiefly to the large proportion of mountainous land. In the northwestern counties the density was only 23 to the square mile, in the northern 34, in the west midland 68, in the southern 68, while in the northeastern it was 115, in the east midland 149, in the southeastern 299, and in the southwestern—Renfrew, Ayr, and Lanark—614. Table IV. (see p. 552) shows by the excess of births over deaths the increase that should have taken place between 1861 and 1871, and between 1871 and 1881 (but for the balance of emigration over immigration), compared with the actual increase, the grouping being into towns with over 25,000 inhabitants, towns between 10,000 and 25,000, towns under 10,000 and above 2000, and rural districts. It is impossible to make a comparison between 1861 and 1881 inasmuch as the proportion of large and small towns and rural districts has varied. It must also be explained that in comparing 1861 and 1871 the census of 1861 is taken as the authority for the grouping and in comparing 1871 and 1881 the census of 1871. This table shows in both decades an actual increase in the large and in the principal towns greater than that

TABLE II.

Groups.	Total Population.			Increase or Decrease, 1861 to 1871.		Increase or Decrease, 1871 to 1881.		Percentage to Total Population.		
	1861.	1871.	1881.	Actual.	Percentage.	Actual.	Percentage.	1861.	1871.	1881.
Towns	1,616,134	1,951,704	2,306,852	+335,570	+20.76	+355,148	+18.20	52.78	58.09	61.75
Villages	339,740	386,993	447,884	+ 47,253	+13.90	+ 60,891	+15.73	11.09	11.52	11.99
Rural districts	1,106,420	1,021,321	980,837	— 85,099	— 7.69	— 40,484	— 3.96	36.13	30.39	26.26
Scotland	3,062,294	3,360,018	3,735,573	+297,724	+ 9.72	+375,555	+11.18	100.00	100.00	100.00

TABLE III.

Name.	1801.	1811.	1821.	1831.	1841.	1851.	1861.	1871.	1881.	Estimate 1885.
Edinburgh } Leith }	81,404	101,492	136,351	136,548 / 25,855	132,977 / 25,984	160,302 / 30,919	168,121 / 33,628	196,979 / 44,280	228,357 / 59,485	250,616 / 68,414
Glasgow	77,058	103,224	140,432	193,030	261,004	329,097	394,864	547,156	551,415	519,965
Aberdeen	26,992	34,640	43,821	56,681	63,288	71,973	73,805	88,108	105,189	113,212
Dundee	27,396	31,058	32,126	48,026	64,629	78,931	90,417	118,977	140,239	152,838
Paisley	25,058	29,461	38,102	46,222	48,263	47,952	47,406	48,240	55,638	59,108
Greenock	17,190	18,750	21,719	27,082	36,169	36,689	42,098	57,146	66,704	73,695
Perth	16,388	16,564	18,197	19,238	20,407	23,835	25,250	25,585	28,980	31,322

resulting from excess of births over deaths. It is the result not only of migration from the small towns and rural districts but of the immigration of English, Irish, and foreigners, and the return of natives of Scotland from abroad. By a comparison with Table II. it will be observed that the increase in the rural districts between the decades in Table IV. occurs only in the villages, and a closer examination of Table IV. further shows that any seeming increase is really delusive, and arises from the fact that there is no provision for the increase in the number of small towns. Thus according to the grouping of 1871 the rural population of 1871 was nearly 28,000 less than the rural population of 1861 according to the grouping of 1861. It is from the villages and small towns that the large towns are principally recruited, the purely rural population preferring as a rule to emigrate.

Table V. shows the nationalities of the people of Scotland in 1871 and 1881, with the nationalities in 1881 in those burghs which had a population of 10,000 and upwards:

Nationality.

This table indicates not merely an actual but a proportional increase in non-natives, there being an actual increase but a proportional decrease of natives of Ireland, and both an actual and a proportional increase of natives of England. Over the whole of Scotland the proportion of non-natives is a little over 9 per cent., while in the burghs it is nearly 13 per cent. The number of persons of Scottish birth in Ireland in 1881 was 22,328, and in England it was 253,528, —a total in the two countries of 275,856. On the other hand, the natives of the two countries in Scotland in 1881 were together 308,762, so that there is a smaller migration from Scotland to these countries than from these countries to Scotland.

The following table (VI.) shows the emigration of persons of Scottish origin from the United Kingdom at various periods since 1853: Comparing 1856–60 with 1881–85 it will be seen that the number of emigrants has more than doubled,—an increase of course proportionately much greater than the population. There are no statistics as to the number of immigrants into Scotland; and the significance of Table VI. is further lessened by the fact that it includes persons who may have been for some time resident in England or Ireland, or who may have been born there of Scottish parentage, and also supplies no information regarding emigration to the Continent. Only the principal ports, moreover, are included in the return.

Emigration.

TABLE IV.

Groups.	Population according to Grouping in 1861.		Population according to Grouping in 1871.		Births 1861–71.	Deaths 1861–71.	Births 1871–81.	Deaths 1871–81.	Increase or Decrease from 1861 to 1871.		Increase or Decrease from 1871 to 1881.	
	1861.	1871.	1871.	1881.					Actual.	Excess of Births over Deaths.	Actual.	Excess of Births over Deaths.
Principal towns	884,955	1,068,556	1,193,940	1,411,536	376,856	274,511	429,679	296,285	+183,601	+102,345	+217,596	+133,394
Large towns	254,030	310,165	327,734	388,797	103,519	68,769	150,095	94,498	+ 56,135	+ 34,750	+ 61,063	+ 55,597
Small towns	502,833	540,807	696,958	790,796	190,128	115,147	293,220	171,485	+ 37,974	+ 74,981	+ 93,838	+121,735
Rural districts	1,420,476	1,440,490	1,141,386	1,144,444	450,288	247,769	361,357	203,200	+ 20,014	+202,519	+ 3,058	+158,157
Scotland	3,062,294	3,360,018	3,360,018	3,735,573	1,120,791	706,196	1,234,351	765,468	+297,724	+414,595	+375,555	+468,883

TABLE VI.

Years	1853-55	1856-60	1861-65	1866-70	1871-75	1876-80	1881-85	1853-85
Emigrants	62,514	59,016	62,461	85,621	95,055	70,596	133,527	568,790

TABLE V.

Nationalities.	Scotland 1871.		Scotland 1881.		Burghs 1881.	
	Number.	Percentage to Pop.	Number.	Percentage to Pop.	Number.	Percentage to Pop.
Scots	3,061,531	91.117	3,397,759	90.957	1,429,012	87.116
Irish	207,770	6.184	218,745	5.856	141,626	8.634
English	69,401	2.065	90,017	2.410	51,402	3.134
British colonials	9,740	0.290	12,874	0.345	7,768	0.473
British subjects from abroad	5,068	0.151	7,024	0.188	4,954	0.254
Foreigners	4,698	0.140	6,399	0.171	4,171	0.302
Welsh	1,081	0.032	1,806	0.048	882	0.054
From Channel Isles	729	0.021	949	0.025	545	0.033
Totals	3,360,018	100.000	3,735,573	100.000	1,640,360	100.000

The male population in 1881 was 1,799,475, an increase since 1871 of 12.2 per cent.; the female population 1,936,098, an increase of only 10.2 per cent. Since 1811, when there were 118.5 females to every 100 males, the proportion has been continuously diminishing, and in 1881 it was 107.6, but still greater than prevails either in England, which was 105.5, or in Ireland, which was 104.3. The proportion differs greatly in different counties, being as high as 134.71 in Shetland, chiefly on account of the number of males at sea. In Scotland the

Vital statistics.

TABLE VII.

Sexes.	Scotland.			England and Wales.			Ireland.		
	Single.	Married.	Widowed.	Single.	Married.	Widowed.	Single.	Married.	Widowed.
Males	66.281	30.441	3.278	61.932	34.628	3.440	68.714	27.501	3.785
Females	62.854	28.957	8.189	59.226	33.282	7.492	63.442	26.976	9.582

SCOTLAND

SCALE OF MILES
0 10 20 30 40

Railroads
Submarine Cables
Canals

Size of type indicates relative importance of places

ATLANTIC OCEAN
NORTH SEA
IRELAND
GULF OF THE HEBRIDES
Outer Hebrides or Long Island
THE MINCH
Lewis
Harris
N. Uist
LITTLE MINCH
South Uist
Barra
Skye
Isle of Skye
Raasay I.
Rona
Scalpa
Pabbay
Berneray
Benbecula
Eriskay
Barra Head
Butt of Lewis
Cellar Hd.
Tolsta Hd.
Flannan Is. or Seven Hunters
Loch Roag
Gallon Hd.
Barvas
Eragaly
Broad Bay
Eye Peninsula
Stornoway
Stornoway Harbor
L. Erisort
L. Langabhat
L. Resort
Scarpa
Forest of Harris
Loch Seaforth
W.L. Tarbert
Taransay
L. Clay
Shiant Is.
Toe Hd.
Scalpa
E.L. Tarbert
Pabbay
Sound of Harris
Ru Renish
Fiaddachuan
Valley
Vaternish Pt.
L. Maldy
L. Scare
Pt. of Aird
L. Staffin
Quirding
Loch Snizort
The Storr
Snizort
Dunvegan L.
L. Pooltiel
Kilmuir
Portree
Isle of Skye
Bracadale
L. Bracadale
Talisker
Carbost
Scalpa
Aird Vuld
L. Skiport
L. Eynort
L. Boisdale
Eriskay
Canna I.
Cuillin Hills
Glen Sligachan
Sligachan
Broadford
Kyle Akin
Raasay
Inner Sound
Kyle of Lochalsh
Loch Carron
Strome Ferry
Balmacara
Cas. Donan
L. Duich
Scour-Ouran
Ben Attow
Ben Sgriol
Glen Shiel
Fort Augustus
L. Oich
L. Cluny
L. Lochy
Caledonian Canal
Glen Garry
L. Quoich
The Pan
L. Arkaig
Loch Morar
Mallaig
Hyskeir I.
Sd. of Sleat
Sleat Pt.
Eigg I.
Muck I.
L. Aylort
Loch Nevis
Loch Shiel
Loch Eil
Fort William
Ben Nevis
Ben Alder
Loch Treig
Loch Laggan
Loch Lochy
Spean
Tulloch
Banavie
Ardnamurchan Pt.
Ben Resipol
Strontian
Loch Sunart
Tobermory
L. Erisa
Coll
Passage of Coll
Tiree
L. Tuadh
Ulva I.
Staffa
Loch Scridan
Iona
Sd. of Iona
Ross of Mull
Ben More
Kyrera I.
Mull
Oban
Appin
Loch Linnhe
Loch Leven
Glen Etive
Loch Etive
Kilninver
Firth of Lorne
Sound of Jura
Loch Melfort
Shuna
Inveraray
Loch Awe
Ben Cruachan
Scarba I.
L. Craignish
Craignish
Arrochar
Strachur
Ben Vorlich
Ben Ledi
Callander
Aberfoyle
Loch Lomond
Luss
Tarbet
Arrochar
Ardlui
Dalmally
L. Lubnaig
L. Voil
Lochearnhead
Ben Lui
Killin
Crianlarich
Tyndrum
Glen Lyon
Loch Tay
Kenmore
Aberfeldy
Weem
Dunkeld
Birnam
Ben Vrackie
Pitlochry
Schiehallion
Loch Rannoch
Rannoch
Tummel R.
Loch Tummel
Blair Atholl
Glen Tilt
Braemar
Ben Macdhui
Cairngorm Mts.
Monadhliath Mts.
Fall of Foyers
Loch Ness
Urquhart Castle
Drumnadrochit
Glen Urquhart
Glen Moriston
Loch Cluanie
Loch Garry
Loch Quoich
Loch Hourn
Knoydart
Kyle of Sleat
Skye
Raasay
Rona
Scalpa
Pabbay
Barra
Vatersay
Sd. of Vatersay
Sandray
Pabbay Isles
Hyskeir I.
Neola Mt.
Barra Head
Gulf of the Hebrides
Ardnamurchan Pt.
Muck I.
Eigg I.
Rum I.
Canna I.
Sleat Pt.
Kyle of Lochalsh
Loch Alsh
Glenelg
Kyle Rhea
Skye
Raasay
Rona
Scalpa
Applecross
Jeantown
Shieldaig
Loch Torridon
Torridon
Ben Eighe
Liathach
Beinn Alligin
Loch Maree
Gairloch
Loch Ewe
Aultbea
Poolewe
Loch Ewe
Ru Rea
Greenstone Pt.
Rhu Coygach
Enard Bay
Rhu Stoir
Eddrachilles Bay
L. Inver
Loch Inver
Stoer
Point of Stoer
Handa I.
L. Laxford
L. Inchard
Scourie
Kylesku
Loch Glendhu
Loch Glencoul
Unapool
Loch Assynt
Ben More Assynt
Ben Hee
L. More
L. Naver
Loch Naver
Strath Naver
Ben Klibreck
L. Loyal
Ben Hope
L. Hope
Tongue
Loch Eriboll
Whiten Hd.
Durness
C. Wrath
Kyle of Durness
Kyle of Tongue
Strath Melness
Bettyhill
Strathy Pt.
Farr Pt.
Strathy
Melness
Reay
Thurso
Thurso R.
Castletown
Dunnet
Dunnet Hd.
Brims Ness
Dwarwick Hd.
Dwarwick Pier
Harbour
Scrabster
Holborn Hd.
Holborn Head
Pentland Firth
Stroma
Stroma Skerries
Duncansbay Hd.
Duncansbay Head
Freswick Bay
Freswick L.
Keiss
Keiss Bay
Wick Bay
Wick
Noss Hd.
Sinclair B.
L. Watten
Watten
Halkirk
Halkirk
Carlshay
Carlshay
Dunbeath
Latheron
Lybster
Sarclet
Ulbster
Fulteneytown
Berriedale
Morven
Helmsdale
Port Gower
Helmsdale R.
Kildonan
Loch Shin
Rogart
Lairg
Oykel R.
Invershin
Golspie
Dunrobin Castle
Clyne
Brora
L. Fleet
Dornoch
Dornoch Firth
Tarbat Ness
Portmahomack
Edderton
Tain
Bonar Br.
Ben Wyvis
Ben Uarary
Invergordon
Alness
Alness R.
L. Glass
Loch Glass
Dingwall
Cromarty
Cromarty Firth
Findhorn
Hilton
Nigg
Moray Firth
Burghead
Hopeman
Lossiemouth
Elgin
Forres
Findhorn R.
Nairn R.
Nairn
Auldearn
Cawdor
Kessock
Kessock Ferry
Inverness
Beauly
Beauly R.
Beauly Firth
Dochfour
Loch Ness
Loch Dochfour
Loch Oich
Loch Lochy
Loch Arkaig
Loch Morar
Loch Shiel
Loch Eil
Fort William
Ben Nevis
Ben Alder
Loch Treig
Loch Laggan
Loch Lochy
Spean
Tulloch
Banavie
Caledonian Canal
Glen Garry
Glen Moriston
Glen Urquhart
Drumnadrochit
Urquhart Castle
Loch Ness
Fort Augustus
Monadhliath Mts.
Fall of Foyers
Strathspey
Rothiemurchus
Aviemore
Boat of Garten
Grantown
Strathspey
Spey R.
Spey Bay
Findhorn R.
Findhorn
Forres
Elgin
Lossiemouth
Burghead
Hopeman
Cromarty
Cromarty Firth
Findhorn
Hilton
Nigg
Moray Firth
Tarbat Ness
Portmahomack
Dornoch
Dornoch Firth
Tain
Edderton
Bonar Br.
Ben Wyvis
Ben Uarary
Invergordon
Alness
Alness R.
L. Glass
Loch Glass
Dingwall
Strathpeffer
Loch Fannich
Achnasheen
Loch Torridon
Torridon
Shieldaig
Applecross
Jeantown
Strome Ferry
Balmacara
Kyle of Lochalsh
Skye
Raasay
Rona
Scalpa
Kyle Rhea
Glenelg
Loch Alsh
Cas. Donan
L. Duich
Scour-Ouran
Ben Attow
Ben Sgriol
Glen Shiel
Loch Cluanie
Loch Garry
Loch Quoich
Loch Hourn
Knoydart
Kyle of Sleat
Sleat Pt.
Eigg I.
Muck I.
Rum I.
Canna I.
Ross & Cromarty
Sutherland
Caithness
Inverness
Nairn
Elgin
Banff
Aberdeen
Kincardine
Forfar
Perth
Kinross
Fife
Argyll
Dumbarton
Stirling
Clackmannan
Linlithgow
Edinburgh
Haddington
Berwick
Peebles
Selkirk
Roxburgh
Lanark
Renfrew
Ayr
Bute
Wigtown
Kirkcudbright
Dumfries
Dunbarton
Glasgow
Greenock
Paisley
Hamilton
Motherwell
Kilmarnock
Ayr
Girvan
Stranraer
Wigtown
Newton Stewart
Castle Douglas
Kirkcudbright
Dumfries
Annan
Lochmaben
Moffat
Hawick
Jedburgh
Kelso
Coldstream
Berwick
Dunbar
North Berwick
Haddington
Linlithgow
Falkirk
Stirling
Dunblane
Callander
Crieff
Perth
Dunkeld
Blairgowrie
Coupar Angus
Alyth
Forfar
Dundee
Arbroath
Montrose
Brechin
Edzell
Fettercairn
Clova
Brace of Angus
Spittal of Glenshee
Braemar
Ballater
Balmoral Castle
Aboyne
Kincardine O'Neil
Banchory
Aberdeen
Old Aberdeen
Girdle Ness
Peterhead
Fraserburgh
Banff
Macduff
Portsoy
Buckie
Port Gordon
Cullen
Keith
Dufftown
Rothes
Craigellachie
Aberlour
Tomintoul
Huntly
Inverurie
Insch
Turriff
New Deer
Old Deer
Strichen
St. Fergus
New Pitsligo
Rattray Hd.
Kinnaird Hd.
Troup Hd.
Duncansby Hd.
Dunnet Hd.
Strathy Pt.
Cape Wrath
Kyle of Durness
Loch Eriboll
Whiten Hd.
Kyle of Tongue
Loch Erriboll
Durness
Melness
Tongue
Loch Hope
Loch Loyal
Loch Naver
Strath Naver
Ben Hee
Ben Klibreck
Loch More
Rhu Stoir
Eddrachilles Bay
L. Inchard
L. Laxford
Handa I.
Scourie
Kylesku
Loch Glendhu
Loch Glencoul
Unapool
Loch Assynt
Ben More Assynt
Loch Inver
L. Inver
Enard Bay
Rhu Coygach
Stoer
Point of Stoer
L. Scaly
L. Clay
L. Tarbert
Loch Seaforth
Forest of Harris
L. Resort
Scarpa
L. Langabhat
L. Erisort
Stornoway Harbor
Eye Peninsula
Broad Bay
Stornoway
Eragaly
Barvas
Cellar Hd.
Tolsta Hd.
Flannan Is. or Seven Hunters
Loch Roag
Gallon Hd.
Butt of Lewis
Shiant Is.
Toe Hd.
Scalpa
E.L. Tarbert
Pabbay
Sound of Harris
Ru Renish
Fiaddachuan
Valley
Vaternish Pt.
L. Maldy
L. Scare
Pt. of Aird
L. Staffin
Quirding
Loch Snizort
The Storr
Snizort
Dunvegan L.
L. Pooltiel
Kilmuir
Portree
Isle of Skye
Bracadale
L. Bracadale
Talisker
Carbost
Scalpa
Aird Vuld
L. Skiport
L. Eynort
L. Boisdale
Eriskay
Canna I.
Cuillin Hills
Glen Sligachan
Sligachan
Broadford
Kyle Akin
Raasay
Inner Sound
Kyle of Lochalsh
Loch Carron
Strome Ferry
Balmacara
Cas. Donan
L. Duich
Scour-Ouran
Ben Attow
Ben Sgriol
Glen Shiel
Fort Augustus
L. Oich
L. Cluny
L. Lochy
Caledonian Canal
Glen Garry
L. Quoich
The Pan
L. Arkaig
Loch Morar
Mallaig
Hyskeir I.
Sd. of Sleat
Sleat Pt.
Eigg I.
Muck I.
L. Aylort
Loch Nevis
Loch Shiel
Loch Eil
Fort William
Ben Nevis
Ben Alder
Loch Treig
Loch Laggan
Loch Lochy
Spean
Tulloch
Banavie
Ardnamurchan Pt.
Ben Resipol
Strontian
Loch Sunart
Tobermory
L. Erisa
Coll
Passage of Coll
Tiree
L. Tuadh
Ulva I.
Staffa
Loch Scridan
Iona
Sd. of Iona
Ross of Mull
Ben More
Kyrera I.
Mull
Oban
Appin
Loch Linnhe
Loch Leven
Glen Etive
Loch Etive
Kilninver
Firth of Lorne
Sound of Jura
Loch Melfort
Shuna
Inveraray
Loch Awe
Ben Cruachan
Scarba I.
L. Craignish
Craignish
Arrochar
Strachur
Ben Vorlich
Ben Ledi
Callander
Aberfoyle
Loch Lomond
Luss
Tarbet
Ardlui
Dalmally
L. Lubnaig
L. Voil
Lochearnhead
Ben Lui
Killin
Crianlarich
Tyndrum
Glen Lyon
Loch Tay
Kenmore
Aberfeldy
Weem
Dunkeld
Birnam
Ben Vrackie
Pitlochry
Schiehallion
Loch Rannoch
Rannoch
Tummel R.
Loch Tummel
Blair Atholl
Glen Tilt
Braemar
Ben Macdhui
Cairngorm Mts.
Monadhliath Mts.
Fall of Foyers
Loch Ness
Urquhart Castle
Drumnadrochit
Glen Urquhart
Glen Moriston
Loch Cluanie
Loch Garry
Loch Quoich
Loch Hourn
Knoydart
Kyle of Sleat
Skye
Raasay
Rona
Scalpa
Pabbay
Barra
Vatersay
Sd. of Vatersay
Sandray
Pabbay Isles
Hyskeir I.
Neola Mt.
Barra Head
Gulf of the Hebrides
Ardnamurchan Pt.
Muck I.
Eigg I.
Rum I.
Canna I.
Sleat Pt.
Kyle of Lochalsh
Loch Alsh
Glenelg
Kyle Rhea
Skye
Raasay
Rona
Scalpa
Applecross
Jeantown
Strome Ferry
Balmacara
Kyle of Lochalsh
Skye
Raasay
Rona
Scalpa
Kyle Rhea
Glenelg
Loch Alsh
Cas. Donan
L. Duich
Scour-Ouran
Ben Attow
Ben Sgriol
Glen Shiel
Loch Cluanie
Loch Garry
Loch Quoich
Loch Hourn
Knoydart
Kyle of Sleat
Sleat Pt.
Eigg I.
Muck I.
Rum I.
Canna I.
Inner Hebrides
Outer Hebrides
Islay
Jura
Colonsay
Oronsay
Gigha I.
Rhynns Pt.
Port Ellen
Port Askaig
Sanaig Pt.
Loch Indaal
Loch Gruinart
Loch Tarbert
Loch Fyne
Loch Sween
Loch Caolisport
Loch Crinan
Crinan Canal
Dhu Heartach
Skerryvore
Tiree
Coll
Passage of Coll
Ardnamurchan Pt.
Ben Resipol
Strontian
Loch Sunart
Tobermory
L. Erisa
Loch Aline
Loch Teacuis
Loch Don

proportion of female births is smaller than that of male births: in 1885 it was 100 to 105; and males preponderate in the population up till the age of twenty-five, clearly showing that the excess of females is due to male emigration or the greater mortality of male occupations. The percentage of illegitimate to the total number of births in 1855 was 7.8, and reached its maximum in 1865, when it was 10.2, while in 1885 it was 8.46. It is much higher in the Lowland rural districts than in the Highland rural districts, and lowest in the large towns. The percentages of births, deaths, and marriages to population in the annual reports of the registrar-general are in a great degree misleading, inasmuch as the estimated population generally differs greatly from the actual. They place it, however, beyond doubt that the greatest birth, marriage, and mortality rates are in the town districts, that the smallest birth and marriage rates are in the insular districts, after which come the mainland rural districts, and that the mortality is not so high in the insular rural as in the mainland rural districts. Table VII. (see p. 552) gives the percentage of single, married, and widowed to the total of each sex in Scotland, England and Wales, and Ireland respectively in 1881.

Blind, etc.

The number of blind persons in Scotland in 1881 was 3158 (males 1556, females 1602), the proportion to the total population being 1 in 1182 (males 1156, females 1208); the proportion in 1871 was 1 in 1112. The deaf and dumb in 1881 numbered 2142 (males 1149, females 993), the proportion to the total population being 1 in every 1744 as against 1 in every 1610 in 1871. The number of lunatics was returned as 8406 (males 3939, females 4467) or 1 in every 444 of the total population, the proportion in 1871 being 1 in every 494. In addition to this there were 5991 imbeciles (males 2896, females 3095), or 1 to every 623 of the population, the proportion in 1871 being 1 in every 727.

Occupations.

Table VIII. gives a classification of the population according to occupations in 1871 and 1881:

TABLE VIII.

Classes of Occupation.	1871.	1881.	Per cent. of Total Pop.	
			1871.	1881.
1. Professional.....	72,911	96,103	2.17	2.57
2. Domestic.....	159,403	176,565	4.74	4.73
3. Commercial.....	114,694	132,126	3.41	3.54
4. Agricultural.....	270,008	269,537	8.04	7.21
5. Industrial.....	751,281	932,653	22.36	24.97
6. Unproductive...	1,991,721	2,128,589	59.28	56.98

Pauperism.

It should be explained that the apparent diminution in the proportion of the unproductive class may be accounted for by the fact that in 1871 paupers were returned in this class, whereas in 1881 they were returned under the occupation at which they used to work. The increase in the proportion of the professional and commercial classes is at least a slight indication of higher average prosperity, but this is more conclusively established by the fact that the number of paupers has for many years been steadily on the decline, the proportion being now (1886) only 2.4 of the population. The average cost of maintenance is, however, on the increase, owing entirely to the increased cost of the maintenance of the lunatic poor.

Crime.

Crime, like pauperism, is also steadily declining, as is shown by Table IX.:

TABLE IX.

Offences.	Average.				1884.		
	1836–40.	1851–55.	1875–79.	1880–84.	Males.	Females.	Total.
Against person.....	751	1014	881	838	905	75	980
Against property with violence..	530	532	520	524	515	80	595
Against property without violence.....	1676	1916	1102	930	649	262	911
Against property, malicious.....	47	62	122	89	52	8	60
Forgery, etc.....	120	109	44	48	36	6	42
Other offences.....	266	247	112	122	82	7	89
	3390	3880	2781	2551	2239	438	2677

Roads.

Communication.—In the 12th century an Act was passed providing that the highways between market-towns should be at least 20 feet broad. Over the principal rivers at this early period there were bridges near the most populous places, as over the Dee near Aberdeen, the Esk at Brechin, the Tay at Perth, and the Forth near Stirling. Until the 16th century, however, traffic between distant places was carried on chiefly by pack-horses. The first stage-coach in Scotland was that which ran between Edinburgh and Leith in 1610. In 1658 there was a fortnightly stage-coach between Edinburgh and London, but afterwards it would appear to have been discontinued for many years. Separate Acts enjoining the justices of the peace, and afterwards along with them the commissioners of supply, to take measures for the maintenance of roads were passed in 1617, 1669, 1676, and 1686. These provisions had reference chiefly to what afterwards came to be known as "statute labor roads," intended primarily to supply a means of communication within the several parishes. They were kept in repair by the tenants and cotters, and, when their labor was not sufficient, by the landlords, who were required to "stent" (assess) themselves, customs also being sometimes levied at bridges, ferries, and causeways. By separate local Acts the "statute labor" was in many cases converted into a payment called "conversion money," and the General Roads Act of 1845 made the alteration universal. By the Roads and Bridges (Scotland) Act of 1878 the old organization for the management of these roads was entirely superseded in 1883. The Highlands had good (military) roads earlier than the rest of the country. The project, begun in 1725, took ten years to complete, and the roads were afterwards kept in repair by an annual parliamentary grant. In the Lowlands the main lines of roads have been constructed under the Turnpike Acts, the earliest of which was obtained in 1750. Originally they were maintained by tolls exacted from those who used them; but this method was—after several counties had obtained separate Acts for its abolition—superseded throughout Scotland in 1883 by the general Act of 1878, providing for the maintenance of all classes of roads by assessment levied by the county road trustees.

Canals.

Scotland possesses two canals constructed primarily to abridge the sea passage around the coast,—the Caledonian and the Crinan. The Caledonian Canal, extending from southwest to northeast, a distance of 60 miles along the line of lochs from Loch Linnhe on the west coast to the Moray Firth on the east coast, was begun in 1803, opened while yet unfinished in 1822, and completed in 1847, the total cost being about £1,300,000 [$6,318,000]. Constructed originally to afford a quicker passage for ships to the east coast of Scotland and the coasts of Europe, it has, owing to the increased size of vessels, ceased to fulfil this purpose, its chief service having been in opening up a picturesque route for tourists, assisting local trade, and affording a passage for fishing boats between the east and west coasts. The Crinan Canal, stretching across the Mull of Cantyre from Loch Gilp to Jura Sound, a distance of 9 miles, and admitting the passage of vessels of 200 tons burden, was opened in 1801 at a cost of over £100,000 [$486,000]. The principal boat canals are the Forth and Clyde or Great Canal, begun in 1798, between Grangemouth on the Forth and Bowling on the Clyde, a distance of 30¼ miles, with a branch to Port Dundas, making the total distance 33¾ miles; the Union Canal between Edinburgh and the Forth and Clyde Canal at Port Dundas, near Glasgow, completed in 1822; and the Monkland Canal, completed in 1791, connecting Glasgow with the Monkland mineral district and communicating with a lateral branch of the Forth and Clyde Canal at Port Dundas. Several other canals in Scotland have been superseded by railway routes.

Railways.

The first railway in Scotland for which an Act of Parliament was obtained was that between Kilmarnock and Troon (9¾ miles), opened in 1812, and of course worked by horses. A similar railway, of which the chief source of profit was the passenger traffic, was opened between Edinburgh and Dalkeith in 1831, branches being afterwards extended to Leith and Musselburgh. By 1840 the length of the railway lines in Scotland for which Bills were passed was 191¼ miles, the capital being £3,122,133 [$15,173,566.38]. The chief railway companies in Scotland are the Caledonian, formed in 1845, total capital in 1884–85 £37,999,933 [$184,679,674.38]; the North British, of the same date, total capital £32,821,526 [$159,512,616.36]; the Glasgow and South-Western, formed by amalgamation in 1850, total capital £13,230,849 [$64,301,926.14]; the Highland, formed by amalgamation in 1865, total capital £4,445,316 [$21,604,235.76]; and the Great North of Scotland, 1846, total capital £4,869,983 [$23,668,117.38]. The management of the small branch

lines belonging to local companies is generally undertaken by the larger companies. By 1849 there were 795 miles of railway in Scotland. The following table (X.) shows the progress since 1857 (see also RAILWAY, vol. xx. pp. 233-9):

TABLE X.

Year.	Mean Length.	Passengers.				Receipts from Passenger Trains.	Receipts from Goods Trains.	Total.
		First Class.	Second Class.	Third and Mixed Classes.	Total.			
						£	£	£
1857	1243	1,823,542	2,180,284	10,729,677	14,733,503	916,697	1,584,781	2,501,478
1874	2700	4,261,473	3,769,485	30,189,934	38,220,892	2,350,593	3,884,424	6,235,017
1884	2999	4,711,500	2,715,932	46,877,642	54,305,074	2,931,737	4,426,023	7,357,760

Ownership of soil.

Agriculture.—Table XI. shows the divisions of land as regards ownership according to the return (the latest) of 1873:

TABLE XI.

Owners holding each.	Number of Owners.	Estimated Acreage.	Gross Annual Value.	Average Rental per Acre.	Percentage of Total Acreage to each Owner.
			£	£ s.	
Less than 1 acre	113,005	28,177	5,800,046	205 17	.1
More than 1 acre and less than 10	9,471	29,327	1,433,106	48 17	.2
" 10 " 50	3,469	77,619	843,471	10 17	.4
" 50 " 100	1,213	86,483	380,345	4 8	.5
" 100 " 500	2,367	556,372	1,674,773	3 0	2.9
" 500 " 1,000	826	582,741	1,263,524	2 3	3.1
" 1,000 " 2,000	596	835,242	1,179,756	1 8	4.4
" 2,000 " 5,000	587	1,843,378	1,946,507	1 1	9.7
" 5,000 " 10,000	250	1,726,869	1,043,519	0 12	9.1
" 10,000 " 20,000	159	2,150,111	965,166	0 9	11.3
" 20,000 " 50,000	103	3,071,728	945,914	0 6	16.2
" 50,000 " 100,000	44	3,025,616	588,788	0 4	16.0
100,000 and upwards	24	4,931,884	623,148	0 3	26.1
No areas	11	.....	10,740	... ...	.....
No rental	11	1,147	.....	... ...	.....
Total	132,136	18,946,694	18,698,804	1 0	100.0

Scotland, as compared with either England or Ireland, is emphatically a country of large proprietors. Taking the population of 1871 as the basis of comparison, a little over 3.9 per cent. of the population of Scotland have a share in the ownership of the soil, the proportion in England and Wales being about 5 per cent., while in Ireland it is only about 1.7. On an average each owner in England possesses 33 acres, in Scotland 143, and in Ireland 293. While in Ireland, however, only a little over one-half of the number of proprietors possess less than 1 acre, and in England about five-sevenths, this class in Scotland amounted to about five-sixths of the whole. They possessed only .1 per cent. of the total area, the remaining 99.9 being possessed by 19,131 persons, while 171 persons held 58.3, and 68 persons 42.1. Whereas in England 1 and in Ireland only 3 proprietors held upwards of 100,000 acres each, in Scotland there were 24 persons who each held more than this amount, and together they possessed 26.1 per cent. of the total area. The excessive size of the properties of Scotland may be partly accounted for by the fact that a large proportion of the land is so mountainous and unproductive as to be unsuitable for division into small properties; but two other causes have also powerfully coöperated with this, viz., the wide territorial authority exercised by some of the lowland nobles, as the Scotts and Douglases, and such powerful Highland nobles as the Argylls and Breadalbanes, and the stricter law of entail introduced by the Act of 1685 (see ENTAIL, vol. viii. p. 402). The largest estates are thus in the hands of the old hereditary families. The almost absolute power anciently wielded by the landlords, who within their own territories were lords of regality, tended to hinder independent agricultural enterprise, and it was not till after the abolition of hereditary jurisdictions in 1746 that agriculture in Scotland made any real progress.

The following table (XII.) gives a classification of the holdings of Scotland in 1875 and 1880: Holdings.

TABLE XII.

Years.	50 Acres and under.		From 50 to 100 Acres.		From 100 to 300 Acres.		From 300 to 500 Acres.		From 500 to 1000 Acres.		Above 1000 Acres.		Total.	
	Number.	Area in Acres.	Number.	Area in Acres.	Number.	Area in Acres.	Number.	Area in Acres.	Number.	Area in Acres.	Number.	Area in Acres.	Number.	Area in Acres.
1875.....	56,311	666,356	9878	697,620	11,823	1,980,081	1967	729,885	691	427,478	126	109,675	80,796	4,611,095
1880.....	55,280	653,295	9726	721,844	12,348	2,082,914	2007	750,295	661	418,650	79	114,298	80,101	4,741,296

It will be observed that nearly one-half of the total area of the holdings is occupied by those possessing from 100 to 300 acres each. The holdings over 300 acres are generally sheep farms, and it is to the enterprise of the medium class of holders that the agricultural progress of Scotland is chiefly due. A society of improvers in the knowledge of agriculture was founded in 1723, but ceased to exist after the Rebellion of 1745; and the introduction of new and improved methods, where not the result of private enterprise, has been chiefly associated with the efforts of the

Highland Society, instituted in 1783, and latterly known as the Highland and Agricultural Society. A great stimulus was also afforded in the beginning of the 19th century by the high prices obtained during the Continental wars, and, although periods of occasional severe depression have occurred since then, not only has the science of agriculture continued rapidly to advance but the position of the large farmer has until within recent years been one of increasing prosperity. The system of nineteen years' lease had proved, as regards both agricultural progress and the interests of the farmer, a much superior arrangement to the system of yearly tenancy so largely prevailing in England; but it was conjoined with customs and modified by conditions which during the period of agricultural distress prevailing since 1872 have caused the relations between landlord and tenant to become severely strained. The more prominent grievances of the farmer were the difficulty of obtaining sufficient compensation for improvements, the inconveniences resulting from the law of hypothec (see HYPOTHEC, vol. xii. p. 633), and the hardships suffered from the existence of the game laws. Hypothec was abolished in 1879, except as regards the Act of Sederunt; a ground game Act was passed in 1880; and, succeeding the report of the duke of Richmond's commission in 1882, the Agricultural Holdings Act was passed in 1883, containing provisions for securing to the tenant control in the disposition of his lease, and also compensation for improvements; but already it is evident that these reforms have failed to meet the difficulties created by the

Landlord and tenant.

hausted soil. He is subject to arbitrary augmentations of money rent, he is without security of tenure, and has only recently received the concession of compensation for improvements." The crofters in Scotland are now estimated to number 40,000 families or 200,000 persons, and many of them support themselves partly by fishing. In the struggle for existence they have had to contend against the tendency towards the creation of large farms, the demand for sporting estates, the desire of landlords to escape the burden of poor rates, and the fact that they have absolutely no choice as regards the conditions imposed on them by the landlord. In March, 1883, a commission was appointed to inquire into the condition of the cotters and crofters in the Highlands and islands of Scotland; this commission gave in its report in 1884, and an Act based on their recommendations was passed in 1886.

Notwithstanding the unsatisfactory condition of agricultural affairs in Scotland at present, there is no country in the world where farming is prosecuted with more skill and enterprise. On account of the great variety of soil and climate the methods in operation differ greatly in different districts, and for special details the reader is referred to the articles on the several counties. The following table (XIII.) shows the cultivated area and the areas under each kind of crop in different years, with the proportion of the acreage under each kind of crop, etc., to every 1000 acres of cultivated land for 1885 in Scotland, England, and Ireland:

Distribution of crops.

TABLE XIII.

	Yearly Averages.		1880.	1885.	Average per 1000 Acres 1885.		
	1867-70.	1871-75.			Scotland.	England.	Ireland.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Total acreage under crops, bare fallow, and grass	4,420,375	4,560,825	4,738,127	4,845,805	1000	1000	1000
Permanent pasture	1,036,844	1,084,983	1,159,353	1,220,000	252	492	673
Arable land	3,383,531	3,475,842	3,578,774	3,625,805	748	508	327
Corn crops:							
Wheat	124,296	122,513	73,976	55,155	11	95	5
Barley or bere	227,988	252,105	264,120	237,472	49	76	11
Oats	1,011,480	1,007,339	1,037,254	1,046,285	216	66	87
Rye	8,135	10,480	7,333	7,095	2	2	1
Beans	23,711	26,746	19,977	23,135	5	16	.....
Pease	2,367	2,332	1,227	1,750	.....	9	.....
Total under corn crops	1,397,977	1,421,515	1,403,887	1,370,892	283	264	104
Green crops:							
Potatoes	170,978	167,880	187,061	148,994	31	14	53
Turnips and swedes	490,598	503,709	485,987	484,213	100	59	20
Mangold	944	1,748	1,822	1,495	.....	14	2
Carrots	964	1,048	1,393	1,296	.....	1	.....
Cabbage, kohl-rabi, and rape	3,441	4,656	5,478	5,833	1	6	3
Vetches, etc.	14,529	14,780	15,705	18,088	4	16	2
Total under green crops	681,454	693,821	697,446	659,919	136	110	80
Grasses under rotation	1,248,747	1,338,106	1,455,745	1,571,745	324	110	134
Flax	1,417	731	182	41	.....	.....	7
Hops	1	.....	.....	.....	.....	3	.....
Fallow	54,289	21,669	21,514	23,208	5	21	1

altered conditions of things, due to the increasing scarcity of land and the importation of foreign produce.

While the relations between the landlord and the large farmer cannot be regarded as satisfactory, the difficulties of the crofters—small holders now chiefly to be found in the western Highlands and the islands to the north and west of Scotland—have reached a more acute stage. The crofter system prevailing in Orkney and Shetland—described in the article on those islands—has a totally different origin from that prevailing in the Highlands. On account of the ancient relations between the Highlander and his chief, the inheritance is claimed by the Highland crofters of an inalienable right to security of tenure; but when the old feudal system of the Highlands was suddenly abolished after the Rebellion of 1745 no legal steps were taken for the recognition of this right, and from the beginning of the 19th century wholesale clearances of tenants were carried out in many districts even by the heirs of the old Highland chiefs. In the words of the report of the crofters commission of 1884: "The crofter of the present time has through past evictions been confined within narrow limits, sometimes on inferior land and ex-

Crofters.

The earliest year included in this table (1867) is the date at which the agricultural statistics began to be collected and published by the Board of Trade. The work previous to this had been undertaken by the Highland and Agricultural Society of Scotland, but their returns were necessarily less complete and accurate. The return for 1857, for example, gives the arable acreage ("acreage under a rotation of crops") as 3,776,572; but this is clearly too much, as it exceeds that of 1885, and since 1867 there has been a gradual increase. Only a little over one-fourth of the area of Scotland is cultivated, while in England only one-fourth is left uncultivated. It must, however, be taken into consideration that in the agricultural returns "permanent pasture" does not include the mountainous districts which form such a large portion of the surface of Scotland, where heaths and natural grasses occupy the soil and yield a scanty herbage for sheep and cattle. In the return "permanent pasture" is represented as occupying an area little more than a third as large as that occupied by arable land, while in England the two areas are pretty nearly equal, but as a matter of fact pasturage plays a much more important part in the economy of the Scottish than of the

English farmer. It will be observed that as regards the main divisions of arable land the total areas under both corn crops and green crops have been slightly decreasing, while there has been a considerable increase in the area under rotation grasses. The following table (XIV.) shows the yield of the principal crops in 1857, 1884, and 1885, with the average yield per acre in the last two years:

Yield of crops.

TABLE XIV.

	1857.	1884.	1885.	Average per Acre.	
				1884.	1885.
Wheat.....Bushels	6,154,986	2,348,261	1,893,501	34.17	34.33
Barley..... "	7,236,207	7,901,209	8,245,820	34.27	34.72
Oats..... "	32,750,763	36,713,321	33,407,127	35.10	31.93
Beans } ... "	1,037,760	{ 705,398	709,577	32.23	30.67
Pease }		{ 38,551	37,464	24.74	21.41
Turnips.....Tons	6,690,109	7,532,779	6,496,189	15.53	15.39
Potatoes "	430,468	986,808	803,523	6.02	5.39

This table being founded on estimates can, of course, only be regarded as approximately correct. The average yield of both wheat and barley is higher than that of England, while the average yield of both oats and potatoes is lower, which may be accounted for by the fact that the first two crops occupy the best soils of Scotland, while the last two occupy every variety of soil in the country. Wheat is grown chiefly in the sea-coast districts and the fertile river-valleys. The area under wheat has declined more than a half since 1867, the combined causes of this being wet seasons and increased foreign competition. Barley, for which the distilleries keep up a steady demand, and oats, the staple crop of the country, have rather increased in area since 1867. The area under potatoes—a very uncertain crop—has rather declined within recent years, and that under turnips has considerably declined, partly owing to the increased use of artificial stuffs in cattle-feeding. The following table (XV.) shows the number of live stock in different years, with the average number to every 1000 acres of cultivated land in 1885 in Scotland and England:

Live stock.

TABLE XV.

	Yearly Average.		1880.	1885.	Average per 1000 Acres, 1885.	
	1867-70.	1871-75.			Scotland.	England.
Horses (including ponies)—						
Used solely for agricultural purposes	138,564	136,689	141,332	141,522	29	30
Unbroken horses and mares kept for breeding	34,307[1]	41,963	52,681	46,770	10	13
Total horses	172,871[1]	178,652	194,013	188,292	39	43
Cattle—						
Cows and heifers in milk or in calf	380,509	392,252	387,195	419,210	87	74
Other cattle—two years old and above	249,541	267,920	258,967	260,505	54	43
" —under two years	392,336	467,165	453,124	496,289	102	72
Total cattle	1,022,386	1,127,337	1,099,286	1,176,004	243	189
Sheep—						
One year old and above	4,582,835	4,735,008	4,651,116	4,560,436	941	407
Under one year old	2,355,142	2,426,114	2,420,972	2,396,762	495	269
Total sheep	6,937,977	7,161,122	7,072,088	6,957,198	1436	676
Pigs	153,959	166,148	120,925	150,984	31	82

This table does not indicate any constant decrease or increase in any of the classes of live stock. It will be observed that the average number of cattle to the acreage of cultivated land in Scotland is about a third more than in England, and of sheep more than double as many; but the number of pigs in England is more than double as many to the acreage of cultivated land as it is in Scotland, and the number of horses is greater. The special breeds of horses in Scotland are the Shetland ponies, the Highland ponies, and the Clydesdale draught horses, the latter originally bred in the Clydesdale district from crossing with Flemish stallions imported about the beginning of the 18th century. The breeds of cattle include the Ayrshire, which, since they are chiefly noted for their yield of milk, and are specially adapted for dairy farms (which prevail especially in the southwest of Scotland), have in a great measure supplanted the Galloway in their native district, except where these are kept for feeding purposes; the polled Angus or Aberdeen, fair milkers, but chiefly valuable for their beef-making qualities, and on this account, as well as their hardihood, in especial favor in the northeast of Scotland, where the art of cattle-feeding has reached its greatest perfection; and the west Highland breed, noted for their long horns, their shagginess, the decided character of their various colors—black, red, dun, cream, and brindle—and their power of thriving on wild and heathy pasture. The special breeds of sheep are the fine-woolled breed, peculiar to Shetland; the blackfaced, native to the Highland districts; and the Cheviots, native to the range of hills of that name, and now the favorite breed in the south of Scotland, although border Leicesters and other English breeds, as well as a variety of crosses, are kept for winter feeding on the Lowland farms.

The area under orchards as returned on 4th June, 1885, was 1892 acres and under nursery grounds 1654. Orchards, chiefly for apples, are most numerous in the Carse of Gowrie and the neighborhood of Perth, and along the banks of the Clyde above Hamilton. The area under woods in 1812 was 907,695 acres, of which 501,469 acres were natural woods and 406,226 planted; by 1872 it had declined to 734,490, but by 1881 (*i.e.*, by the latest return) it had increased to 829,476, the principal increase having been in Aberdeen, Perth, and Inverness, the counties where the growth of woods is largest. The Board of Trade returns do not distinguish between planted and natural woods, but it is well known that large cuttings have been made in the indigenous forests of the Highlands, while at the same time considerable attention has been paid within the present century to the growth of plantations in the Lowlands, partly as a covert for game; the science of forestry has made great advances within recent years owing to the encouragement and guidance of the Scottish Arboricultural Society, established in 1854, and of the Highland and Agricultural Society. The modern plantations are formed chiefly of Scotch fir with a sprinkling of larch. On the botany of Scotland H. C. Watson's *Topographical Botany* (1883) may be consulted.

Forests.

According to the report of the crofters commission, the area under deer forests in Scotland is 1,975,209 acres, or about one-tenth of the whole area of the country. The species of deer peculiar to the Scottish Highlands is the red deer; the fallow deer is not uncommon in the Lowlands, especially in the hilly southwestern districts. The grouse moors of Scotland occupy a much more extensive area, and are also much more widely distributed, while they supply sport to a much greater number of persons. Ptarmigan and blackcock are abundant in many districts; and pheasants and partridges, as well as hares, are carefully preserved on many estates in the cultivated districts. Rabbits are common throughout the whole country. Fox hunting is a fashionable sport in most of the Lowland counties; but otter-hunting has almost died out. The bear, wolf, and beaver, at one time common in Scotland, have become ex-

Deer forests, game, etc.

[1] These figures are for 1870 only.

tinct. The last wolf, it is said, was killed by Sir Ewen Cameron, of Lochiel, in 1680. The wild cat is still to be found in the Highlands, and the polecat, ermine, and pine marten exist in considerable numbers. The golden eagle and the white-tailed eagle tenant the wilder mountainous districts, but other larger birds of prey, as the osprey and the kite, are becoming scarce. In all there are more than 300 species of birds in Scotland, including a great variety of water-fowl in the sea and inland lochs.

Fisheries.—Details regarding the Scottish fisheries will be found under FISHERIES (vol. ix. pp. 224–9). Fisheries. The former Board of White Herring Fishery was abolished in 1882 and the Fishery Board of Scotland established, which has devoted more systematic attention to the collection of statistics and the general encouragement of the industry. In 1856 the herring and deep-sea fisheries engaged only about 30,000 persons in Scotland, but in 1884 they employed directly or indirectly 103,804 persons, while the total estimated produce in 1884 was valued at £3,351,848 [$16,289,981.28],—the value of cured fish being £2,279,614 or $11,078,924.04 (herrings, £2,121,346 [$10,309,741.56]; cod, ling, and hake dried, £149,407 [$726,118.02]; ditto pickled, £8861 [$43,064.46]); of white fish sold fresh, £716,295 [$3,481,193.70] (haddocks, £300,712 [$1,461,460.32]; herrings, £150,720 [$732,499.20]; cod, ling, and hake, £97,443 [$473,572.98]; torsk and saithe, £10,481 [$50,937.66]; whitings, £32,808 [$159,446.88]; sprats, £5232 [$25,427.52]; mackerel, £5286 [$25,629.96]; turbot, £9368 [$45,528.48]; halibut, £17,624 [$85,652.64]; flounders, £47,723 [$231,933.78]; skate, £14,171 [$68,871.06]; soles and other flat fish, £24,727 [$120,173.22]; of shell-fish, £80,939 [$393,363.54]; and of salmon £275,000 [$1,336,500].

Mining Industries.—The chief sources of the mineral wealth of Scotland are coal and iron, which are generally found in convenient juxtaposition. Coal. The principal coal-fields are described under COAL (vol. vi. p. 50 *sq.*). The privilege of digging coal in the lands of Pittencrieff was conferred by charter on the abbot and convent of Dunfermline in 1291, and at a very early period the monks of Newbattle Abbey dug coal from surface pits on the banks of the Esk. Æneas Sylvius (afterwards Pope Pius II.), who visited Scotland in the 15th century, refers to the fact that the poor people received at the church doors a species of stone which they burned in place of wood; but, although the value of coal for smith's and artificer's work was early recognized, it was not generally employed for domestic purposes till about the close of the 16th century. In 1606 an Act was passed binding colliers to perpetual service at the works at which they were engaged, and their full emancipation did not take place till 1799. An Act was passed in 1843 forbidding the employment of children of tender years and of women in underground mines. According to the census of 1851, the number of persons engaged in connection with coal-mining was 36,973 males and 358 females (the latter employed above ground), and in 1881 the numbers were 53,340 and 401. According to the mineral statistics of 1885 there were 69,425 persons employed in the coal-mines of Scotland,—45,082 in the western and 24,343 in the eastern district. The output within twenty years has been more than doubled. In 1854 it was 7,488,000 tons, by 1866 it had increased to 12,034,638, and in 1884 it was 21,186,688.

The rise of the iron industry in Scotland dates from the establishment in 1760 of the Carron ironworks Iron. near Falkirk. The number of persons employed in iron-mining in 1851 was 7648, and in iron manufacture 13,296; and by 1881 the numbers had increased respectively to 10,473 and 38,309. The total output of iron ore and ironstone in Scotland in 1884 was 1,885,376 tons, valued at £854,416 [$4,152,461.76], less than the estimated amount in 1858, which was 2,312,000 tons, valued at £750,000 [$3,645,000]. There has been no increase in the manufacture of pig-iron since about 1866. The imports of iron ore were 356,380 tons in 1883, valued at £359,918 [$1,749,201.48], and in 1884 406,007 tons, valued at £356,451 [$1,732,351.86]. The production of pig-iron increased with great rapidity after the introduction of railways. In 1796 the quantity produced was 18,640 tons, and in 1830 only 37,500; in 1840 it had risen to 241,000, in 1845 to 475,000, in 1865 to 1,164,000; but in 1884 it was only 988,000, the industry being confined to Ayrshire, Fifeshire, and Lanarkshire. The iron-mills and forges in operation are confined to the last county, there being in 1884 22 works, 334 puddling furnaces, and 82 rolling mills. In 1884 there were 63 open-hearth steelworks in operation, of which 46 were in Glasgow, 10 in Holytown, 4 in Motherwell, and 3 in Wishaw, the quantity made in 1884 being 208,650 tons.

Since about the years 1850–55 shale-mining has become an important industry, especially in Linlithgowshire and Midlothian, the total quantity raised in Scotland in 1884 being 1,469,649 tons, valued at £370,024 [$1,798,316.64]. Lead ore is worked at Abington in Lanarkshire and Wanlockhead in Dumfriesshire; the dressed lead ore obtained amounts to 4327 tons, valued at £34,997 [$170,085.42], and yielding 3219 tons of lead and 20,011 ounces of silver. The amount of fireclay dug in 1884 was 463,294 tons, valued at £56,237 [$273,311.82]. Stone quarrying, especially of granite, sandstone, flagstone, slate, and limestone, is extensively carried on, but the returns of the several amounts raised annually are incomplete. The number of persons engaged in quarries in 1881 was 13,742, and the value of the materials raised in 1884 was estimated at £1,030,650 [$5,007,501]. The principal granite works occur in Aberdeenshire and Kirkcudbrightshire, while freestone quarries are common throughout the greater part of the Lowland district, although whinstone also is frequently used for building purposes. Large quantities of paving stones are exported from Caithness and Forfarshire, and there are very extensive slate quarries at Ballachulish and other places in Argyllshire. Other mining industries.

Manufactures.—Although a company of woollen weavers was incorporated by the town council of Edinburgh in 1475, the cloth worn by the wealthier classes down to the beginning of the 17th century was of English or French manufacture, the lower classes wearing "coarse cloth made at home," in the fashion still prevailing in the remoter districts of the Highlands. In 1601 seven Flemings were brought to Edinburgh by commissioners from the burghs to instruct the people in the manufacture of serges and broadcloth, and eight years later a company of Flemings was established in the Canongate (Edinburgh) for the manufacture of cloth under the special protection of the king; but, notwithstanding also the establishment in 1681 of an English company for the manufacture of woollen fabrics near Haddington, the industry for more than fifty years after this made very tardy progress in the country. In fact its importance dates from the introduction and improvement of machinery in the 19th century. The most important branch of the trade, that of tweeds, first began to attract attention shortly after 1830; though still having its principal seat in the district from which it takes its name, including Galashiels, Hawick, Innerleithen, and Selkirk, it extends to a large number of towns throughout Scotland, especially to Aberdeen, Elgin, Inverness, Stirling, Bannockburn, and Paisley. The chief seat of the hosiery trade is Hawick. Carpet manufacture has had its principal seat in Kilmarnock since 1817, but is also carried on in Aberdeen, Ayr, Bannockburn, Glasgow, Paisley, and other towns. Tartans are largely manufactured in Tillicoultry, Bannockburn, and Kilmarnock, and shawls and plaids are largely manufactured in several towns. In 1850 there were in Scotland 188 woollen and worsted factories, with 233,533 spindles and 247 power-looms, employing 10,210 persons. Twenty-eight years later (1878) the total number of factories was 246, in which there were 559,021 spinning spindles, 62,013 doubling spindles and 6284 power-looms, the number of persons employed being 22,667, of whom 10,083 were males and 12,584 females. Woollen cloth.

The manufacture of cloth from flax is of very ancient date in Scotland, and towards the close of the 16th century Scottish linen cloths were largely exported to foreign countries, besides having an extensive sale in England. Regulations in regard to the manufacture were passed in 1641 and 1661. In a petition presented to the privy council in 1684, complaining of the severe treatment of Scotsmen selling linen in England it was stated that 12,000 persons were engaged in the manufacture. Through the intercession of the secretary of state with the king these restrictions were removed. To further encourage the trade it was enacted in 1686 that the bodies of all persons, with the exception of poor tenants and cotters, should be buried in plain linen only, spun and made within the kingdom. The Act was repeated in 1693 and 1695, and in the former year another Act was passed prohibiting the export of lint and permitting its import free of duty. At the time of the Union the annual amount of linen cloth manufactured in Scotland is supposed to have been about 1,500,000 yards. The Union gave a considerable impetus to the manufacture, as did also the establishment of the Board of Manufacturers in 1727, which applied an annual sum of £2650 [$12,879] to its encouragement, and in 1729 established a colony of French Protestants in Edinburgh, on the site of the present Picardy Place, to teach the spinning and weaving of cambric. From 1st November, 1727, to 1st November, 1728, the amount of linen cloth stamped in Scotland was 2,183,978 yards, valued at £103,312 [$502,096.32], but by the year ending 1st November, 1771, it had increased to 13,672,548 yards, valued at £632,389 [$3,073,410.54], during the year ending 1st Linen and jute.

November, 1798, to 21,297,059, valued at £850,405 [$4,132,968.30], and by the year ending 1st November, 1822, when the regulations as to the inspection and stamping of linen ceased, to 36,268,530 yards, valued at £1,396,296 [$6,785,867.34]. The counties in which the manufacture is now most largely carried on are Forfar, Perth, Fife, Kinross, and Clackmannan, but Aberdeen, Renfrew, Lanark, Edinburgh, and Ayr are also in a considerable degree associated with it. Dundee is the principal seat of the coarser fabrics, Dunfermline of the table and other finer linens, while Paisley is widely known for its sewing threads. The allied industry of jute is the staple industry of Dundee. The number of persons employed in the flax-factories of Scotland in 1837 was 15,462. The following table (XVI.) gives particulars of these factories for the years 1856, 1867, and 1878:

TABLE XVI.

Years.	Factories.	Spindles.		Power-Looms.	Persons employed.
		Spinning.	Doubling.		
1856.....	168	278,304		4,011	31,722
1867.....	197	487,579		19,917	77,195
1878.....	155	265,263	18,495	16,756	36,476

Principally owing to foreign competition, the linen manufacture has within recent years been in a very languid condition.

Cotton.

The first cotton-mill in Scotland was built at Rothesay by an English Company in 1778. It was soon afterwards acquired by David Dale, who was the agent in Scotland for Arkwright, and had the invaluable aid of his counsel and advice. Dale also established cotton-factories in 1785 at New Lanark, afterwards so closely associated with the socialistic schemes of his son-in-law, Robert Owen, and thus laid the foundation of the industry in the two counties, Lanark and Renfrew, which are now its principal seats in Scotland. Nine-tenths of the cotton-factories of Scotland are now concentrated in Glasgow, Paisley, and the neighboring towns, but the industry extends into other districts of the west of Scotland and is also represented in the counties of Aberdeen, Perth, and Stirling. The following table (XVII.) gives particulars for 1850, 1861, 1875, and 1885:

TABLE XVII.

Years.	Factories.	Spindles.	Power-Looms.	Persons employed.
1850.....	168	1,683,093	23,564	34,325
1861.....	163	1,915,398	30,110	41,237
1875.....	96	1,711,214	29,171	35,652
1885.....	147	1,149,514	29,684	37,167

For further particulars regarding the manufacture in Scotland, see COTTON, vol. vi. pp. 445–6.

Silk, etc.

Silk is manufactured in Paisley and Glasgow, but the industry is of minor importance, employing only about 600 persons. Floor-cloth is manufactured at Kirkcaldy, where also the first linoleum factory in Scotland was established in 1877.

Whisky.

Next to textile fabrics, the most important manufacture in Scotland is that of whisky, in which it has Ireland for its only competitor. Distillation was introduced into Scotland from England, but by 1771 large quantities of spirits were sent to England from Scotland. The legal manufacture of whisky was greatly checked in the 19th century by occasional excessive advances in the rates of duty, but after the reduction to 2s. 4½d. per gallon in 1823 the number of licensed distillers rapidly increased, while illegal distillation became much less common. The following table (XVIII.) shows the number of gallons made in various years since 1824:

TABLE XVIII.

Year.	Gallons.	Year.	Gallons.	Year.	Gallons.
1824	5,108,373	1855	11,283,636	1878	17,670,460
1840	9,032,353	1865	13,445,752	1884	20,164,962

Beer.

Ale was a common beverage in Scotland as early as the 12th century, there being one or more brew-houses attached to every religious house and barony. So important was the use of the beverage even in the beginning of the 18th century that a threatened imposition of a tax on malt in 1725 led to serious riots in Glasgow and a proposal to repeal the Union. Though ale has been superseded by whisky as the national beverage, Scotland still possesses several large breweries, and Edinburgh ales vie in repute with those of Burton-on-Trent. The number of barrels charged with duty in Scotland in 1885, was 1,237,323, the number in England being 24,519,173.

Miscellaneous industries.

The first sugar refinery in Scotland was erected in 1765 in Greenock, where the industry made rapid progress and has still its principal seat, although it is extensively carried on in Leith and in a lesser degree in Glasgow and Dundee. Glass-making, introduced in 1610 by Sir John Hay at Wemyss in Fife, is now of considerable importance, Edinburgh being celebrated for the finer branches of the manufacture. A paper-mill was erected in 1675 at Dalry Mills on the Water of Leith, in which French workmen were employed to give instruction, with the result, as was reported by the owners, that "gray and blue paper was produced much finer than ever was done before in the kingdom." The most important seat of the industry is now Valleyfield near Penicuik, where it was introduced in 1709. Edinburgh has since the time of the Ballantynes enjoyed a widely-extended fame for the excellence and beauty of its printing. The other manufactures prevailing in different parts of Scotland, such as those of leather, soap, earthenware and hardware, carriages, and the various implements and utensils in general use, do not call for special characterization.

Shipping.

Commerce and Shipping.—That Scotland had a considerable trade with foreign countries at a very early period may be inferred from the importation of rich dresses by Malcolm III. and the enjoyment of Oriental luxuries by Alexander I. David I. receives the special praise of Fordun for enriching "the ports of his kingdom with foreign merchandise." In the 13th century the Scots had acquired a considerable celebrity in shipbuilding; and a powerful French baron had a ship specially built at Inverness in 1249 to convey him and his vassals to the Holy Land. The principal shipowners at this period were the clergy, who embarked the wealth of their religious houses in commercial enterprises. Definite statements regarding the number and tonnage of shipping are, however, lacking till the 18th century. From two reports printed by the Scottish Burgh Record Society in 1881, it appears that the number of vessels belonging to the principal ports—Leith, Dundee, Glasgow, Kirkealdy, and Montrose—in 1656 was 58, the tonnage being 3140, and that by 1692 they had increased to 97 of 5905 tons. These figures only represent a portion of the total shipping of the kingdom. At the time of the Union in 1707 the number of vessels was 215 of 14,485 tons. The following table (XIX.) gives the numbers for various years from 1850:

TABLE XIX.

	1850.		1860.		1870.		1884.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Sailing vessels.....	3432	491,895	3172	552,212	2715	727,942	2065	827,295
Steam vessels.....	169	30,827	314	71,579	582	209,142	1403	866,780
Total...	3601	522,222	3486	623,791	3297	937,084	3468	1,694,075

Table XX. shows the progress of the coasting and foreign trade since 1855:

TABLE XX.

Year.	Coasting.		Colonial and Foreign.		Total.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
1855....	1,963,552	2,057,936	668,078	840,150	3,631,630	2,898,086
1880....	6,628,853	5,691,136	2,700,915	3,001,897	9,329,768	8,693,033
1884....	7,167,230	6,098,938	3,073,561	3,638,423	10,240,791	9,737,361

Commerce

Table XXI. shows the great expansion of the foreign and colonial trade since 1755:

TABLE XXI.

Year.	Imports.	Exports.	Year.	Imports.	Exports.
1755	£464,411	£535,576	1825	£4,994,304	£5,842,296
1790	1,688,337	1,235,405	1851	8,921,108	5,016,116
1795	1,268,520	976,791	1874	31,012,750	17,912,932
1800	2,212,790	2,340,069	1880	34,997,652	18,243,078
1815	3,447,853	6,997,709	1884	30,600,258	20,322,355

The value of the imports into Scotland is only about a tenth of that of England, but this does not represeut the proper proportion of foreign imports used or consumed in Scotland, as large quantities find their way to Scotland from England by rail,—nearly all the tea, for example, consumed in Great Britain being imported into London, while various other ports have almost a monopoly of certain other imports. Reckoniug by the combined value of their imports and exports, the principal ports of Scotland are Glasgow, Leith, Greenock, Dundee, Grangemouth, and Aberdeen, in the order named, but for particulars regarding the trade of these and other ports reference must be made to the articles on the several towns.

Ship-building.

For many of the most important improvements in the construction of ships, especially steam vessels, Great Britain is indebted to the enterprise and skill of the Clyde shipbuilders. From the time of the construction by Mr. Robert Napier of the steamers for the Cunard line, formed in 1840, the shipbuilders on the Clyde have enjoyed an unrivalled reputation for the construction of large ocean steamers, both as regards mechanical appliances and the beauty and convenience of the internal arrangements. Shipbuilding is also carried on to a considerable extent at Dundee, Leith, and Aberdeen, and to a certain degree at most of the ports of the kingdom, but within recent years the industry has been in a very fluctuating condition, the tonnage of the vessels constructed annually varying between 1880 and 1885 from a little over 100,000 to nearly 300,000.

National wealth.

National Wealth.—The immense increase in the wealth of Scotland within the last 200 years is sufficiently proved by the fact that, while in 1674 the valued rent was only £3,656,408 Scots or £304,700 sterling [$1,480,842], the gross annual value of the land according to the estimate in the return of 1873 was £18,698,804 [$90,876,187.44], or more than sixty times as much, and about fifteen times as great as the proportional increase of population. This increase is of course partly due to agricultural improvements and partly to the discovery and development of the mineral wealth in coal and iron, but it may also be accounted for by the smaller representative value of money, and by the fictitious increase in rents in towns, which does not represent an increase in absolute value. The annual value of real property assessed for income-tax under schedule A in 1843 was £9,481,000 [$46,077,660]; the average value for the three years ending 5th April, 1883, was £16,995,718 [$82,599,189.48], and for the year ending 5th April, 1884, the value was £17,066,705 [$82,944,186.30]. For the year ending 5th April, 1857, the amount of property and income charged with duty was £22,563,238 [$109,657,336.68]; and during the following twenty-five years it was more than doubled, the average amount for the three years ending 5th April, 1883, being £48,069,765 [$233,619,057.90], and for the year ending 5th April, 1884, £49,600,348 [$241,057,691.28]. This is less than a tenth of that for the United Kingdom. The total amount of money lying in deposit in savings banks in 1884, was £7,709,471 [$37,468,029.06],—about a seventh part of the whole amount deposited in the savings-banks of the United Kingdom. Notice of the rise and progress of banking in Scotland will be found uuder BANKING (vol. iii. pp. 287–90). The total paid-up capital of the Scottish banks at the dates of balance in 1885 was £9,052,000 [$43,992,720], and their total liabilities £107,882,595 [$524,309,411.70].

Elementary schools.

Education.—Notices of the existence of schools in the principal towns occur as early as the 13th century. They were under the supervision of the chancellor of each diocese and were chiefly devoted to studies preparatory for the church. Previous to the Reformation schools for general education were attached to many religious houses. In the *First Book of Discipline*, 1560, a comprehensive scheme of general education was propounded, but neither this proposal nor an Act passed in 1616 by the privy council for the establishment of a school in every parish was carried into effect; and the system of parochial schools which prevailed till the passing of the Education Act of 1872 really dates from the Act of William and Mary in 1696 providing for the maintenance of a school in every parish at the cost of the heritors. The various religious secessions in Scotland led to the founding of a large number of denominational and subscription schools, and at the Disruption in 1843 the Free Church made provision for the supply of secular education as well as religious instruction to its adherents. The Education Act of 1872 abolished the old management of the parish schools, and provided for the creation of districts under the management of school boards elected for three years by the ratepayers, male and female. These boards have the power to levy rates for the maintenance and erection of schools for primary instruction, elect the teachers, and enforce the clause in regard to compulsory attendance. The maintenance of schools is also aided by a Government grant, and the salary of the teacher is paid partly by school fees and partly by a grant dependent upon the result of the examination of the scholars by the Government inspector, the school board having the power, however, to make their own terms with the teacher. Denominational schools are permitted to receive a Government grant. The following table (XXII.) shows the proportion of persons in the receipt of education in Scotland in 1861, 1871, and 1881:

TABLE XXII.

Year.	Population at different Ages.				Persons in Receipt of Education.				Percentages to the Pop. at each Age.			
	0–5 years.	5–15 years.	15 and above.	Total.	0–5 years.	5–15 years.	15 and above.	Total.	0–5 years.	5–15 years.	15 and above.	Total.
1861	417,259	685,912	1,959,123	3,052,294	8,666	439,388	19,002	467,056	2.08	64.05	0.96	15.25
1871	455,620	776,871	2,127,527	3,360,018	10,025	541,995	22,101	574,121	2.19	69.77	1.04	17.09
1881	510,591	855,015	2,369,967	3,735,573	14,152	675,314	30,633	720,099	2.77	78.98	1.29	19.28

Particulars in regard to schools under school board management are given in the following table (XXIII.):

TABLE XXIII.

Year.	Total Expenditure.	Number of Scholars.	School Places.	Schools Inspected.	Expenditure per Scholar on Average Attendance.	Scholars Examined in Higher Subjects.	Certificated Teachers.	Assistant Teachers.	Pupil Teachers.
1875.....	£551,140	314,164	391,538	2730	£1 15 9¼	12,958	3811	129	4262
1884.....	938,223	458,121	655,672	3131	2 1 5¾	61,429	6220	1012	3629

Secondary schools.

All the training colleges for teachers in board schools are connected with religious denominations—three with the Established Church, three with the Free Church, and one with the Episcopal Church.

As early as the 14th century some of the burghs had grammar-schools partly under the control of the magistrates. In 1496 an Act was passed enjoining the attendance at the schools of the eldest sons of barons and freeholders until "they be

founded in perfect Latin, and thereafter to remain at the schools of arts and law" (where ecclesiastics were trained). The grammar or burgh schools enjoyed a monopoly of teaching certain branches, and private schools were frequently prohibited as interfering with their rights. Grammar-schools were chiefly devoted to instruction in Latin, and the course usually extended to five years. According to the report of the education commissioners, the number of burgh schools in 1867 was twenty-six. By the Act of 1872 their management was transferred to the school board, but they were excluded from participation in the school fund, and no provision was made for their inspection. The Act of 1878 authorized certain grants of money, and contained certain provisions for inspection, which, however, have been practically inoperative. The Educational Endowments Act of 1882 provides for a more comprehensive scheme for the promotion of secondary education, and also for a scheme of systematic inspection. These educational endowments—the result of private bequest—yield an annual income of £175,000, and, on account of the changed conditions of society, the primary objects of the donors were in a great degree frustrated by the manner in which they were being administered. Some of the best secondary schools in Scotland are under the management of trustees. For the four universities of Scotland (St. Andrews, Aberdeen, Glasgow, and Edinburgh) see the articles on these cities, also UNIVERSITIES. University College in Dundee and Anderson's College in Glasgow have similar courses of instruction to the universities, but possess no power to grant degrees and receive no Government aid. A notice of the various medical schools and scientific colleges will be found in the articles on the towns in which they are situated.

Religion.—For an historical account of the more important religious denominations of Scotland the reader is referred to the articles SCOTLAND, CHURCH OF, FREE CHURCH OF SCOTLAND, UNITED PRESBYTERIAN CHURCH, and PRESBYTERIANISM. The bulk of the population is Presbyterian, and the following table (XXIV.) gives particulars reported in 1885 regarding the Church of Scotland and other churches originated by secessions from it at various times,—the "contributions" indicating the amounts raised by the churches for all purposes, and of course excluding the endowments of the Established Church:

Presbyterian churches.

TABLE XXIV.

	Church of Scotland.	Free Church.	U.P. Church.	Evangelical Union.	Original Seceders.	Reformed Presby.
Congregations.....	1,479	1,067	543	87	27	12
Members.....	565,261	329,541	177,517	13,210	3249	1037
Contributions.....	£366,431	£626,028	£387,355	£21,760	£5606	£2592

Other denominations.

The Roman Catholic Church has 327 "churches, chapels, and stations,"—the estimated population connected with it being over 340,000. The Episcopal church in Scotland has about 250 churches with 80,000 members (of all ages) and nearly 30,000 communicants. The churches in connection with the Congregational Union number 101, 73 of which report a membership of 10,869, the money raised for all purposes in 1884–85 being £23,027 [$111,911.22]. The Baptist Union has 88 churches with 9688 members and the Wesleyan Methodists have 26 "circuits" with 4653. There are a few other religious denominations, such as the Primitive Methodists, the Catholic Apostolic Church, and the Glassites, but the membership of each is comparatively small.

Government, Law, and Local Administration.—By the Act of Union in 1707 Scotland ceased to have a separate parliament and its government was assimilated to that of England. In the parliament of Great Britain its representation was fixed at sixteen peers (the same number as at present) elected by the peers of Scotland at each new parliament, in the House of Lords, and at forty-five members in the House of Commons,—the counties returning thirty and the burghs fifteen. The power of the sovereign to create new Scottish peerages lapsed at the Union, and their number has already diminished by nearly one-half. By the Reform Act of 1832 the number of Scottish representatives in the Commons was raised to fifty-three, the counties under a slightly altered arrangement returning thirty members as before, and the burghs, reinforced by the erection of various towns into parliamentary burghs, twenty-three; the second Reform Act (1868) increased the number to sixty, the universities obtaining representation by two members, while three additional members were assigned to the counties and two to the burghs; by the Redistribution of Seats Act of 1885 an addition of six members was made to the representation of the counties and six to that of the burghs, the total representation being raised to seventy-two. The management of Scottish business in parliament has since 1885 been under the charge of the secretary for Scotland.

Parliamentary representation.

At the Union Scotland retained its old system of law and legal administration, a system modelled on that of France; but since the Union the laws of England and Scotland have been on many points assimilated, the criminal law of the two countries being now practically identical, although the methods of procedure are in many respects different. The Court of Session, as the supreme court in civil causes is called, dates from 1532, and was formed on the model of the parlement of Paris; it is held at Edinburgh, the capital. Since the Union it has undergone certain modifications. It consists of thirteen judges, acting in an Inner and an Outer House. The Inner House has two divisions, with four judges each, the first being presided over by the lord president of the whole court, and the second by the lord justice clerk. In the Outer House five judges, called lords ordinary, sit in separate courts. Appeals may be made from the lords ordinary to either of the divisions of the Inner House, and, if the occasion demands, the opinion of all the judges of the Court of Session may be called for; but whether this be done or not the decision is regarded as a decision of the Court of Session. Appeals may be made from the Court of Session to the House of Lords. The lord justice general (lord president), the lord justice clerk, and five other judges form the High Court of Justiciary, instituted in 1672, for criminal cases, which sits at Edinburgh for the trial of cases from the three Lothians and of cases referred from the circuit courts. The latter meet for the south at Jedburgh, Dumfries, and Ayr; for the west at Glasgow, Inveraray, and Stirling; and for the north at Perth, Aberdeen, Dundee, and Inverness. The law agents who undertake cases to be decided before the supreme courts are either solicitors before the supreme courts or writers to the signet, the latter of whom possess certain special privileges. The lawyer authorized to plead before the supreme courts is termed an advocate. The principal law officer of the crown is the lord advocate, who is assisted by the solicitor-general and by advocates-depute. The lord advocate has since 1885 ceased to have the charge of Scottish business in the House of Commons. See ADVOCATE, vol. i., 162. The subordinate legal courts and officials are described under the next heading.

Law.

Local administration.

The largest administrative area is that of the county, but for purposes of registration Scotland is partitioned into eight divisions, to each of which an examiner for inspection of registers is appointed by the registrar-general: and for the carrying out of the provisions of the Lunacy Acts it is divided into twenty-two districts. Registration counties date from the Act of 1854 providing that for purposes of registration the areas of the counties may be altered. For the purposes of the General Police Act of 1862 part of the area of one county may also be brought into the area of another. Certain counties have been united for parliamentary or other purposes, and certain others have been divided for parliamentary purposes, while others again for certain administrative purposes retain their old subdivisions, Lanark for assessment purposes being still divided into wards. The civil counties were originally synonymous either with sheriffdoms or stewartries. Stewartries ceased with the abolition of hereditary jurisdictions in 1748, but Kirkcudbright still retains the designation. The office of sheriff, which formerly implied a much less limited authority than at present, was in existence in the reign of David I., when the greater part of the kingdom was divided into twenty-five sheriffdoms. In the latter part of the 13th century they numbered thirty-four. The counties now number thirty-three, of which Ross and Cromarty constitute one, while Edinburgh is a "county of a city." The highest county dignitary is the lord-lieutenant, the office being instituted in 1782. He is nominated by the crown, holds office for life, except in cases of misconduct, represents the crown in military matters, recommends for commissions of the peace, holds the position of high sheriff, and is a member of the police committee. Practically, however, the office is little more than honorary, and the real administration of county affairs is in the hands of commissioners of supply, who were originally appointed to apportion and collect the national revenue, but who now regulate the land-tax, control the

county police, raise the militia, and levy rates to meet the county expenditure. In 1878 an Act was passed for the creation of road trustees, who have the power to levy rates for the maintenance throughout the county of roads and bridges (see p. 553 above). The practical administration of the law in the county is under the control of the sheriff. See SHERIFF. A large proportion of his duties are, however, delegated to the sheriff-substitute. At one time the functions of the sheriff-principal were confined to one county, but by an Act passed in 1855 it was arranged that as sheriffdoms fell vacant certain counties should be grouped into districts, each under the control of the sheriff-principal, and in 1870 this arrangement was further modified and extended. The sheriff-clerk, appointed by the crown, has, under the Ballot Act of 1872, the charge of ballot papers in connection with the parliamentary elections, and is *custos rotulorum*. The public prosecutor for counties is the procurator-fiscal, who takes the initiative in regard to suspected cases of sudden death, although in this respect the law of Scotland is less strict than that of England. Justices of the peace, who are unpaid and require no special qualification, but who, as they are recommended by the lord-lieutenant, are generally persons of position in the county, exercise a certain subordinate jurisdiction. Their office expires on the demise of the crown. In every commission of the peace certain public officials are included. The justices of the peace hold quarter sessions, take affidavits and declarations (such as declarations of marriage), sign warrants, try petty criminal cases (such especially as poaching and assault), and regulate public-house licenses. Under BOROUGH (vol. iv., pp. 56–57) will be found an account of the history and constitution of the three classes of ancient burghs in Scotland,—royal burghs, burghs of regality, and burghs of barony. Police burghs, which may include any of the other classes of burghs, are formed of those places which have adopted the General Police and Improvement Acts (13 and 14 Vict. c. 33 and 25 and 26 Vict. c. 101). They are governed by police commissioners, who have power to regulate all sanitary matters. They may include more than one of the other burghs and may extend into another county. Under the Improvement Act (25 and 26 Vict. c. 101) most of the burghs with over 7000 inhabitants maintain their own police. The parliamentary burghs do not now include all the royal burghs and include various other towns in addition to them. The number of royal burghs is seventy, and, as was to be expected, while some since their formation have enormously increased in population and wealth, others have so declined or made so little progress that they now rank only as villages. In 1881 there were ten royal burghs which had less than 1000 inhabitants each and four which had less than 500 each, Earlsferry (Fife) having only 286. Under the Public Health Act of 1867, amended in 1879, the erection of urban and rural sanitary districts was provided for. The corporation of the burghs is formed of the provost (or lord provost), bailies, and councillors. Bailie courts are held in the burghs for the trial of minor offences. The civil parish or parish *quoad omnia*, originally the ecclesiastical parish or area subject to one cure of souls, is a division of the county for registration of births, deaths, and marriages, and for poor law administration. The boundaries are determined by the boundaries of the estates which appear to lie in the parish, but may be altered by consent of proprietors holding the major value of the property in it. For all sanitary purposes the areas of burghs are removed from those of the parishes, and certain civil parishes may be classed as burghal, landward, and mixed. Under Graham's Act (7 and 8 Vict. c. 44) a parish *quoad sacra* may be erected on the application of persons who have built and endowed a church. For administrative purposes the oldest parish organization is that of the heritors or landowners, who are required to provide and maintain a church, churchyard, manse, and church glebe, and, before the passing of the Education Act in 1872, had to maintain the parochial school. In 1579 the power was granted them of assessment for poor relief, but in 1600 the kirk-session was united with them for these purposes. This organization still exists in those parishes, now very few in number, which have not adopted the Poor Law Amendment Act of 1845; this Act provides for the constitution of a parochial board composed of nominees of the kirk-session and a proportion of persons elected by the ratepayers. Under the Education Act of 1872 the county is divided into school-board districts, whose area corresponds with the civil, or the *quoad sacra*, or landward, or burghal parish (see p. 559 above).

(T. F. H.)

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SCOTLAND, CHURCH OF. In the article PRESBYTERIANISM the history of the Church of Scotland was brought down to the middle of the 18th century, and the story of the secessions of 1733 and 1751 was there told. We take up here the church's history at the beginning of the "Moderate" rule. Her annals during the next three-quarters of a century are singularly uneventful. In close alliance with the state, she increases in power and dignity, and becomes the home of letters and philosophy. But there is no great movement of a theological nature, no striking religious development to lend her popular interest.

The strength of the church as well as her tendency to moderation arose in great part out of the political circumstances of the early part of the 18th century. Presbytery, being loyal to the house of Hanover, while Episcopacy was Jacobite, enjoyed the royal favor and was treated as a firm ally of the Government. The Patronage Act of 1712 threw the filling up of parishes into the hands of those well-affected to the Government, and the example of the mode of patronage practiced in England may have tended to promote a disregard of the religious feelings of the people. The effect on the clergy was to encourage them to seek the friendship of the landed gentry and to regard the higher rather than the lower orders of society as their natural allies, so that they were at the same time led to liberal ways of thinking and rendered largely independent of their congregations.

Period of Moderate ascendency.

It is remarked by Dr. Hill Burton, and Carlyle repeats the remark, that "Scots dissent never was a protest against the principles of the church, but always tended to preserve the old principles of the church, whence the Establishment—by the progress of enlightenment as some said, by deterioration according to others—was lapsing." The secessions carried off the more fervent elements; yet enough of the old leaven always remained to exert a powerful influence. Thus, while the church as a whole was more peaceful, more courtly, more inclined to the friendship of the world than at any former time, it contained two well-marked parties, in one of which these characteristics of the religion of the 18th century were more marked than in the other. The Moderate party, which maintained its ascendency till the beginning of the 19th century, and impressed its character on the church, sought to make the working of the church in its different parts as systematic and regular as possible, to make the assembly supreme and enforce respect for its decisions by presbyteries, and to render the judicial procedure of the church as exact and formal as that of the civil courts. The popular party, regarding the church less from the side of the Government, had less sympathy with the progressive movements of the age, and desired greater strictness in discipline. The main

Question of patronage.

subject of dispute arose at first from the exercise of patronage. Presbyteries in various parts of the country were still disposed to disregard the presentations by lay patrons, and to settle the men desired by the people; but legal decisions had shown that if they acted in this way their nominee, while legally minister of the parish, could not claim the stipend. To the risk of such sacrifices the church, led by the Moderate party, refused to expose herself. By the new policy inaugurated by Dr. Robertson, which led to the second secession, the assembly compelled presbyteries to give effect to presentations, and in a long series of disputed settlements the "call," though still held essential to a settlement, was less and less regarded, until it was declared that it was not necessary, and that the church courts were bound to induct any qualified presentee. The substitution of the word "concurrence" for "call" about 1764 indicates the subsidiary and ornamental light in which the assent of the parishoners was now to be regarded. The church could have given more weight to the wishes of the people; she professed to regard patronage as a grievance, and the annual instructions of the assembly to the commission (the committee representing the assembly till its next meeting) enjoined that body to take advantage of any opportunity which might arise for getting rid of the grievance of patronage, an injunction which was not discontinued till 1784. It is not likely that any change in the law could have been obtained at this period, and disregard of the law might have led to an exhausting struggle with the state, as was actually the case at a later period. Still it was in the power of the church to give more weight than she did to the feelings of the people; and her working of the patronage system drove large numbers from the Establishment. A melancholy catalogue of forced settlements marks the annals of the church from 1749 to 1780, and wherever an unpopular presentee was settled the people quietly left the Establishment and erected a meeting-house. In 1763 there was a great debate in the assembly on the progress of schism, in which the popular party laid the whole blame at the door of the Moderates, while the Moderates rejoined that patronage and Moderatism had made the church the dignified and powerful institution she had come to be. In 1764 the number of meeting-houses was 120, and in 1773 it had risen to 190. Nor was a conciliatory attitude taken up towards the seceders. The ministers of the Relief desired to remain connected with the Establishment, but were not suffered to do so. Those ministers who resigned their parishes to accept calls to Relief congregations, in places where forced settlements had taken place, and who might have been and claimed to be recognized as still ministers of the church, were deposed and forbidden to look for any ministerial communion with the clergy of the Establishment. Such was the policy of the Moderate ascendency, or of Principal Robertson's administration, on this vital subject. It had the merit of success in so far as it completely established itself in the church. The presbyteries ceased to disregard presentations, and lay patronage came to be regarded as part of the order of things. But the growth of dissent steadily continued and excited alarm from time to time; and it may be questioned whether the peace of the church was not purchased at too high a price. The Moderate period is justly regarded as in some respects the most brilliant in the history of the church. Her clergy included many distinguished Scotsmen, of whom an account is given under their respective names. See REID (Thomas), CAMPBELL (George), FERGUSON (Adam), HOME (John), BLAIR (Hugh), ROBERTSON (William), and ERSKINE (John). The labors of these men were not mainly in theology; in religion the age was one not of advance but of rest; they gained for the church a great and widespread respect and influence.

Another salient feature of the Moderate policy was the consolidation of discipline. It is frequently asserted that discipline was lax at this period and that ministers of scandalous lives were allowed to continue in their charges. It cannot, however, be shown that the leaders of the church at this time sought to procure the miscarriage of justice in dealing with such cases. That some offenders were acquitted on technical grounds is true; it was insisted that in dealing with the character and status of their members the church courts should proceed in as formal and punctilious a manner as civil tribunals and should recognize the same laws of evidence, in fact, that the same securities should exist in the church as in the state for individual rights and liberties.

Religious condition of Highlands.

The religious state of the Highlands, to which at the period of the Union the Reformation had only very partially penetrated, occupied the attention of the church during the whole of the 18th century. In 1725 the gift called the "royal bounty" was first granted,—a subsidy amounting at first to £1000 [$4860] per annum, increased in George IV.'s reign to £2000 [$9720],

and continued to the present day; its original object was to assist the reclamation of the Highlands from Roman Catholicism by means of catechists and teachers. The Society for Propagating Christian Knowledge, incorporated in 1709, with a view partly to the wants of the Highlands, worked in concert with the Church of Scotland, setting up schools in remote and destitute localities, while the church promoted various schemes for the dissemination of the Scriptures in Gaelic and the encouragement of Gaelic students. In consequence of these efforts Roman Catholicism now lingers only in a few islands and glens on the west coast. In these labors as well as in other directions the church was sadly hampered by poverty. The need of an increase in the number of parishes was urgently felt, and, though chapels began to be built about 1796, they were provided only in wealthy places by local voluntary liberality; for the supply of the necessities of poor outlying districts no one as yet looked to any agency but the state. In every part of the country many of the ministers were miserably poor; there were many stipends, even of important parishes, not exceeding £40 [$194.40] a year; and it was not till after many debates in the assembly and appeals to the Government that an Act was obtained in 1810 which made up the poorer livings to £150 [$729] a year by a grant from the public exchequer. The churches and manses were frequently of the most miserable description, if not falling to decay.

With the close of the 18th century a great change passed over the spirit of the church. The new activity which sprang up everywhere after the French Revolution produced in Scotland a revival of Evangelicalism which has not yet spent its force. Moderatism had cultivated the ministers too fast for the people, and the church had become to a large extent more of a dignified ruler than a spiritual mother. About this time the brothers Robert and James Haldane devoted themselves to the work of promoting Evangelical Christianity, James making missionary journeys throughout Scotland and founding Sunday schools; and in 1798 the eccentric preacher Rowland Hill visited Scotland at their request. In the journals of these evangelists dark pictures are drawn of the religious state of the country, though their censorious tone detracts greatly from their value; but there is no doubt that the efforts of the Haldanes brought about or coincided with a quickening of the religious spirit of Scotland. The assembly of 1799 passed an Act forbidding the admission to the pulpits of laymen or of ministers of other churches, and issued a manifesto on Sunday schools. These Acts helped greatly to discredit the Moderate party, of whose spirit they were the outcome; and that party further injured their standing in the country by attacking Leslie, afterwards Sir John Leslie, on frivolous grounds,—a phrase he had used about Hume's view of causation—when he applied for the chair of mathematics in Edinburgh. In this dispute, which made a great sensation in the country, the popular party successfully defended Leslie, and thus obtained the sympathy of the enlightened portion of the community. In 1810 the *Christian Instructor* began to appear under the editorship of Dr. Andrew Thomson, a churchman of vigorous intellect and noble character. It was an ably written review, in which the theology of the Haldanes asserted itself in a somewhat dogmatic and confident tone against all unsoundness and Moderatism, clearly proclaiming that the former things had passed away. The question of pluralities began to be agitated in 1813, and gave rise to a long struggle, in which Dr. Chalmers took a notable part, and which terminated in the regulation that a university chair or principalship should not be held along with a parish which was not close to the university seat.

The Haldanes.

The growth of Evangelical sentiment in the church, along with the example of the great missionary societies founded in the end of the 18th and the beginning of the 19th century, led to the institution of the various missionary schemes still carried on, and their history forms the chief part of the history of the church for a number of years. The education scheme, having for its object the planting of schools in destitute Highland districts, came into existence in 1824. The foreign mission committee was formed in 1825, at the instance of Dr. Inglis, a leader of the Moderate party; and Dr. Duff went to India in 1829 as the first missionary of the Church of Scotland. The church extension committee was first appointed in 1828, and in 1834 it was made permanent. The colonial scheme was inaugurated in 1836, and the Jewish mission in 1838, M'Cheyne and Andrew Bonar setting out in the following year as a deputation to inquire into the condition of the Jews in Palestine and Turkey and on the Continent of Europe. Of these schemes that of church extension has most historical importance. It was originally formed to collect information regarding the spiritual wants of the country, and to apply to the Government to build the churches found to be necessary. As the population of Scotland had doubled since the Reformation, and its distribution had been completely altered in many counties, while the number of parish churches remained unchanged, and meeting-houses had only been erected where seceding congregations required them, the need for new churches was very great. The application to Government for aid, however, proved the occasion of a "Voluntary controversy," which raged with great fierceness for many years and has never completely subsided. The union of the Burgher and the Antiburgher bodies in 1820 in the United Secession—both having previously come to hold Voluntary principles—added to the influence of these principles in the country, while the political excitement of the period disposed men's minds to such discussions. The Government built forty-two churches in the Highlands, providing them with a slender endowment; and these are still known as parliamentary churches. Under Dr. Chalmers, however, the church extension committee struck out a new line of action. That great philanthropist had come to see that the church could only reach the masses of the people effectively by greatly increasing the number of her places of worship and abolishing or minimizing seat-rents in the poorer districts. In his powerful defence of establishments against the voluntaries in both Scotland and England, in which his ablest assistants were those who afterwards became, along with him, the leaders of the Free Church, he pleaded that an established church to be effective must divide the country territorially into a large number of small parishes, so that every corner of the land and every person of whatever class, shall actually enjoy the benefits of the parochial machinery. This "territorial principle" the church has steadily kept in view ever since. With the view of realizing this idea he appealed to the church to provide funds to build a large number of new churches, and personally carried his appeal throughout the country. By 1835 he had collected £65,626 [$318,942.36] and reported the building of sixty-two churches in connection with the Establishment. The keenness of the conflict as it approached the crisis of 1843 checked the liberality of the people for this object, but by 1841 £305,747 [$1,485,930.42] had been collected and 222 churches built.

Church extension scheme.

The zealous orthodoxy of the church found at this period several occasions to assert itself. John M'Leod Campbell, minister of Row, was deposed by the assembly of 1830 for teaching that assurance is of the essence of faith and that Christ died for all men. He has since been recognized as one of the profoundest Scottish theologians of the 19th century, although his deposition has never been removed. The same assembly condemned the doctrine put forth by Edward Irving, that Christ took upon Him the sinful nature of

man and was not impeccable, and Irving was deposed five years later by the presbytery of Annan, when the outburst of supposed miraculous gifts in his church in London had rendered him still more obnoxious to the strict censures of the period. In 1841 Wright of Borthwick was deposed for a series of heretical opinions, which he denied that he held, but which were said to be contained in a series of devotional works of a somewhat mystical order which he had published.

Disruption of 1843.

The influence of dissent also acted along with the rapidly rising religious fervor of the age in quickening in the church that sense of a divine mission, and of the right and power to carry out that mission without obstruction from any worldly authority, which belongs to the essential consciousness of the Christian church. An agitation against patronage, the ancient root of evil, and the formation of an anti-patronage society, helped in the same direction. The Ten Years' Conflict, which began in 1833 with the passing by the assembly of the Veto and the Chapel Acts, is treated in the article FREE CHURCH OF SCOTLAND. It is not therefore necessary to dwell further in this place on the consequences of those Acts. The assembly of 1843, from which the exodus took place, proceeded to undo the Acts of the church during the preceding nine years. The Veto was not repealed but ignored, as having never had the force of law; the Strathbogie ministers were recognized as if no sentence of deposition had gone forth against them. The protest which the moderator had read before leaving the assembly had been left on the table; and an Act of Separation and deed of demission were received from the ministers of the newly formed Free Church, who were now declared to have severed their connection with the Church of Scotland. The assembly addressed a pastoral letter to the people of the country, in which, while declining to "admit that the course taken by the seceders was justified by irresistible necessity," they counselled peace and goodwill towards them, and called for the loyal support of the remaining members of the church.

Two Acts at once passed through the legislature in answer to the claims put forward by the church. The Scottish Benefices Act of Lord Aberdeen, 1843, gave the power to state objections personal to a presentee, and bearing on his fitness for the particular charge to which he was presented, and also authorized the presbytery in dealing with the objections to look to the number and character of the objectors. Sir James Graham's Act, 1844, provided for the erection of new parishes, and thus created the legal basis for a scheme under which chapel ministers might become members of church courts.

Development of the church since 1843.

The Disruption left the Church of Scotland in a sadly maimed condition. Of 1203 ministers 451 left her, and among these were many of her foremost men. A third of her membership is computed to have gone with them. In Edinburgh many of her churches were nearly empty. The Gaelic-speaking population of the northern counties completely deserted her. All her missionaries left her but one. She had no gale of popular enthusiasm to carry her forward, representing as she did not a newly arisen principle but the opposition to a principle which she maintained to be dangerous and exaggerated. For many years she had much obloquy to endure. But she at once set herself to the task of filling up vacancies and recruiting the missionary staff. A lay association was formed, which raised large sums of money for the missionary schemes, so that their income was not allowed seriously to decline. The good works of the church, indeed, were in a few years not only continued but extended. All hope being lost that parliament would endow the new churches built by the church extension scheme of Dr. Chalmers, it was felt that this also must be the work of voluntary liberality. Under Dr. James Robertson, professor of church history in Edinburgh, one of the leading champions of the Moderate policy in the Ten Years' Conflict, the extension scheme was transformed into the endowment scheme, and the church accepted it as her duty and her task to provide the machinery of new parishes where they were required. By 1854 30 new parishes had been added at a cost of £130,000 [$631,800], and from this time forward the work of endowment proceeded still more rapidly. In 1860 61 new parishes had been endowed, in 1870 150, in 1876 250, while in 1886 there were 351.[1] In 1843 the number of parishes was 924. Of 42 parliamentary churches existing at that time 40 have been erected into parishes *quoad sacra*; hence the total number of parishes in Scotland at midsummer 1886 was 1315. By the Poor Law Act of 1845 parishes were enabled to remove the care of the poor from the minister and the kirk-session, in whom it was formerly vested, and to appoint a parochial board with power to assess the ratepayers. The Education Act of 1872 severed the ancient tie connecting church and school together, and created a school board having charge of the education of each parish. At that date the Church of Scotland had 300 schools, mostly in the Highlands. The church, however, continues to carry on normal schools for the training of teachers in Edinburgh, Glasgow, and Aberdeen.

Abolition of patronage.

In 1874 patronage was abolished. The working of Lord Aberdeen's Act had given rise to many unedifying scenes and to lengthy struggles over disputed settlements, and it was early felt that some change at least was necessary in the law. The agitation on the subject went on in the assembly from 1857 to 1869, when the assembly by a large majority condemned patronage as restored by the Act of Queen Anne, and resolved to petition parliament for its removal. The request was granted, and the right of electing parish ministers was conferred on the congregation; thus a grievance of old standing, from which all the ecclesiastical troubles of a century and a half had sprung, was removed and the church placed on a thoroughly democratic basis. This Act, combined with various efforts made within the church for her improvement, has secured for the Scottish Establishment a large measure of popular favor, and during the last quarter of a century she has grown rapidly both in numbers and in influence. This revival is largely due on the one hand to the improvement of her worship which began with the efforts of Dr. Robert Lee (1804–1868), minister of old Greyfriars, Edinburgh, and professor of Biblical criticism in Edinburgh university. By introducing into his church a printed book of prayers, and also an organ, Dr. Lee stirred up vehement controversies in the church courts, which resulted in the recognition of the liberty of congregations to improve their worship. A church service society, having for its object the study of ancient and modern liturgies, with a view to the preparation of forms of prayer for public worship, was founded in 1865; it has published five editions of its "Book of Common Order," which, though at first regarded with suspicion, is now recognized as a useful and respected adjunct. Church music has been cultivated and improved in a marked degree; a fine collection of hymns has been introduced to supplement the psalms and paraphrases. And architecture has restored the larger churches from their disfigurement by partition walls and galleries—though much still remains to be done in this way—and has erected new churches of a style favorable to devotion.

Improvements in public worship.

The fervor of the church has, on the other hand, found a channel in the operation of a "Committee

[1] Those branches of the church extension scheme which dealt with church building, and with the opening of new missions to meet the wants of increasing populations, were taken up by a new department, called the home mission scheme. The home mission as the pioneer in opening up new fields of labor, and the endowment scheme which renders permanent the religious centres that the mission has founded, are both traceable to Dr. Chalmers.

on Christian Life and Work," appointed in 1869 with the aim of exercising some supervision of the work of the church throughout the country, stimulating evangelistic efforts, and organizing the labors of lay agents. This committee publishes a magazine of "Life and Work," which has a circulation of about 100,000, and has lately been seeking to organize young men's guilds in connection with congregations. It was to reinforce this element of the church's activity, as well as to strengthen her generally, that Mr. James Baird in 1873 made the munificent gift of £500,000 [$2,430,000]. This fund is administered by a trust which is not under the control of the church, and the revenue is used mainly in aid of church building and endowment throughout the country.

Committee on Christian Life and Work.

The church has greatly increased of late years in liberality of sentiment, and there has been no deposition for heresy since 1843. A volume of *Scotch Sermons* published in 1880 by ministers holding liberal views brought out the fact that the church would not willingly be led into such prosecutions. An agitation on the part of the Dissenters for disestablishment sprang up afresh after the passing of the Patronage Act and has continued ever since; while a countermovement was represented by a Bill, introduced into parliament in 1886 to declare the spiritual independence of the Church of Scotland, which, if successful, would, it was understood, have opened the way for a reunion of the Presbyterian bodies.[1]

Church Membership.—The Church of Scotland has now (1886) 1315 parishes, 160 non-parochial churches, and 121 preaching and mission stations, in all 1596 charges. The number of presbyteries is 84, and there are 16 provincial synods. The general assembly consists of 252 clerical and 118 lay members elected by presbyteries, with 73 representatives of royal burghs and universities, and 4 representatives of churches abroad, in all 447 members. In 1873 the number of communicants as returned to parliament in 1874 was 460,526; in 1878 the number as returned to parliament in 1879 was 515,786; in 1883 the number returned to the assembly of 1884 was 543,969; in 1885, 564,435. The professors of divinity at the four Scottish universities must be ministers of the church, and students aspiring to the ministry are required to attend one of the divinity halls of the universities for three sessions, after an arts course of three years. A large number of ministers of the church are employed elsewhere than in Scotland. The Church of Scotland in England consists of 16 charges. There are 31 chaplains ministering to Presbyterians in the army and navy, 15 of these being stationed in India. The foreign mission employs 15 ordained and 11 unordained European missionaries, with a large number of native agents, in India, East Africa, and China. The Jewish mission employs 6 ordained ministers, with other agents, at Constantinople, Smyrna, Salonica, Beyrout, and Alexandria. The colonial committee supplies religious ordinances to emigrants from Scotland in India, Fiji, Cyprus, Mauritius, Ceylon, and the West Indies, besides assisting Presbyterian colleges in Canada and Australia. A minister of the church presides over the Scots church of old standing at Amsterdam. Two lectureships have been founded in recent times in connection with the church—one by Mr. James Baird (already mentioned), the other by Mr. John Croall, of Southfield—and these have already produced several notable contributions to Scottish theology.

Statistics of membership, etc.

An association for augmenting the smaller livings was formed in 1866, and the church now has a smaller livings scheme, which aims at bringing up to £200 [$972] a year all livings that fall below that sum. Such numbered 311 in 1885; and the sum distributed among them was £8537 [$41,489.82], which, however, was £5000 [$24,300] short of the sum necessary to accomplish fully the desired object.

In the following details of the income of the church we give first the value of her endowments and then some figures showing the growth of her voluntary liberality.

Means from Endowments.—(1) From a parliamentary return obtained in 1874 the church is seen to derive from teinds, including the value of manses and glebes, the annual sum of £289,413 [$1,406,547.18]. Augmentations have been obtained since that date amounting to upwards of £10,000 [$48,600], but the fiars prices have declined during the same period by nearly 25 per cent., so that the total amount so derived has not increased. The unexhausted teinds amounted in 1880 to £134,413 [$653,247.18]. (2) The exchequer pays to 190 poor parishes and to 42 Highland churches, from church property in the hands of the crown, £17,040 [$82,814.40]. (3) From local sources the church derives £23,501 [$114,214.86]. (4) The endowments raised by the church for 342 new parishes amount to £42,500 [$206.550]. The total endowments, not counting church buildings, amount to £383,041 [$1,861,579.26].

Finance.

Means from Voluntary Liberality.—The following table (I.) gives a view of the financial progress of certain of the schemes of the church since the secession:

Year.	Foreign Mission.	Education.	Colonial Scheme.	Jewish Mission.	Home Mission.
	£	£	£	£	£
1842	6,748	3630	3,753	4298	...
1845	3,572	3688	2,481	1867	2,615
1850	6,047	4019	2,707	2472	3,567
1855	3,712	4466	3,060	2619	3,866
1860	4,873	4487	3,228	2804	4,858
1865	5,822	4952	3,696	3299	5,389
1870	7,754	8245	4,634.	4101	7,082
1875	12,315	9035	8,371	5644	11,163
1880	16,270	...	11,674	4715	15,604
1885	13,346	...	4,750	5128	9,450

No attempt was made until 1873 to collect statistics of the whole liberality of the church; and changes introduced from time to time in the mode of stating the various sums make it impossible to give a complete comparative statement since that date. The following table (II.) shows the amount at quinquennial periods down to 1885, the church-door collections and seat-rents probably affording the most accurate indication of the general progress of the body. The building operations of which the values are given include only such building as is the result of voluntary effort. Under the head of "general church objects" are included the collections for missions, for small livings, aged and infirm ministers, zenana missions, etc. These figures do not include income from trust funds or endowments; they state what was given in the year referred to. A number of objects of liberality are not included in the table:

Year.	Church-door Collections.	Seat Rents.	Church or Manse Building or Repairs.	General Church Objects.	Other Objects.	Total.
	£	£	£	£	£	£
1872	41,561	35,225	31,851	43,618	27,224	255,350
1877	65,827	53,094	69,800	40,117	54,572	373,715
1882	76,399	59,859	67,134	51,520	61,253	386,061
1885	80,887	63,197	59,395	60,110	61,739	374,576

The following sums were raised during the thirteen years 1872–84: congregational and charitable purposes, £1,462,091 [$7,105,762.26]; support of ordinances and supplement of stipends, £233,406 [$1,134,353.16]; education (exclusive of sums raised for training colleges), £161,931 [$786,984.66]; home mission work, £358,543 [$1,742,518.98]; church building, £737,775 [$3,585,586.50]; endowment of new parishes, £486,693 [$2,365,327.98]; foreign mission work, £376,523 [$1,829,901.78]; total, £3,816,962 [$18,550,435.32]. Mr. James Baird's gift is not included in this statement. (A. M.*)

SCOTLAND, LITERATURE OF. Literature in Scotland, as distinct from England, dates from the time of COLUMBA (*q.v.*). Adamnan, abbot of Iona, who in 690 wrote in Latin the life of his predecessor, may be regarded as the first author that Scotland produced. In addition to his biography of St. Columba, a long extract from a work of his on the "Holy Places" is incorporated by Bede in his *Ecclesiastical History*. The greater part of Scotland was at that time inhabited by a Celtic population and the period from the 7th to the 13th century has left but few literary remains (see CELTIC LITERATURE, vol. v. p. 271–2). In the latter part of the 13th century what may be called the ancient literary language of

Adamnan.

[1] For the period since 1843 the most useful book is Dr. Story's *Life of Dr. Robert Lee*, 1870.

Scotland was used in the district between the Humber and the Forth and coastwise as far north as Aberdeen. Its earliest writer is Thomas of Ercildoune, or Thomas the Rhymer, who reached the height of his fame in 1280. The fairy tale or romance that bears his name may be regarded as the earliest example of romance poetry in Britain. Nearly contemporary with the Rhymer were two other distinguished Scots, Michael Scot (*q.v.*) and John of Duns, or Duns Scotus (*q.v.*), both of whom, however, wrote in Latin. Three Arthurian romances taken from Anglo-Norman sources relating to Sir Gawain, one of the most celebrated knights of the Round Table, seem to have been composed about the end of the 13th century. These were—*Syr Gawayn and the Grene Knycht*, the *Knightly Tale of Golagros and Gawayne*, and the *Awntyrs of Arthur at the Terne-wathelyne*. Sir Gawain's exploits were so popular in the south of Scotland that he was claimed by the people as one of their own chieftains and called the lord of Galloway. The *Awntyrs of Arthur*, or the adventures of King Arthur at the Ternwadling, a small lake near Carlisle, and the *Pystil of Swete Susan*, a version of the apocryphal story of Susanna, are supposed to have been the productions of Sir Hew of Eglintoun about that period. The *Tuill of Ranf Coilzear*, in which the adventures of the emperor Charlemagne in the house of a charcoal-burner named Ralph in the neighborhood of Paris are related with much poetic humor, and the fairy tale of *Orfeo and Heurodis* were written in the early part of the 14th century and were very popular in Scotland in former times.

Arthurian romances.

The War of Independence gave a new impetus to Scottish nationality and produced a corresponding effect on the literature of the country. The *Brus*, or metrical account of the deeds of Robert Bruce, was written by John Barbour (*q.v.*), archdeacon of Aberdeen, in the latter part of the 14th century. To him we owe a translation of a mediæval romance on the *Trojan War*, nearly 3000 lines in length, and a large collection of metrical lives of saints, which, after being long preserved in manuscript, have recently been printed by Dr. Horstmann. About this time was compiled the first formal history of Scotland by John of Fordun (*q.v.*) which was written in Latin and brought down to the death of David I. He, however, left materials for the completion of the work, the last date of which is 1385. In 1441 a continuation of it was made by Walter Bower or Bowmaker. The whole work was then styled the *Scotichronicon*, and brings the history of Scotland down to 1437. A metrical history was written between 1420 and 1424 by Andrew of Wyntoun, a canon regular of St. Andrews and prior of St. Serf's Inch in Loch Leven. This work, known as the *Orygynale Cronykil of Scotland*, is prefaced by an account of the human race from the creation, and, although for the most part its verse is homely and dull, its author occasionally describes stirring incidents with considerable power. The beautiful poem of James I. called *The Kingis Quhair*, written about this period, was far in advance of the contemporary metrical chronicles. It possesses a melody of verse unknown before and gives the king a conspicuous place in early Scottish literature. He is supposed to have also written *A Ballad of Good Counsel* and a song *On Absence;* but two poems, *Christis Kirk of the Grene* and *Peblis to the Play*, believed to have been his composition, have been recently shown by the Rev. W. W. Skeat to be by some other early poet. An allegorical poem called the *Buke of the Howlat* was written about 1450 by Sir Richard Holland, an adherent of the noble family of Douglas. It is a warning against pride, exemplified by the owl, decked out in the splendor of borrowed feathers, compelled on account of his insolence to resume his original form. The poem displays some inventive and descriptive power, though marred by its alliteration. The exploits of Sir William Wallace found about 1460 a worthy chronicler in Henry the Minstrel, or Blind Harry, who, born with such a serious defect must be regarded as one of the most extraordinary individuals recorded in the annals of literature. His well-known poem, which bears the name of his hero, is in versification, expression, and poetic imagery a remarkable production for that period. The grave and thoughtful poetry of Robert Henryson (*q.v.*), notary public and preceptor in the Benedictine convent at Dunfermline, who flourished about 1470, contrasts favorably with that of his English contemporaries. His *Testament of Cresseid* was often incorporated in the old editions of the works of Chaucer, to whose poetry it is not inferior. His *Robene and Makyne* is the earliest specimen of pastoral poetry in the Scottish language. These, with his *Fables* and other works, entitle him to a high place amongst the early Scottish poets. Nearly coeval with Henryson was Sir Gilbert Hay, chamberlain to Charles VI. of France, who made several translations from the works of French authors. One of these, taken from a popular French romance of Alexander the Great, extends to upwards of 20,000 lines. A long anonymous poem called *Clariodus* belongs to this period. It is a romance founded on a French original, the more material incidents of which are supposed to have happened at the English court. It abounds with illustrations of the manners and customs peculiar to the age of chivalry. Being nearly 3000 lines in length, it is, like the last-mentioned, an extensive specimen of the language and versification of the time. The *Thrie Tales of the Thrie Preistis of Peblis* (1490), the authorship of which is unknown, are moral tales possessing considerable freshness. As a fragment of an old version of them occurs in the Asloan MS., written in 1490, they must have existed long before the edition printed by Henry Charteris in 1603, in which form only they are now accessible. The *Ledger* of Andrew Halyburton, conservator of the privileges of the Scottish nation in the Netherlands, 1492–1503, is a valuable source of information regarding the early trade of Scotland.

Barbour. Fordun. Bower. Wyntoun. James I. Blind Harry. Henryson.

The close of the 15th century exhibited a considerable growth of literary ability in the writings of William Dunbar (*q.v.*) and his contemporaries. His works were so highly esteemed at the time he wrote that he was raised to the dignity of "the makar" or poet-laureate of Scotland. Such of Dunbar's writings as have come down to the present time are of a miscellaneous character, in which there is much power of description and command of verse. The *Thistle and the Rose* and the *Golden Targe* are excellent specimens of his poetic power. His satirical poems, such as the *Twa Marïit Wemen and the Wedo* and the *Flyting with Kennedie*, contain much coarse humor. Seven of his poems were the first specimens of Scottish typography, having been printed by Chepman and Myllar at Edinburgh in 1508, followed in 1509 by the well-known *Breviary* for the church of Aberdeen. A humorous poem called the *Freiris of Berwik* has been attributed to Dunbar and is usually printed with his works. Contemporary with Dunbar were a number of minor Scottish poets, of whose works only a few specimens have come down to the present time. These were Walter Kennedie, with whom he had his "flyting" or poetical contest, Sir John Rowll, Quintyne Shaw, Patrick Johnestoun, Merseir, James Afflek, and others.[1] The most classical of the Scottish poets was Gawyn or Gavin Douglas (*q.v.*), bishop of Dunkeld, whose great literary work was the translation of the *Æneid* of Virgil into

Dunbar. Gavin Douglas.

[1] Kennedie wrote *The Praise of Aige* and *The Passioun of Christ;* Rowll, *The Cursing on the Steilaris af his Fowlis;* Shaw, *Advice to a Courtier;* Johnestoun, *The Three Deid Powis;* Merseir, *Perrell in Paramours;* and Afflek, *The Quair of Jelousy.*

Scottish verse. To each book he prefixed a prologue; the one before the twelfth is an admirable descriptive poem of the beauties of May. His *Palice of Honour* and *Kyng Hart*, two allegorical poems, are able productions, the latter of which is full of dramatic vigor. Contemporary with Douglas was Sir David Lyndsay. Sir David Lyndsay (*q.v.*), Lyon king-of-arms in the reign of James V., who may be regarded as the most popular of the early Scottish poets. His *Monarchie, or ane Dialog betuix Experience and ane Courteour of the Miserabyl Estait of the Warld* gives a short survey of sacred and classical history which rendered it very popular in its time. His *Satire of the Thrie Estaitis* is a skilfully written attempt to reform the abuses of the period, especially those of the church. While some of its characters recite long and erudite political speeches, he introduces interludes of a farcical kind suited to the tastes of the times. This work may be considered the first dramatic effort of any British author. In his *Testament of Squire Meldrum* he relates the adventures of his hero with much poetic fire. Lyndsay's other poems consist of appeals to the king for advancement and some *jeux d'esprit* of no great length. One of the best scholars and teachers of this period was John Major or Mair, a native of Haddington, who was principal of St. Salvator's College, St. Andrews. Besides being the author of learned commentaries on Aristotle, he wrote a well-known work, *De historia gentis Scotorum libri sex*, printed in 1521. Another Scottish author that wrote in Latin with considerable elegance was Hector Boece (*q.v.*), principal of King's College, Aberdeen. Boece. His great work, *Historia gentis Scotorum a prima gentis origine*, was published in Paris in 1526. It was translated into Scottish by John Bellenden, archdeacon of Moray, under the title of the *Hystory and Croniklis of Scotland*, printed at Edinburgh in 1536. Bellenden also translated the first five books of Livy into Scottish. The *Chronicle* of Boece was versified in Scottish in 1531–35 by William Stewart, a descendant of the first earl of Buchan. It was written by command of Margaret, sister of Henry VIII. of England, for the instruction of her son, the youthful James V. A Latin poem of much merit, entitled *De animi tranquillitate*, was published in 1543 by Florence Wilson, master of Carpentras School. It is in the form of a dialogue and displays much variety of knowledge, while its Latinity has long been celebrated. In an anonymous work, written in 1548 or 1549, and called the *Complaynt of Scotland*, the author deplores the calamities to which Scotland was then subject. These are stated to be the wrongs done to the Scottish laborers at the hands of the landholders and the clergy, the difficulties with England, and the treachery of the Scottish nobility. The work is valuable as affording a glimpse of the literature then popular in Scotland, some pieces of which are no longer to be found,—such as *The Tayle of the Reyde Eyttyn* [red giant] *vith the Thre Heydes, The Tayl of the Volfe of the Varldis End, The Tayl of the Giantis that eit Quyk Men, The Tayl of the thrie futtit Dog of Norroway*, and *Robyn Hude and Litil Jhone.*

In 1552 there was printed at St. Andrews a *Catechism, that is to say ane Commone and Catholike Instructioun of the Christian People in Materis of our Catholike Faith and Religioun*, written by John Hamilton, archbishop of St. Andrews, the last primate of the Roman Catholic Faith in Scotland. The poems of Sir Richard Maitland, which are of a Maitland. somewhat satirical kind, are valuable, as they, like those of Lyndsay, contain much information about the abuses of the time (1560), such as the oppressive conduct of the landholders, vexatious lawsuits, and the depredations of the Border thieves. Sir Richard deserves the thanks of posterity for the large manuscript collection of poems by Scottish authors which he and his daughter formed, and which is now preserved in the Pepysian Library, at Magdalene College, Cambridge. The name of George Bannatyne is inseparably connected with the history of Scottish poetry, as in 1568 he too formed Bannatyne. an extensive collection of Scottish poetry which is certainly the most valuable extant. It was written by him at Edinburgh in the time of the plague, when the dread of infection confined him closely at home. The *Bannatyne MS.* now preserved in the Advocates' Library extends to 800 pages folio, and includes several of Bannatyne's own poems, of which the two most considerable are of an amatory character. The works of Alexander Scott, consisting principally of love poems, embrace also a spirited account of a *Jousting betwix Adamson and Sym* at the Drum, a place a little to the south of Edinburgh. The author, who was one of the most elegant poets of this period, has sometimes been called the "Scottish Anacreon." Two poems of some merit—the *Praises of Wemen* and the *Miseries of a Puir Scolar*—were written by Alexander Arbuthnot, principal of King's College, Aberdeen, about 1570. A poem of considerable length, called the *Sege of the Castell of Edinburgh*, published in 1573, was by Robert Semple, who also wrote an attack on Archbishop Adamson, called the *Legend of the Bishop of Sanct Androis Lyfe.* To this Rolland. period belong two poems of considerable length—the *Court of Venus* (1575), an imitation of the *Palice of Honour* of Gawyn Douglas, and the romance of the *Seaven Seages* (1578), a Scottish version of one of the most remarkable mediæval collections of stories belonging to the same class as the *Arabian Nights*, in which one single story is employed as a means of stringing together a multitude of subsidiary tales. These poems were written by John Rolland, notary in Dalkeith. One of the best Latin scholars that modern Europe has produced was George Buchanan. Buchanan (*q.v.*), who flourished in the middle of the 16th century. He wrote several Latin tragedies and an unrivalled translation of the Psalms. His *De jure regni apud Scotos* was composed to instruct James VI., to whom he had been tutor, in the duties belonging to his kingly office. His last and more important labor was his *History of Scotland*, originally printed in 1582, of which seventeen editions have appeared. An excellent specimen of the ancient vernacular language is the Lyndsay of Pitscottie. *Chronicle of Scotland*, by Robert Lyndsay of Pitscottie. It includes the period from 1436 to the marriage of Mary to Darnley in 1565. Although its author was a simple-minded and credulous man, he describes events of which he was an eye-witness with circumstantiality and great prolixity of detail. Another historical work of greater importance was the *De origine, moribus, et rebus gestis Scotorum* Lesley. (1578) by John Lesley, bishop of Ross. A translation of this work made by Father James Dalrymple, a religious in the Scottish cloister of Ratisbon, 1596, is in course of publication by the Rev. Father E. B. Cody for the Scottish Text Society. Lesley also wrote in Scottish a *History of Scotland* from the death of James I. in 1536 to the year 1561. This work, intended for the perusal of Mary while in captivity in England, is written in an elegant style. The bishop was the champion of that unfortunate queen, and in 1569 wrote *Defence of the Honour of Marie Quene of Scotland and Dowager of France*, with a declaration of her right, title, and interest to the succession of the crown of England.

The Reformation exerted a considerable influence on Scottish literature. Amongst the earliest Protestant writers of the country may be mentioned Alexander Ales or Alesius, a native of Edinburgh, who published several controversial works and commentaries on various parts of the Bible. But the most eminent promoter of the reform was John Knox. Knox (*q.v.*), who wrote several controversial pamphlets and some religious treatises; his great work was

the *History of the Reformation of Religion in Scotland*, first printed in 1586. One of the principal opponents of Knox was Ninian Winzet, a priest of considerable ability and one familiar with the scholastic learning of the age. He began life as master of Linlithgow school and subsequently became abbot of St. James's at Ratisbon. He wrote several tracts in which he strenuously recommended the observance of certain popish festivals. In 1562 he published his *Buke of Four Scoir Thrie Questions tuching Doctrine, Ordour, and Maneris proponit to the Prechouris of the Protestantis in Scotland and deliverit to Jhone Knox the 20th day of February*, 1562. The writings of James VI., who was a man of scholarly attainments, embrace several works both in poetry and prose. His earliest production, published in 1584, when he was only eighteen, was the *Essayes of a Prentice in the Divine Art of Poesie.* This was followed by his poetical *Exercises at Vacant Houres* (1591). He also wrote a great many sonnets and a translation of the Psalms. His prose works are *Dæmonologie* (1597), Βασιλικὸν Δῶρον (1599), *Counterblast to Tobacco*, *Paraphrase on Revelation*, *Law of Free Monarchies*, etc. Among the Scottish poets who frequented his court were William Fowler, the elegant translator of the *Triumphs* of Petrarch, and Stewart of Baldinnies (Perth), a translator of Ariosto. Both these poets wrote other works which exist in MS., but are still unpublished. The zeal of Sir David Lyndsay and others for the reformation of the church initiated a religious revival, and in 1597 was published the collection known as *Ane Compendious Booke of Godly and Spiritual Sangs for avoiding of Sinne and Harlotrie.* This very curious work is attributed to John and Robert Wedderburn, the latter of whom was vicar of Dundee. A number of religious poems were written about the end of the 16th century by James Melville, minister of Anstruther, afterwards of Kilrenny, both in Fife. His *Morning Vision*, printed in 1598, consists of paraphrases of the Lord's Prayer, the Shorter Catechism, and the Ten Commandments. He also wrote the *Black Bastel*, a lamentation over the Church of Scotland, which is dated 1611. Another religious poet was James Cockburn, a native of Lanarkshire, who wrote *Gabriel's Salutation to Marie* (1605), and some other poems not destitute of merit. An eminent theological writer of this era, Robert Rollock, first principal of the university of Edinburgh, wrote many commentaries on the Scriptures which show extensive learning. Most are in Latin; but one or two are in the Scottish language. A very popular poem, the *Cherrie and the Slae*, first printed by Waldegrave at Edinburgh in 1597, afterwards went through many editions. Its author was Alexander Montgomerie, who also wrote some translations of the Psalms and the *Flyting betwixt Montgomerie and Polwarth*, in imitation of Dunbar's *Flyting with Kennedie.* In 1599 was published an interesting volume of poems written by Alexander Hume, entitled *Hymnes or Sacred Songs, wherein the Right Use of Poesie may be espied.* One is on the defeat of the Spanish Armada. To the beginning of the 17th century belongs a comedy in rhyming stanza, the authorship of which is unknown, —*Ane verie Excellent and Delectabill Treatise intitulit Philotus, quhairin we may perceive the Greit Inconveniences that fallis out in the Marriage betuix Aige and Youth* (1603). Its versification is easy and pleasant, and its plan a nearer approximation to the modern drama than the satire of Lyndsay. In the same year appeared the poems of Sir William ALEXANDER (*q.v.*), earl of Stirling. One, called *Doomsday, or the Great Day of the Lord's Judgment*, consists of 11,000 verses. His *Monarchicke Tragedies*, four in number, were not intended for representation on the stage. His exhortation or *Parænesis to Prince Henry* (1604) is his best poem. He also wrote *Recreations with the Muses* (1637), which is of a somewhat philosophical character. One of the most distinguished writers of this era was William DRUMMOND (*q.v.*) of Hawthornden, who published *Poems, amorous, funerall, divine, pastorall* (1616), and *Flowers of Zion, or Spiritual Poems* (1623). He also wrote a *History of Scotland during the Reigns of the Five Jameses* (1655), some political tracts, and the *Cypress Grove*, a moral treatise in prose. As a writer of sonnets he has always been highly esteemed. Nearly contemporary with Drummond was Patrick Hannay, a native of Galloway, who seems to have followed James to England. He published his poems in 1622, the principal of which are *Philomela the Nightingale* and *Sheretrine and Maviana.* He occupies a favorable position amongst the minor Scottish poets. After the removal of the Scottish court to London and the union of the crowns in 1603, the old language began to be considered as a provincial dialect; and the writers subsequent to Drummond, who was the first Scottish poet that wrote well in English, take their places amongst British authors.

Winzet. James VI. Religious poets. Montgomerie. Sir William Alexander. Drummond of Hawthornden. Hannay.

To the short sketch above given may be added a notice of the early Scottish writers on mathematics, philosophy, jurisprudence, and medicine. In mathematical science the name of Joannes Sacro Bosco (John Holywood or Holybush) may be mentioned, as he is believed to have been a native of Nithsdale and a canon of the monastery of Holywood, from which he took his name. He flourished about the beginning of the 13th century, and his treatise *De Sphera Mundi* was very generally taught in colleges and schools. The system of astronomy and the other mathematical treatises of James Bassantie, who taught at Paris about 1560 with much success, were celebrated in their time. The greatest of the Scottish mathematicians, however, was John NAPIER (*q.v.*) of Merchiston, who wrote on various kindred subjects, and in 1614 astonished the world by his discovery of logarithms. In philosophy, besides the voluminous works of Duns Scotus and John Major already mentioned, various learned commentaries on Aristotle, of which Scottish philosophy then almost entirely consisted, were published by Robert Balfour, principal of the college of Guienne; by John Rutherford, professor of philosophy at St. Andrews (under whom Admirable Crichton was a pupil); and by James Cheyne, professor of philosophy at Douai. In jurisprudence a celebrated treatise on the *Feudal Law* was written by Sir Thomas Craig about 1603. It was not, however, published till about half a century after his death, as the printing of any treatise on the law of Scotland while he lived seems to have been considered as out of the question. Commentaries on some of the titles of the *Pandects* of Justinian, and a treatise *De Potestate Papæ* (1609), in opposition to the usurpation of temporal power by the pope, were written by William Barclay, professor of law in the university of Angers. Another early legal work was a treatise *On the Connexion between Government and Religion*, by Adam Blackwood, judge of the parlement of Poitiers, who was the antagonist of Buchanan and a strenuous defender of Mary queen of Scots. In medicine the principal early Scottish works were written by Duncan Liddell, a native of Aberdeen, who in 1605 published at Helmstädt his *Disputationes medicinales*, containing the theses or disputations maintained by himself and his pupils from 1592 to 1606. He also published other works, which contain an able digest of the medical learning of his age. Henry Blackwood, dean of faculty to the college of physicians at Paris, wrote various treatises on medicine, of which a list will be found in Mackenzie's *Lives of the Scottish Writers*, but which are now only historically interesting. (J. SM.)

Mathematicians. Philosophers. Writers on jurisprudence. Medical writers.

SCOTT, DAVID (1806–1849), historical painter, was born at Edinburgh in October, 1806, and studied under his father, Robert Scott, an engraver of repute in the city. For a time in his youth he occupied himself with the burin; but he soon turned his attention to original work in color, and in 1828 he exhibited his first oil picture, the Hopes of Early Genius dispelled by Death, which was followed by Cain, Nimrod, Adam and Eve singing their Morning Hymn, Sarpedon carried by Sleep and Death, and other subjects of a poetic and imaginative character. In 1829 he became a member of the Scottish Academy, and in 1832 visited Italy, where he spent more than a year in study. At Rome

he executed a large symbolical painting, entitled the Agony of Discord, or the Household Gods Destroyed. On his return to Scotland he continued the strenuous and unwearied practice of his art; but his productions were too recondite and abstract in subject ever to become widely popular, while the defects and exaggerations of their draftsmanship repelled connoisseurs. So the gravity which had always been characteristic of the artist passed into gloom; he shrank from society and led a secluded life, hardly quitting his studio, his mind constantly occupied with the great problems of life and of his art. The works of his later years include Vasco da Gama encountering the Spirit of the Storm, a picture—immense in size and most powerful in conception—finished in 1842, and now preserved in the Trinity House, Leith; the Duke of Gloucester entering the Water Gate of Calais (1841), an impressive subject, more complete and harmonious in execution than was usual with the artist; the Alchemist (1838), Queen Elizabeth at the Globe Theatre (1840), and Peter the Hermit (1845), remarkable for their varied and elaborate character-painting; and Ariel and Caliban (1837) and the Triumph of Love (1846), distinguished by their beauty of coloring and depth of poetic feeling. The most important of his religious subjects are the Descent from the Cross (1835) and the Crucifixion—the Dead Rising (1844). In addition to his works in color Scott executed several remarkable series of designs. Two of these—the Monograms of Man and the illustrations to Coleridge's *Ancient Mariner*—were etched by his own hand, and published in 1831 and 1837 respectively, while his subjects from the *Pilgrim's Progress* and Nichol's *Architecture of the Heavens* were issued after his death. Among his literary productions are five elaborate and thoughtful articles on the characteristics of the Italian masters, published in *Blackwood's Magazine*, 1839 to 1841, and a pamphlet on *British, French, and German Painting*, 1841. He died in Edinburgh on the 5th of March, 1849. As a colorist David Scott occupies a high place in the Scottish school, but the most distinctive merit of his works lies in the boldness of their conception and their imaginative and poetic power.

See W. B. Scott, *Memoir of David Scott, R.S.A.* (1850), and J. M. Gray, *David Scott, R.S.A., and his Works* (1884).

SCOTT, Sir George Gilbert (1811–1878), one of the most successful ecclesiastical architects of the 19th century, was born in 1811 at Gawcott near Buckingham, where his father was rector; his grandfather was Thomas Scott (1747–1821), the well-known commentator on the Bible. In 1827 young Scott was apprenticed for four years to an architect in London named Edmeston, and at the end of his pupildom acted as clerk of the works at the new Fishmongers' Hall and other buildings in order to acquire a knowledge of the practical details of his profession. In Edmeston's office he became acquainted with a fellow-pupil, named Moffat, a man who possessed considerable talents for the purely business part of an architect's work, and the two entered into partnership. In 1834 they were appointed architects to the union workhouses of Buckinghamshire, and for four years were busily occupied in building a number of cheap and ugly unions, both there and in Northamptonshire and Lincolnshire. In 1838 Scott built at Lincoln his first church, won in an open competition, and this was quickly followed by six others, all very poor buildings without chancels; that was a period when church building in England had reached its very lowest point both in style and in poverty of construction. About 1839 his enthusiasm was aroused by some of the eloquent writings of Pugin on mediæval architecture, and by the various papers on ecclesiastical subjects published by the Camden Society. These opened a new world to Scott, and he thenceforth studied and imitated the architectural styles and principles of the Middle Ages with the utmost zeal and patient care. The first result of this new study was his design for the Martyrs' Memorial at Oxford, erected in 1840, a clever adaptation of the late 13th-century crosses in honor of Queen Eleanor. From that time Scott became the chief ecclesiastical architect in England, and in the next twenty-eight years completed an almost incredibly large number of new churches and "restorations," the fever for which was fomented by the Ecclesiological Society and the growth of ecclesiastical feeling in England.

In 1844 Scott won the first premium in the competition for the new Lutheran church at Hamburg, a noble building with a very lofty spire, designed strictly in the style of the 13th century. In the following year his partnership with Moffat was dissolved, and in 1847 Scott was employed to renovate and refit Ely cathedral, the first of a long series of English cathedral and abbey churches which passed through his hands. In 1851 Scott visited and studied the architecture of the chief towns in northern Italy, and in 1855 won the competition for the town-house at Hamburg, designed after the model of similar buildings in north Germany. In spite of his having won the first prize, another architect was selected to construct the building, after a very inferior design. In 1856 a competition was held for designs of the new Government offices in London; Scott obtained the third place in this, but the work was afterwards given to him on the condition (insisted on by Lord Palmerston) that he should make a new design, not Gothic, but Classic or Renaissance in style. This Scott very unwillingly consented to do, as he had little sympathy with any styles but those of England or France from the 13th to the 15th century. In 1862–63 he was employed to design and construct the Albert Memorial, a very costly and elaborate work, in the style of a magnified 13th-century reliquary or ciborium, adorned with many statues and reliefs in bronze and marble. On the partial completion of this he received the honor of knighthood. In 1866 he competed for the new London law-courts, but the prize was adjudged to his old pupil, G. E. Street. In 1873, owing to illness caused by overwork, Scott spent some time in Rome and other parts of Italy. The mosaic pavement which he designed for Durham cathedral soon afterwards was the result of his study of the 13th-century mosaics in the old basilicas of Rome. On his return to England he resumed his professional labors, and continued to work almost without intermission till his short illness and death in 1878. He was buried in the nave of Westminster Abbey, and an engraved brass, designed by G. E. Street, was placed over his grave. In 1838 Scott married his cousin, Caroline Oldrid, who died in 1870; they had five sons, two of whom have taken up their father's profession.

Scott's architectural works were more numerous than those of any other architect of the century; unfortunately for his fame, he undertook far more than it was possible for him really to design or supervise with thought and care. He carried out extensive works of repair, refurnishing, and restoration in the following buildings: the cathedrals of Ely, Hereford, Lichfield, Salisbury, Chichester, Durham, St. David's, Bangor, St. Asaph, Chester, Gloucester, Ripon, Worcester, Exeter, Rochester, the abbeys of Westminster, St. Alhans, Tewkesbury, and countless minor churches. He also built the new Government offices (India, Foreign, Home, and Colonial), the Midland Railway terminus and hotel, and a large number of private houses and other buildings. His style was (with the one exception of the Government offices) a careful copy of architectural periods of the Middle Ages, used with a profound knowledge of detail, but without much real inventive power, and consequently rather dull and uninteresting in effect. As a "restorer" of ancient buildings he was guilty of an immense amount of the most irreparable destruction, but any other architect of his generation would probably have done as much or even more harm. While a member of the Royal Academy Scott held for many years the post of professor of architecture, and gave a long series of able lectures on mediæval styles, which were published in 1879. He wrote a work on *Domestic Architecture*, and a volume of *Personal and Professional Recollections*, which, edited by his eldest son, was published in 1879, and also a large number of articles and reports on

many of the ancient buildings with which he had to deal. Owing to his numerous pupils, among whom have been many leading architects, his influence was for some time very widely spread; but it is now rapidly passing away, mainly owing to the growing reaction against the somewhat narrow mediævalism of which he, both in theory and practice, was the chief exponent.

SCOTT, John. See Eldon, Earl of.

SCOTT, Michael. See Scot, Michael.

SCOTT, Sir Walter (1771–1832), poet and novelist, was born at Edinburgh on 15th August, 1771. His pedigree, in which he took a pride that strongly influenced the course of his life, may be given in the words of his own fragment of autobiography. "My birth was neither distinguished nor sordid. According to the prejudices of my country it was esteemed *gentle*, as I was connected, though remotely, with ancient families both by my father's and mother's side. My father's grandfather was Walter Scott, well known by the name of *Beardie*. He was the second son of Walter Scott, first laird of Raeburn, who was third son of Sir William Scott, and the grandson of Walter Scott, commonly called in tradition *Auld Watt* of Harden. I am therefore lineally descended from that ancient chieftain, whose name I have made ring in many a ditty, and from his fair dame, the Flower of Yarrow,—no bad genealogy for a Border minstrel."

Scott's desire to be known as a cadet of the house of Harden, and his ruling passion—so disastrous in its ultimate results—to found a minor territorial family of Scotts, have been very variously estimated. He himself, in a notice of John Home, speaks of pride of family as "natural to a man of imagination," remarking that, "in this motley world, the family pride of the north country has its effects of good and of evil." Whether the good or the evil preponderated in Scott's own case would not be easy to determine. It tempted him into courses that ended in commercial ruin; but throughout his life it was a constant spur to exertion, and in his last years it proved itself as a working principle capable of inspiring and maintaining a most chivalrous conception of duty. If the ancient chieftain Auld Watt was, according to the anecdote told by his illustrious descendant, once reduced in the matter of live stock to a single cow, and recovered his dignity by stealing the cows of his English neighbors, Professor Veitch is probably right in holding that Scott's Border ancestry were, as a matter of literal fact, sheep-farmers, who varied their occupation by "lifting" sheep and cattle, and whatever else was "neither too heavy nor too hot." The Border lairds were really a race of shepherds in so far as they were not a race of robbers. Professor Veitch suggests that Scott may have derived from this pastoral ancestry an hereditary bias towards the observation of nature and the enjoyment of open-air life. He certainly inherited from them the robust strength of constitution that carried him successfully through so many exhausting labors. And it was his pride in their real or supposed feudal dignity and their rough marauding exploits that first directed him to the study of Border history and poetry, the basis of his fame as a poet and romancer. His father, a writer to the signet (or attorney) in Edinburgh—the original of the elder Fairford in *Redgauntlet*—was the first of the family to adopt a town life or a learned profession. His mother was the daughter of Dr. Rutherford, a medical professor in the university of Edinburgh, who also traced descent from the chiefs of famous Border clans. The ceilings of Abbotsford display the arms of about a dozen Border families with which Scott claimed kindred through one side or the other. His father was conspicuous for methodical and thorough industry; his mother was a woman of imagination and culture. The son seems to have inherited the best qualities of the one and acquired the best qualities of the other.

The details of his early education are given with great precision in his autobiography. Stuart Mill was not more minute in recording the various circumstances that shaped his habits of mind and work. We learn from himself the secret—as much at least as could be ascribed to definite extraneous accident—of the "extempore speed" in romantic composition against which Carlyle protested in his famous review of Lockhart's *Life of Scott*.[1] The indignant critic assumed that Scott wrote "without preparation;" Scott himself, as if he had foreseen this cavil, is at pains to show that the preparation began with his boyhood, almost with his infancy. The current legend when Carlyle wrote his essay was that as a boy Scott had been a dunce and an idler. With a characteristically conscientious desire not to set a bad example, the autobiographer solemnly declares that he was neither a dunce nor an idler, and explains how the misunderstanding arose. His health in boyhood was uncertain;[2] he was consequently irregular in his attendance at school, never became exact in his knowledge of Latin syntax, and was so belated in beginning Greek that out of bravado he resolved not to learn it at all.

Left very much to himself throughout his boyhood in the matter of reading, so quick, lively, excitable, and uncertain in health that it was considered dangerous to press him and prudent rather to keep him back, Scott began at a very early age to accumulate the romantic lore of which he afterwards made such splendid use. As a child he seems to have been an eager and interested listener and a great favorite with his elders, apparently having even then the same engaging charm that made him so much beloved as a man. Chance threw him in the way of many who were willing to indulge his delight in stories and ballads. Not only his own relatives—the old women at his grandfather's farm at Sandyknowe, his aunt, under whose charge he was sent to Bath for a year, his mother—took an interest in the precocious boy's questions, told him tales of Jacobites and Border worthies of his own and other clans, but casual friends of the family—such as the military veteran at Prestonpans, old Dr. Blacklock the blind poet, Home the author of *Douglas*, Adam Ferguson the martial historian of the Roman republic—helped forward his education in the direction in which the bent of his genius lay. At the age of six he was able to define himself as "a virtuoso," "one who wishes to and will know everything." At ten his collection of chapbooks and ballads had reached several volumes, and he was a connoisseur in various readings. Thus he took to the High School, Edinburgh, when he was

[1] Latest edition in 10 vols. fcap. 8vo. Edinburgh, 1847–48.

[2] Dr. Charles Creighton supplies us with the following medical note on Scott's early illness: "Scott's lameness was owing to an arrest of growth in the right leg in infancy. When he was eighteen months old he had a feverish attack lasting three days, at the end of which time it was found that he 'had lost the power of his right leg,'—*i.e.*, the child instinctively declined to move the ailing member. The malady was a swelling at the ankle, and either consisted in or gave rise to arrest of the bone-forming function along the growing line of cartilage which connects the lower epiphysis of each of the two leg-bones with its shaft. In his fourth year, when he had otherwise recovered, the leg remained 'much shrunk and contracted.' The limb would have been blighted very much more if the arrest of growth had taken place at the upper epiphysis of the tibia or the lower epiphysis of the femur. The narrowness and peculiar depth of Scott's head point to some more general congenital error of bone-making allied to rickets but certainly not the same as that malady. The vault of the skull is the typical 'scaphoid' or boat-shaped formation, due to premature union of the two parietal bones along the sagittal suture. When the bones of the cranium are universally affected with that arrest of growth along their formative edges, the sutures become prematurely fixed and effaced, so that the brain-case cannot expand in any direction to accommodate the growing brain. This universal synostosis of the cranial bones is what occurs in the case of microcephalous idiots. It happened to me to show to an eminent French anthropologist a specimen of a miniature or microcephalic skull preserved in the Cambridge museum of anatomy; the French *savant*, holding up the skull and pointing to the 'scaphoid' vault of the crown and the effaced sagittal suture, exclaimed 'Voilà Walter Scott!' Scott had fortunately escaped the early closure or arrest of growth at other cranial sutures than the sagittal, so that the growing brain could make room for itself by forcing up the vault of the skull bodily. When his head was opened after death it was observed that 'the brain was not large, and the cranium thinner than it is usually found to be.' In favor of the theory of congenital liability it has to be said that he was the ninth of a family of whom the first six died in 'very early youth.'"

strong enough to be put in regular attendance, an unusual store of miscellaneous knowledge and an unusually quickened intelligence, so that his master "pronounced that, though many of his schoolfellows understood the Latin better, *Gualterus Scott* was behind few in following and enjoying the author's meaning."

Throughout his school days and afterwards when he was apprenticed to his father, attended university classes, read for the bar, took part in academical and professional debating societies, Scott steadily and ardently pursued his own favorite studies. His reading in romance and history was really study, and not merely the indulgence of an ordinary schoolboy's promiscuous appetite for exciting literature. In fact, even as a schoolboy he specialized. He followed the line of overpowering inclination; and even then, as he frankly tells us, "fame was the spur." He acquired a reputation among his schoolfellows for out-of-the-way knowledge, and also for story-telling, and he worked hard to maintain this character, which compensated to his ambitious spirit his indifferent distinction in ordinary school-work. The youthful "virtuoso," though he read ten times the usual allowance of novels from the circulating library, was carried by his enthusiasm into fields much less generally attractive. He was still a schoolboy when he mastered French sufficiently well to read through collections of old French romances, and not more than fifteen when, attracted by translations to Italian romantic literature, he learnt the language in order to read Dante and Ariosto in the original. This willingness to face dry work in the pursuit of romantic reading affords a measure of the strength of Scott's passion. In one of the literary parties brought together to lionize Burns, when the peasant poet visited Edinburgh, the boy of fifteen was the only member of the company who could tell the source of some lines affixed to a picture that had attracted the poet's attention,—a slight but significant evidence both of the width of his reading and of the tenacity of his memory. The same thoroughness appears in another little circumstance. He took an interest in Scottish family history and genealogy, but, not content with the ordinary sources, he ransacked the MSS. preserved in the Advocates' Library. By the time he was one and twenty he had acquired such a reputation for his skill in deciphering old manuscripts that his assistance was sought by professional antiquaries.

This early, assiduous, unintermittent study was the main secret, over and above his natural gifts, of Scott's extempore speed and fertility when at last he found forms into which to pour his vast accumulation of historical and romantic lore. He was, as he said himself, "like an ignorant gamester who keeps up a good hand till he knows how to play it." That he had vague thoughts from a much earlier period than is commonly supposed of playing the hand some day is extremely probable, if, as he tells us, the idea of writing romances first occurred to him when he read Cervantes in the original. This was long before he was out of his teens; and if we add that his leading idea in his first novel was to depict a Jacobitic Don Quixote, we can see that there was probably a long interval between the first conception of *Waverley* and the ultimate completion.

Scott's preparation for painting the life of past times was probably much less unconsciously such than his equally thorough preparation for acting as the painter of Scottish manners and character in all grades of society. With all the extent of his reading as a schoolboy and a young man he was far from being a cloisteral student, absorbed in his books. In spite of his lameness and his serious illnesses in youth, his constitution was naturally robust, his disposition genial, his spirits high; he was always well to the front in the fights and frolics of the High School, and a boon companion in the "high jinks" of the junior bar. The future novelist's experience of life was singularly rich and varied. While he lived the life of imagination and scholarship in sympathy with a few choice friends, he was brought into intimate daily contact with many varieties of real life. At home he had to behave as became a member of a Puritanic, somewhat ascetic, well-ordered Scottish household, subduing his own inclinations towards a more graceful and comfortable scheme of living into outward conformity with his father's strict rule. Through his mother's family he obtained access to the literary society of Edinburgh, at that time electrified by the advent of Burns, full of vigor and ambition, rejoicing in the possession of not a few widely known men of letters, philosophers, historians, novelists, and critics, from racy and eccentric Monboddo to refined and scholarly Mackenzie. In that society also he may have found the materials for the manners and characters of *St. Ronan's Well*. From any tendency to the pedantry of over-culture he was effectually saved by the rougher and manlier spirit of his professional comrades, who, though they respected *belles lettres*, would not tolerate anything in the shape of affectation or sentimentalism. The atmosphere of the Parliament House (the Westminster Hall of Edinburgh) had considerable influence on the tone of Scott's novels. His peculiar humor as a story-teller and painter of character was first developed among the young men of his own standing at the bar. They were the first mature audience on which he experimented, and seem often to have been in his mind's eye when he enlarged his public. From their mirthful companionship by the stove, where the briefless congregated to discuss knotty points in law and help one another to enjoy the humors of judges and litigants, "Duns Scotus" often stole away to pore over old books and manuscripts in the library beneath; but as long as he was with them he was first among his peers in the art of providing entertainment. It was to this market that Scott brought the harvest of the vacation rambles which it was his custom to make every autumn for seven years after his call to the bar and before his marriage. He scoured the country in search of ballads and other relics of antiquity; but he found also and treasured many traits of living manners, many a lively sketch and story with which to amuse the brothers of "the mountain" on his return. His staid father did not much like these escapades, and told him bitterly that he seemed fit for nothing but to be a "gangrel scrape-gut." But as the companion of "his Liddesdale raids" happily put it, "he was *makin' himsell* a' the time, but he didna ken maybe what he was about till years had passed: at first he thought o' little, I daresay, but the queerness and the fun."

We may as well dispose at once of Scott's professional career. His father intended him originally to follow his own business and he was apprenticed in his sixteenth year; but he preferred the upper walk of the legal profession, and was admitted a member of the faculty of advocates in 1792. He seems to have read hard at law for four years at least, but almost from the first to have limited his ambition to obtaining some comfortable appointment such as would leave him a good deal of leisure for literary pursuits. In this he was not disappointed. In 1799 he obtained the office of sheriff-depute of Selkirkshire, with a salary of £300 [$1458] and very light duties. In 1806 he obtained the reversion of the office of clerk of session. It is sometimes supposed, from the immense amount of other work that Scott accomplished, that this office was a sinecure. But the duties, which are fully described by Lockhart, were really serious, and kept him hard at fatiguing work, his biographer estimates, for at least three or four hours daily during six months out of the twelve, while the court was in session. He discharged these duties faithfully for twenty-five years, during the height of his activity as an author. He did not enter on the emoluments of the office till 1812, but from that time he received

from the clerkship and the sheriffdom combined an income of £1600 [$7776] a year, being thus enabled to act in his literary undertakings on his often-quoted maxim that "literature should be a staff and not a crutch."

Scott's profession, in addition to supplying him with a competent livelihood, supplied him also with abundance of opportunities for the study of men and manners. Characters of all types and shades find their way into courts of law. The wonder is that so much technical drudgery did not crush every particle of romance out of him; but such was the elasticity and strength of his powers that this daily attendance at the transaction of affairs in open court face to face with living men—under a strain of attention that would have exhausted an ordinary man's allowance of energy—seems rather to have helped him in giving an atmosphere of reality to his representations of the life of the past.

It was not, however, as a prose writer that he was first to make a reputation. The common notion is that Scott, having made a reputation as a poet, was led to attempt romances in prose by a chance impulse, hitting upon the new vein as if by accident. The truth seems rather to be that, as it is his prose romances which give the fullest measure of his genius, so the greater part of his early life was a conscious or unconscious preparation for writing them; whereas his metrical romances, in every way slighter and less rich and substantial, were comparatively speaking, a casual and temporary deviation from the main purpose of his life. According to his own account, he was led to adopt the medium of verse by a series of accidents. The story is told by himself at length and with his customary frankness and modesty in the *Essay on Imitations of the Ancient Ballad*, prefixed to the 1830 edition of his *Border Minstrelsy*, and in the 1830 introduction to the *Lay of the Last Minstrel*. The first link in the chain was a lecture by Henry Mackenzie on German literature, delivered in 1788. This apprized Scott, who was then a legal apprentice and an enthusiastic student of French and Italian romance, that there was a fresh development of romantic literature in German. As soon as he had the burden of preparation for the bar off his mind he learnt German, and was profoundly excited to find a new school founded on the serious study of a kind of literature his own devotion to which was regarded by most of his companions with wonder and ridicule. We must remember always that Scott quite as much as Wordsworth created the taste by which he was enjoyed, and that in his early days he was half-ashamed of his romantic studies, and pursued them more or less in secret with a few intimates. While he was in the height of his enthusiasm for the new German romance, Mrs. Barbauld visited Edinburgh, and recited an English translation of Bürger's *Lenore*. Scott heard of it from a friend, who was able to repeat two lines,—

> "Tramp, tramp, across the land they speed;
> Splash, splash, across the sea!"

The two lines were enough to give Scott a new ambition. He could write such poetry himself! The impulse was strengthened by his reading Lewis's *Monk* and the ballads in the German manner interspersed through the work. He hastened to procure a copy of Bürger, at once executed translations of several of his ballads, published two of them in a thin quarto in 1796 (his ambition being perhaps quickened by the unfortunate issue of a love affair), and was much encouraged by the applause of his friends. Soon after he met Lewis personally, and his ambition was confirmed. "Finding Lewis," he says, "in possession of so much reputation, and conceiving that if I fell behind him in poetical powers, I considerably exceeded him in general information, I suddenly took it into my head to attempt the style of poetry by which he had raised himself to fame." Accordingly, he composed *Glenfinlas*, *The Eve of St. John*, and the *Gray Brother*, which were published in Lewis's collection of *Tales of Wonder*. But he soon became convinced that "the practice of ballad-writing was out of fashion, and that any attempt to revive it or to found a poetical character on it would certainly fail of success." His study of Goethe's *Götz von Berlichingen*, of which he published a translation in 1799, gave him wider ideas. Why should he not do for ancient Border manners what Goethe had done for the ancient feudalism of the Rhine? He had been busy since his boyhood collecting Scottish Border ballads and studying the minutest details of Border history. He began to cast about for a form which should have the advantage of novelty, and a subject which should secure unity of composition. He was engaged at the time preparing a collection of the *Minstrelsy of the Scottish Border*. The first instalment was published in 1802; it was followed by another next year, and by an edition and continuation of the old romance of *Sir Tristram;* and Scott was still hesitating about subject and form for a large original work. It seems probable from a conversation recorded by Gillies that he might have ended by casting his meditated picture of Border manners in the form of a prose romance. But chance at last threw in his way both a suitable subject and a suitable metrical vehicle. He had engaged all his friends in the hunt for Border ballads and legends. Among others, the countess of Dalkeith, wife of the heir-apparent to the dukedom of Buccleuch, interested herself in the work. Happening to hear the legend of a tricksy hobgoblin named Gilpin Horner, she asked Scott to write a ballad about it. He agreed with delight, and, out of compliment to the lady who had given this command to the bard, resolved to connect it with the house of Buccleuch. The subject grew in his fertile imagination, till incidents enough had gathered round the goblin to furnish a framework for his long-designed picture of Border manners. Chance also furnished him with a hint for a novel scheme of verse. Coleridge's fragment of *Christabel*, though begun in 1797—when he and Wordsworth were discussing on the Quantock Hills the principles of such ballads as Scott at the same time was reciting to himself in his gallops on Musselburgh sands—was not published till 1816. But a friend of Scott's, Sir John Stoddart, had met Coleridge in Malta, and had carried home in his memory enough of the unfinished poem to convey to Scott that its metre was the very metre of which he had been in search. Scott introduced still greater variety into the four-beat couplet; but it was to *Christabel* that he owed the suggestion, as one line borrowed whole and many imitated rhythms testify.

The *Lay of the Last Minstrel* appeared in January, 1805, and at once became widely popular. It sold more rapidly than poem had ever sold before. Scott was astonished at his own success, although he expected that "the attempt to return to a more simple and natural style of poetry was likely to be welcomed." Many things contributed to the extraordinary demand for the *Lay*. First and foremost, no doubt, we must reckon its simplicity. After the abstract themes and abstruse, elaborately allusive style of the 18th century, the public were glad of verse that could be read with ease and even with exhilaration, verse in which a simple interesting story was told with brilliant energy, and simple feelings were treated not as isolated themes but as incidents in the lives of individual men and women. The thought was not so profound, the lines were not so polished, as in *The Pleasures of Memory* or *The Pleasures of Hope*, but the "light-horseman sort of stanza" carried the reader briskly over a much more diversified country, through boldly outlined and strongly colored scenes. No stanza required a second reading; you had not to keep attention on the stretch or pause and construe laboriously before you could grasp the writer's meaning or enter into his artfully

condensed sentiment. To remember the pedigrees of all the Scotts, or the names of all the famous chiefs and hardy retainers "whose gathering word was Bellenden," might have required some effort, but only the conscientious reader need care to make it. The only puzzle in the *Lay* was the goblin page, and the general reader was absolved from all trouble about him by the unanimous declaration of the critics, led by Jeffrey in the *Edinburgh Review*, that he was a grotesque excrescence, in no way essential to the story. It is commonly taken for granted that Scott acquiesced in this judgment, his politely ironic letter to Miss Seward being quoted as conclusive. This is hardly fair to the poor goblin, seeing that his story was the germ of the poem and determines its whole structure; but it is a tribute to the lively simplicity of the *Lay* that few people should be willing to take the very moderate amount of pains necessary to see the goblin's true position in the action. The supernatural element was Scott's most risky innovation. For the rest, he was a cautious and conservative reformer, careful not to offend established traditions. He was far from raising the standard of rebellion, as Wordsworth had done, against the great artistic canon of the classical school,

"True art is nature to advantage dressed."

To "engraft modern refinement on ancient simplicity," to preserve the energy of the old ballad without its rudeness and bareness of poetic ornament, was Scott's avowed aim. He adhered to the poetic diction against which Wordsworth protested. His rough Borderers are "dressed to advantage" in the costume of romantic chivalry. The baronial magnificence of Branksome, Deloraine's "shield and jack and acton," the elaborate ceremony of the combat between the pseudo-Deloraine and Musgrave, are concessions to the taste of the 18th century. Further, he disarmed criticism by putting his poem into the mouth of an ancient minstrel, thus pictorially emphasizing the fact that it was an imitation of antiquity, and providing a scapegoat on whose back might be laid any remaining sins of rudeness or excessive simplicity. And, while imitating the antique romance, he was careful not to imitate its faults of rambling, discursive, disconnected structure. He was scrupulously attentive to the classical unities of time, place, and action. The scene never changes from Branksome and its neighborhood; the time occupied by the action (as he pointed out in his preface) is three nights and three days; and, in spite of all that critics have said about the superfluity of the goblin page, it is not difficult to trace unity of intention and regular progressive development in the incidents.

The success of the *Lay* decided finally, if it was not decided already, that literature was to be the main business of Scott's life, and he proceeded to arrange his affairs accordingly. It would have been well for his comfort, if not for his fame, had he adhered to his first plan, which was to buy a small mountain-farm near Bowhill, with the proceeds of some property left to him by an uncle, and divide his year between this and Edinburgh, where he had good hopes, soon afterwards realized, of a salaried appointment in the Court of Session. This would have given him ample leisure and seclusion for literature, while his private means and official emoluments secured him against dependence on his pen. He would have been laird as well as sheriff of the cairn and the scaur, and as a man of letters his own master. Since his marriage in 1797 with Miss Charpentier, daughter of a French refugee, his chief residence had been at Lasswade, about six miles from Edinburgh. But on a hint from the lord-lieutenant that the sheriff must live at least four months in the year within his county, and that he was attending more closely to his duties as quartermaster of a mounted company of volunteers than was consistent with the proper discharge of his duties as sheriff, he had moved his household in 1804 to Ashestiel. When his uncle's bequest fell in, he determined to buy a small property on the banks of the Tweed within the limits of his sheriffdom. There, within sight of Newark Castle and Bowhill, he proposed to live like his ancient minstrel, as became the bard of the clan, under the shadow of the great ducal head of the Scotts. But this plan was deranged by an accident. It so happened that an old schoolfellow, James Ballantyne, a printer in Kelso, whom he had already befriended, transplanted to Edinburgh, and furnished with both work and money, applied to him for a further loan. Scott declined to lend, but offered to join him as sleeping partner. Thus the intended purchase money of Broadmeadows became the capital of a printing concern, of which by degrees the man of letters became the over-wrought slave, milch-cow, and victim.

When the *Lay* was off his hands, Scott's next literary enterprise was a prose romance—a confirmation of the argument that he did not take to prose after Byron had "*bet* him," as he put it, in verse, but that romance writing was a long-cherished purpose. He began *Waverley*, but a friend to whom he showed the first chapters—which do not take Waverley out of England, and describe an education in romantic literature very much like Scott's own—not unnaturally decided that the work was deficient in interest and unworthy of the author of the *Lay*. Scott accordingly laid *Waverley* aside. We may fairly conjecture that he would not have been so easily diverted had he not been occupied at the time with other heavy publishing enterprises calculated to bring grist to the printing establishment. His active brain was full of projects for big editions, which he undertook to carry through on condition that the printing was done by Ballantyne & Co., the "Co." being kept a profound secret, because it might have injured the lawyer and poet professionally and socially to be known as partner in a commercial concern. Between 1806 and 1812, mainly to serve the interests of the firm, though of course the work was not in itself unattractive to him, Scott produced his elaborate editions of Dryden, Swift, the Somers Tracts, and the Sadler State papers. Incidentally these laborious tasks contributed to his preparation for the main work of his life by extending his knowledge of English and Scottish history.

Marmion, begun in November, 1806, and published in February, 1808, was written as a relief to "graver cares," though in this also he aimed at combining with a romantic story a solid picture of an historical period. It was even more popular than the *Lay*. Scott's resuscitation of the four-beat measure of the old "gestours" afforded a signal proof of the justness of their instinct in choosing this vehicle for their recitations. The four-beat lines of *Marmion* took possession of the public like a kind of madness: they not only clung to the memory, but they would not keep off the tongue: people could not help spouting them in solitary places and muttering them as they walked about the streets. The critics, except Jeffrey, who may have been offended by the pronounced politics of the poet, were on the whole better pleased than with the *Lay*. Their chief complaint was with the "introductions" to the various cantos, which were objected to as vexatiously breaking the current of the story.[1]

The triumphant success of *Marmion*, establishing him as *facile princeps* among living poets, gave Scott such a *heeze*, to use his own words, "as almost lifted him off his feet." He touched then the highest point of prosperity and happiness. Presently after, he was irritated and tempted by a combination of little circumstances into the great blunder of his life, the establishment of the publishing house of John Ballantyne & Co. A coolness arose between him and Jeffrey, chiefly on political but partly also on personal

[1] See Mr. Hutton's *Scott*, in English Men of Letters Series, p. 56, for a good defence of these introductions. Scott advertised them originally as a separate publication.

grounds. They were old friends, and Scott had written many articles for the *Review*, but its political attitude at this time was intensely unsatisfactory to Scott. To complete the breach, Jeffrey reviewed *Marmion* in a hostile spirit. A quarrel occurred also between Scott's printing firm and Constable, the publisher, who had been the principal feeder of its press. Then the tempter appeared in the shape of Murray, the London publisher, anxious to secure the services of the most popular *littérateur* of the day. The result of negotiations was that Scott set up, in opposition to Constable, "the crafty," "the grand Napoleon of the realms of print," the publishing house of John Ballantyne & Co., to be managed by a dissipated and swaggering little tailor, whom he nicknamed "Rigdumfunnidos" for his talents as a mimic and low comedian. Scott interested himself warmly in starting the *Quarterly Review*, and in return Murray constituted Ballantyne & Co. his Edinburgh agents. Scott's trust in Rigdumfunnidos and his brother, "Aldiborontiphoscophornio," and in his own power to supply all their deficiencies, is as strange a piece of infatuation as any that ever formed a theme for romance or tragedy. Their devoted attachment to the architect of their fortunes and proud confidence in his powers helped forward to the catastrophe, for whatever Scott recommended they agreed to, and he was too immersed in multifarious literary work and professional and social engagements to have time for cool examination of the numerous rash speculative ventures into which he launched the firm.

The *Lady of the Lake* (May, 1810) was the first great publication by the new house. It was received with enthusiasm, even Jeffrey joining in the chorus of applause. It made the Perthshire Highlands fashionable for tourists, and raised the post-horse duty in Scotland. But it did not make up to Ballantyne & Co. for their heavy investments in unsound ventures. The *Edinburgh Annual Register*, meant as a rival to the *Edinburgh Review*, though Scott engaged Southey to write for it and wrote for it largely himself, proved a failure. In a very short time the warehouses of the firm were filled with unsalable stock. By the end of three years Scott began to write to his partners about the propriety of "reefing sails." But apparently he was too much occupied to look into the accounts of the firm, and, so far from understanding the real state of their affairs, he considered himself rich enough to make his first purchase of land at Abbotsford. But he had hardly settled there in the spring of 1812, and begun his schemes for building and planting and converting a bare moor into a richly wooded *pleasaunce*, than his business troubles began, and he found himself harrassed by fears of bankruptcy. Rigdumfunnidos concealed the situation as long as he could, but as bill after bill came due he was obliged to make urgent application to Scott, and the truth was thus forced from him item by item. He had by no means revealed all when Scott, who behaved with admirable good-nature, was provoked into remonstrating, "For heaven's sake, treat me as a man and not as a milch-cow." The proceeds of *Rokeby* (January, 1813) and of other labors of Scott's pen were swallowed up, and bankruptcy was inevitable, when Constable, still eager at any price to secure Scott's services, came to the rescue. With his help three crises were tided over in 1813.

It was in the midst of these ignoble embarrassments that Scott opened up the rich new vein of the Waverley novels. He chanced upon the manuscript of the opening chapters of *Waverley*, and resolved to complete the story. Four weeks in the summer of 1814 sufficed for the work, and *Waverley* appeared without the author's name in July. Many plausible reasons might be given and have been given for Scott's resolution to publish anonymously. The quaintest reason, and possibly the main one, though it is hardly intelligible now, is that given by Lockhart, that he considered the writing of novels beneath the dignity of a grave clerk of the Court of Session. Why he kept up the mystification, though the secret was an open one to all his Edinburgh acquaintances, is more easily understood. He enjoyed it, and his formally initiated coadjutors enjoyed it, it relieved him from the annoyances of foolish compliment; and it was not unprofitable,—curiosity about "the Great Unknown" keeping alive the interest in his works. The secret was so well kept by all to whom it was definitely entrusted, and so many devices were used to throw conjecture off the scent, that even Scott's friends, who were certain of the authorship from internal evidence, were occasionally puzzled. He kept on producing in his own name as much work as seemed humanly possible for an official who was to be seen every day at his post and as often in society as the most fashionable of his professional brethren. His treatises on chivalry, romance, and the drama, besides an elaborate work in two volumes on Border antiquities, appeared in the same year with *Waverley*, and his edition of Swift in nineteen volumes in the same week. The *Lord of the Isles* was published in January, 1815; *Guy Mannering*, written in "six weeks about Christmas," in February; *Paul's Letters to his Kinsfolk* and *The Field of Waterloo* in the same year. *Harold the Dauntless*,[1] not to mention the historical part of the *Annual Register*, appeared in the same year with *The Antiquary*, *The Black Dwarf*, and *Old Mortality* (1816). No wonder that the most positive interpreters of internal evidence were mystified. It was not as if he had buried himself in the country for the summer half of the year. On the contrary, he kept open house at Abbotsford in the fine old feudal fashion and was seldom without visitors. His own friends and many strangers from a distance, with or without introductions, sought him there, and found a hearty hospitable country laird, entirely occupied to all outward appearance with local and domestic business and sport, building and planting, adding wing to wing, acre to acre, plantation to plantation, with just leisure enough for the free-hearted entertainment of his guests and the cultivation of friendly relations with his humble neighbors. How could such a man find time to write two or three novels a year, besides what was published in his own name? Even the few intimates who knew how early he got up to prepare his packet for the printer, and had some idea of the extraordinary power that he had acquired of commanding his faculties for the utilization of odd moments, must have wondered at times whether he had not inherited the arts of his ancestral relation Michael Scot, and kept a goblin in some retired attic or vault.

Scott's fertility is not absolutely unparalleled; the late Mr. Trollope claimed to have surpassed him in rate as well as total amount of production, having also business duties to attend to. But in speed of production combined with variety and depth of interest and weight and accuracy of historical substance Scott is still unrivalled. On his claims as a serious historian, which Carlyle ignored in his curiously narrow and splenetic criticism, he was always, with all his magnanimity, peculiarly sensitive. A certain feeling that his antiquarian studies were undervalued seems to have haunted him from his youth. It was probably this that gave the sting to Jeffrey's criticism of *Marmion*, and that tempted him to the somewhat questionable proceeding of reviewing his own novels in the *Quarterly* upon the appearance of *Old Mortality*. He was nettled besides at the accusation of having treated the Covenanters unfairly, and wanted to justify himself by the production of historical documents. In this criticism of himself Scott replied lightly to some of the familiar objections to his work, such as the feebleness of his heroes, Waverley, Bertram, Lovel, and the

[1] This poem, like the *Bridal of Triermain*, did not bear his name on the title page, but the authorship was an open secret, although he tried to encourage the idea that the author was his friend Erskine.

melodramatic character of some of his scenes and characters. But he argued more seriously against the idea that historical romances are the enemies of history, and he rebutted by anticipation Carlyle's objection that he wrote only to amuse idle persons who like to lie on their backs and read novels. His *apologia* is worth quoting. Historical romances, he admits, have always been failures, but the failure has been due to the imperfect knowledge of the writers and not to the species of composition. If, he says, anachronisms in manners can be avoided, and "the features of an age gone by can be recalled in a spirit of delineation at once faithful and striking, . . . the composition itself is in every point of view dignified and improved; and the author, leaving the light and frivolous associates with whom a careless observer would be disposed to ally him, takes his seat on the bench of the historians of his time and country. In this proud assembly, and in no mean place of it, we are disposed to rank the author of these works. At once a master of the great events and minute incidents of history, and of the manners of the times he celebrates, as distinguished from those which now prevail, the intimate thus of the living and of the dead, his judgment enables him to separate those traits which are characteristic from those that are generic; and his imagination, not less accurate and discriminating than vigorous and vivid, presents to the mind of the reader the manners of the times, and introduces to his familiar acquaintance the individuals of the drama as they thought and spoke and acted." This defence of himself shows us the ideal at which Scott aimed, and which he realized. He was not in the least unconscious of his own excellence. He did not hesitate in this review to compare himself with Shakespeare in respect of truth to nature. "The volume which this author has studied is the great book of nature. He has gone abroad into the world in quest of what the world will certainly and abundantly supply, but what a man of great discrimination alone will find, and a man of the very highest genius will alone depict after he has discovered it. The characters of Shakespeare are not more exclusively human, not more perfectly men and women as they live and move, than those of this mysterious author."

The immense strain of Scott's double or quadruple life as sheriff and clerk, hospitable laird, poet, novelist, and miscellaneous man of letters, publisher and printer, though the prosperous excitement sustained him for a time, soon told upon his health. Early in 1817 began a series of attacks of agonizing cramp of the stomach, which recurred at short intervals during more than two years. But his appetite and capacity for work remained unbroken. He made his first attempt at playwriting[1] as he was recovering from the first attack; before the year was out he had completed *Rob Roy*, and within six months it was followed by *The Heart of Midlothian*, which by general consent occupies the highest rank among his novels. The *Bride of Lammermoor*, *The Legend of Montrose*, and *Ivanhoe* were dictated to amanuenses, through fits of suffering so acute that he could not suppress cries of agony. Still he would not give up. When Laidlaw begged him to stop dictating he only answered, "Nay, Willie, only see that the doors are fast. I would fain keep all the cry as well as the wool to ourselves; but as to giving over work, that can only be when I am in woollen."

Throughout those two years of intermittent ill-health, which was at one time so serious that his life was despaired of and he took formal leave of his family, Scott's semi-public life at Abbotsford continued as usual,—swarms of visitors coming and going, and the rate of production on the whole suffering no outward and visible check, all the world wondering at the novelist's prodigious fertility. Mr. Ruskin lately put forward the opinion that there is a distinct falling off in the quality of Scott's work traceable from the time of his first serious illness, arguing as a proof of the healthiness of Scott's organization that "he never gains anything by sickness; the whole man breathes or faints as one creature; the ache that stiffens a limb chills his heart, and every pang of the stomach paralyses the brain." Yet, when the world was not aware of the state of the novelist's health, and novel after novel was received without any abatement of enthusiasm, but rather with growing wonder and admiration, no critic was acute enough to detect this, and it is somewhat unfortunate for the theory that Mr. Ruskin has mistaken the date of Scott's first illness and included among the masterpieces produced in perfect health *Rob Roy* and *The Heart of Midlothian*, both composed through recurrent fits of intense bodily pain. The first of the series concerning which there were murmurs of dissatisfaction was *The Monastery*, which was the first completed after the re-establishment of the author's bodily vigor. The failure, such as it was, was due rather to the subject than the treatment, and *The Abbot*, in which Mary Queen of Scots is introduced, was generally hailed as fully sustaining the reputation of "the Great Unknown." *Kenilworth*, *The Pirate*, *The Fortunes of Nigel*, *Peveril of the Peak*, *Quentin Durward*, *St. Ronan's Well*, *Redgauntlet*, followed in quick succession in the course of three years, and it was not till the last two were reached that the cry that the author was writing too fast began to gather volume. *St. Ronan's Well* was very severely criticized and condemned. And yet Mr. Leslie Stephen tells a story of a dozen modern connoisseurs in the Waverley novels who agreed that each should write down separately the name of his favorite novel, when it appeared that each had without concert named *St. Ronan's Well*. There is this certainly to be said for *St. Ronan's*, that, in spite of the heaviness of some of the scenes at the "hottle" and the artificial melodramatic character of some of the personages, none of Scott's stories is of more absorbing or more brilliantly diversified interest. Contradictions between contemporary popular opinion and mature critical judgment, as well as diversities of view among critics themselves, rather shake confidence in individual judgment on the vexed but not particularly wise question which is the best of Scott's novels. There must, of course, always be inequalities in a series so prolonged. The author cannot always be equally happy in his choice of subject, situation, and character. Naturally also he dealt first with the subjects of which his mind was fullest. But any theory of falling off or exhaustion based upon plausible general considerations has to be qualified so much when brought into contact with the facts that very little confidence can be reposed in its accuracy. *The Fortunes of Nigel* comes comparatively late in the series and has often been blamed for its looseness of construction. Scott himself always spoke slightingly of his plots, and humorously said that he proceeded on Mr. Bayes's maxim, "What the deuce is a plot good for but to bring in good things?" Yet so competent a critic as Mr. Hutton has avowed that on the whole he prefers *The Fortunes of Nigel* to any other of Scott's novels. An attempt might be made to value the novels according to the sources of their materials, according as they are based on personal observation, documentary history, or previous imaginative literature. On this principle *Ivanhoe* and *The Tales of the Crusaders* might be adjuged inferior as being based necessarily on previous romance. But as a matter of fact Scott's romantic characters are vitalized, clothed with a verisimilitude of life, out of the author's deep, wide, and discriminating knowledge of realities, and his observation of actual life was colored by ideals derived from romance. He wrote all his novels out of a mind richly stored with learning of all kinds, and in the heat of composition seems to have drawn from whatever his tenacious memory supplied

[1] *The Doom of Devorgoil*. This and his subsequent dramatic sketches, *Macduff's Cross*, *Halidon Hill*, and *The Ayrshire Tragedy*, were slight compositions, dashed off in a few days, and afford no measure of what Scott might have done as a dramatist if he had studied the conditions of stage representation.

to feed the fire of imagination, without pausing to reflect upon the source. He did not exhaust his accumulations from one source first and then turn to another, but from first to last drew from all as the needs of the occasion happened to suggest.

Towards the close of 1825, after eleven years of brilliant and prosperous labor, encouraged by constant tributes of admiration, homage, and affection such as no other literary potentate has ever enjoyed, realizing his dreams of baronial splendor and hospitality on a scale suited to his large literary revenues, Scott suddenly discovered that the foundations of his fortune were unsubstantial. He had imagined himself clear of all embarrassments in 1818, when all the unsalable stock of John Ballantyne & Co. was bargained off by Rigdum to Constable for Waverley copyrights, and the publishing concern was wound up. Apparently he never informed himself accurately of the new relations of mutual accommodation on which the printing firm then entered with the great but rashly speculative publisher, and drew liberally for his own expenditure against the undeniable profits of his novels without asking any questions, trusting blindly in the solvency of his commercial henchmen. Unfortunately, "lifted off their feet" by the wonderful triumphs of their chief, they thought themselves exempted like himself from the troublesome duty of inspecting ledgers and balancing accounts, till the crash came. From a diary which Scott began a few days before the first rumors of financial difficulty reached him we know how he bore from day to day the rapidly unfolded prospect of unsuspected liabilities. "Thank God," was his first reflection, "I have enough to pay more than 20s. in the pound, taking matters at the worst." But a few weeks revealed the unpleasant truth that, owing to the way in which Ballantyne & Co. were mixed up with Constable & Co., and Constable with Hurst & Robinson, the failure of the London house threw upon him personal responsibility for £130,000 [$631,800].

How Scott's pride rebelled against the dishonor of bankruptcy, how he toiled for the rest of his life to clear off this enormous debt, declining all offers of assistance and asking no consideration from his creditors except time, and how nearly he succeeded, is one of the most familiar chapters in literary history, and would be one of the saddest were it not for the heroism of the enterprise. His wife died soon after the struggle began, and he suffered other painful bereavements; but, though sick at heart, he toiled on indomitably, and, writing for honor, exceeded even his happiest days in industrious speed. If he could have maintained the rate of the first three years, during which he completed *Woodstock*, three *Chronicles of the Canongate*, *The Fair Maid of Perth*, *Anne of Geierstein*, the *Life of Napoleon* (involving much research, and equal in amount to thirteen novel volumes), part of his *History of Scotland*, the Scottish series of *Tales of a Grandfather*, besides several magazine articles, some of them among the most brilliant of his miscellaneous writings, and prefaces and notes to a collected edition of his novels,—if he could have continued at this rate he might soon have freed himself from all his encumbrances. The result of his exertions from January, 1826, to January, 1828, was nearly £40,000 for his creditors. But the terrific labor proved too much even for his endurance. Ugly symptoms began to alarm his family in 1829, and in February of 1830 he had his first stroke of paralysis. Still he was undaunted, and not all the persuasions of friends and physicians could induce him to take rest. "During 1830," Mr. Lockhart says, "he covered almost as many sheets with his MS. as in 1829," the new introductions to a collected edition of his poetry and the *Letters on Demonology and Witchcraft* being amongst the labors of the year. He had a slight touch of apoplexy in November and a distinct stroke of paralysis in the following April; but, in spite of these warnings and of other bodily ailments, he had two more novels, *Count Robert of Paris* and *Castle Dangerous*, ready for the press by the autumn of 1831. He would not yield to the solicitations of his friends and consent to try rest and a change of scene, till fortunately, as his mental powers failed, he became possessed of the idea that all his debts were at last paid and that he was once more a free man. In this belief he happily remained till his death. When it was known that his physicians recommended a sea voyage for his health, a Government vessel was put at his disposal, and he cruised about in the Mediterranean and visited places of interest for the greater part of a year before his death. But, when he felt that the end was near, he insisted on being carried across Europe that he might die on his beloved Tweedside at Abbotsford, where he expired on 21st September, 1832. He was buried at Dryburgh Abbey on 26th September following.

A complete list of Scott's works is given in the *Catalogue of Scott Exhibition*, 1871, Edinburgh, 1872. The standard biography of Scott is that by Lockhart referred to above; see also Allan, *Life of Scott*, Edinburgh, 1834.

SCOTT, WILLIAM. See STOWELL, LORD.

SCOTT,[1] WINFIELD (1786–1866), American general,

[1] [The omissions and inaccuracies of this article are supplied without further indications of them by the following note based upon Gen. Scott's *Memoirs* and Gen. E. D. Keyes's *Fifty Years of Observation* (New York, 1884).

In 1807 the British frigate Leopard, having been refused permission to impress seamen from the decks of the United States frigate Chesapeake, fired upon her and wounded a score of her crew. For four years reparation was refused, during which time the country was in a state of extreme irritation and excitement. Scott was among the first to volunteer for the support of the government, and then to seek a commission in the army, which was accorded to him in the artillery, 3d May, 1808, and he was ordered to the department of the lower Mississippi, where Gen. James Wilkinson was in command. For imprudently expressing his belief in Wilkinson's complicity with Aaron Burr's treason, and on a trumped-up charge of irregularity in his accounts, Scott was tried by court-martial, where he was acquitted of any offence affecting his integrity, though censured for violation of discipline. He was again confronted with these charges by party rancor when a candidate for the presidency in 1852, but his probity was never seriously questioned by his comrades or countrymen.

Upon the declaration of war in 1812, Scott was sent with the rank of lieutenant-colonel to the Niagara frontier, and, while in command of an expeditionary force engaged in an attempt to capture Queenstown (13th October, 1812), was taken prisoner, the militia forces in camp at Lewistown refusing to cross the frontier and reinforce their comrades on foreign soil. Paroled and sent home by way of Quebec, he was exchanged in January of the following year, and sent again in command of a regiment to the same frontier, where he captured Fort George on the 27th May, bringing down the colors with his own hand, but receiving the injury of a broken collar-bone. The rest of the season was wasted in attendance upon Gen. Wilkinson's futile campaign against Montreal.

In the spring of 1814, when nearly twenty-eight years of age, Scott became a brigadier-general, and was assigned to the left wing of Gen. Brown's command which placed him again on the Niagara frontier. His first work was to improve the discipline and tactics of the army by adaptations of the French system, a subject to which he gave much attention in after years preparing the treatises which were long the text-books of the service. Putting his forces in motion he forced the capitulation of Fort Erie on the 3d of July, drove the British all the next day behind the Chippewa, and decisively repulsed their attack of the following day, "putting down," he said, alluding to the Hartford Convention assembled to remonstrate against the war, "the federal convention by beating the enemy in front." Lundy-Lane followed twenty days after, an engagement brought on by Scott's command, while on its way to assail Queenstown, coming upon the British army posted along the lane. The conflict raged from the middle of the afternoon until midnight, when the British were repulsed at all points, but Gen. Scott and his superior officer, Gen. Brown, having both been wounded, the command devolved upon Gen. Ripley who withdrew from the field and allowed the enemy to return to its possession. From this battle Gen. Scott's commission as major-general was dated. While on his way from this field to Philadelphia for medical treatment he arrived at Nassau Hall upon commencement day, when a college deputation bore him to their assembly with acclamations of gratitude and made him there a *Master of Arts*. Thirty-six years later Columbia College in New York, and forty-seven years later Harvard College, conferred upon him the honorary degree of Doctor of Laws.

The terms upon which Gen. Scott stood with Andrew Jackson were never cordial, nor were they so with Jefferson Davis, nor in Scott's suspicions with any strongly Democratic partisan or administration. But in his autobiography he distinctly refutes the story that Gen. Jackson persisted in an effort to draw him into a duel or contemplated one. In 1828 Scott became the senior general of the army, although Alexander Macomb was promoted over him to the chief command. In the Black Hawk war that "brave" was defeated by Gen. Atkinson at the mouth of the Badaxe river in Vernon county, Wisconsin, but Gen. Scott had been ordered to the department of the West to make treaties with the Indians by which he secured the cession of Indian

was born near Petersburg, Virginia, 13th June, 1786, the grandson of a Scottish refugee from the field of Culloden. He was a student at William and Mary College in 1805, and was admitted to the bar at Richmond, Virginia, in 1807. One of the sudden war excitements of the time changed the course of his life, and he obtained a captain's commission in the United States army in 1808. He served on the Niagara frontier throughout the war of 1812–15, and became one of its leading figures, rising rapidly through all the grades of the service to that of major-general, which was then the highest. Among other curious testimonials to his valor and conduct, he received from Princeton College in 1814 the honorary degree of doctor of laws, a distinction on which he never ceased to look with peculiar satisfaction. In 1841 he became the senior major-general of the army, and in 1855, after he had passed out of political life, the exceptional grade of lieutenant-general was created for him. His most noteworthy military achievement was his conduct of the main campaign against Mexico in 1847. Landing (9th March) at Vera Cruz with but 5500 men, he fought his way through a hostile country to the capital city of Mexico, which he captured 14th September, thereby practically ending the war. His service, however, was not confined to the army; from 1815 until 1861 he was the most continuously prominent public man of the country, receiving and justifying every mark of public confidence in his integrity, tact, and reasonableness. At a time (1823) when duelling was almost an imperative duty of an officer, he resisted successfully the persistent efforts of a brother officer (Andrew Jackson) to force him into a combat; and the simple rectitude of his intentions was so evident that he lost no ground in public estimation. In 1832, when ordered to Charleston by President Jackson during the "nullification" troubles, he secured every advantage for the Government, while his skilful and judicious conduct gave no occasion to South Carolina for an outbreak. In like manner, in the Black Hawk Indian troubles of 1832–33, in the Canadian "Patriot War" of 1837–38, in the boundary dispute of 1838 between Maine and New Brunswick, in the San Juan difficulty in 1859, wherever there was imminent danger of war and a strong desire to keep the peace, all thoughts turned instinctively to Scott as a fit instrument of an amicable settlement, and his success always justified the choice. Such a career seemed a gateway to political preferment, and his position was strengthened by the notorious fact that, as he was a Whig, the Democratic administration had persistently tried to subordinate his claims to those of officers of its own party. In 1852 his party nominated him for the presidency; but, though his services had been so great and his capacity and integrity were beyond question, he had other qualities which counted heavily against him. He was easily betrayed into the most egregious blunders of speech and action, which drew additional zest from his portly and massive form and a somewhat pompous ceremoniousness of manner. He destroyed his chances of election in the North. The Southern Whigs, believing him to be under the influence of the Seward or anti-slavery wing of the party, cast no strong vote for him, and he was overwhelmingly defeated in both sections, completing the final overthrow of his party. In 1861 he remained at the head of the United States armies, in spite of the secession of his State, until November, when he retired on account of old age and infirmities. After travelling for a time in Europe, he published in 1864 his autobiography, a work which reveals the strong and weak points of his character,—his integrity and complete honesty of purpose, his inclination to personal vanity, his rigid precision in every point of military precedent and etiquette, and his laborious affectation of an intimate acquaintance with *belles lettres*. He died at West Point, New York, 29th May, 1866.

The *Autobiography of Lieutenant-General Winfield Scott, LL.D.*, in two volumes, gives the facts of his career at length. For his defeat in 1852, see Von Holst's *Constitutional History*, vol. iv. p. 171 of the original, p. 206 of the English translation.

SCOTUS. See Duns Scotus and Scholasticism.

SCRANTON, a city of the United States, capital of Lackawanna county, Pennsylvania, on a plateau at the junction of the Roaring Brook and the Lackawanna river, 162 miles north of Philadelphia. It is the centre of the great coal-mining district in the country and the seat of a large number of iron and steel works, rolling-mills, blast-furnaces, etc., and ex-

lands to the United States, embracing a large part of Iowa and an extensive domain in northern Illinois. On his way west the cholera broke out among his troops and the General attended in person and prescribed for the sick, glad to display the fact that a soldier could be as efficient in humane as in military duty.

In the autumn of that year President Jackson sent him to Charleston to enforce the revenue laws which the party in control of South Carolina had attempted to nullify, and gave him "*carte blanche* in respect to troops." His conduct was vigilant, forbearing and firm under circumstances of great delicacy. In the Seminole war, which began in 1835, neither Clinch, Gaines, Scott nor Jesup, who succeeded to command in 1836 and brought his predecessor before an acquitting court of inquiry for dilatoriness, gained especial credit.

It was on the 4th January, 1838, that President Van Buren told Scott "blood has been shed" on the Niagara frontier in the fanatical "Patriots' War," and sent him to maintain neutrality there, where for more than a year he appeased the excitement of the border, and then he went to conduct the memorable exodus of the Cherokees from the southern slopes of the Blue Ridge across the Mississippi. From this duty he was summoned to allay the dispute about the Aroostook lands between Maine and New Brunswick in 1839. In all his semi-diplomatic missions Scott acquitted himself with a magnanimity and tact which seem at variance with his jealous irritability and which won him the approbation of his superior officers

Gen. Macomb died in 1841, when Scott became the general-in-chief of the army, signalizing his accession to the command by an order prohibiting the brutal punishment of soldiers.

Scott's campaign in Mexico, which culminated in "six months and five days," was, to use his own well-nigh justifiable boast, "successful as to every prediction, plan, siege, battle and skirmish." Though he doubted the cordiality of President Polk's support, he was invested with full discretion and started for the field resolved to make Vera Cruz the base of conquest and to reduce Gen. Taylor's operations to a defence of the Rio Grande boundary, since he had no confidence in the practicability of a decisive invasion from the north. The island of Lobos, lying 120 miles north of Vera Cruz, was the rendezvous of the army and fleet. On the 9th of March, 1847, nearly 12,000 troops were landed through the surf near the city and an investment begun, which terminated on the 27th with the capitulation of Vera Cruz and the castle of San Juan de Ulloa, when 5000 prisoners were captured with a loss to the besiegers of 64 officers and men. On the 18th April the Cordilleras were scaled at the pass of Cerro Gordo in a brilliant action of which the fruits to the invaders were 3000 prisoners and the occupation of Jalapa, of the fortified pass at La Hoya and of the fortress of Perote. At Puebla the column was detained for reorganization. Recruited to 14,000 men, Scott cut loose from his communications and on the 7th August began his march for the Valley of Mexico, which he entered on the 10th unopposed. Arriving at the isthmus between lakes Tezcuco and Chalco, he determined not to assault the strong eastern defences of the causeways leading into the capital, but to turn them by skirting the southern shore of the latter lake. The 19th found him at Tlalpam, whence he worked his divisions upon the communications between Valencia's entrenched camp at Contreras and Santa Anna at San Angel. On the following day the camp was taken by assault, San Antonio turned and the bridge and convent of San Pablo at Churubuseo captured with a loss to the enemy of 7000 troops and the demoralization of his army.

The city now lay at the mercy of the invaders, but, as he alleged in his own defence, Scott desired not to drive away the government by precipitation but to reduce it to negotiation. A fallacious armistice ensued and 15 days were passed in the insincere diplomacy of commissioners and in strengthening the defence of the city. On 8th September operations were renewed by the capture of the Molinos del Rey at the western foot of Chapultepec. On the 12th, the line of approach on the south having been fortified by Santa Anna, the castle of Chapultepec was bombarded, the next day it was taken by assault, and Worth and Quitman, following the retreating Mexicans, effected a lodgment, the one in the San Cosme and the other in the Belen gate. On the 14th the victorious Americans entered the city with an army of 6000 men, having lost in the Valley 2700. Scott remained in military occupation of Mexico until 18th February, 1848, enforcing order and winning such favor among some political leaders that they proposed to make him, on the ratification of peace, dictator of the Mexican republic, an offer which he was sagacious enough to decline. Scott received in captured money and stores and in mulcts levied in lieu of pillage, $220,000, of which $118,000 was turned over to the Army department at Washington as a foundation for a Soldier's Asylum and the rest was distributed among the troops in the field.

The rest of Gen. Scott's story is sufficiently told in the article above, except that the rank of lieutenant-general conferred upon him in 1855 was by brevet, and that he was retired upon full pay. Of his Memoirs, Gen. E. D. Keyes, who was for many years upon his personal staff, remarks: "To me it is not surprising that a person should undervalue Gen. Scott, if he only knows him from his autobiography."—Am. Ed.]

tensive factories for the production of rails, locomotives, mining machinery, steam-boilers, stoves, carriages, edge-tools, etc. A public library, a theatre, an academy of music, a hospital, a public hall, a driving park, a Roman Catholic cathedral, a home for the friendless, and a museum of Indian stone relics are among the more prominent features of the place. The population was 9223 in 1860, 35,092 in 1870, and 45,850 in 1880.

Slocum Farm, as the site was called subsequent to 1798, saw its first blast-furnace erected in 1840 by George and Selden Scranton, who soon added a rolling-mill and the manufacture of rails. The opening of the railway in 1856 gave a great stimulus to the new town (1854), which obtained a city charter in 1866. It is divided into twenty-one wards, of which the 4th, 5th, 6th, 14th, 15th, and 18th are known as Hyde Park, the 1st, 2d, and 3d as Providence.

SCREAMER, a bird inhabiting Guiana and the Amazon valley, so called in 1781 by Pennant (*Gen. Birds*, p. 37) "from the violent noise it makes,"—the *Palamedea cornuta* of Linnæus. First made known in 1648 by Marcgrave under the name of "Anhima," it was more fully described and better figured by Buffon under that of *Kamichi*, still applied to it by French writers. Of about the size of a Turkey, it is remarkable for the curious "horn" or slender caruncle, more than three inches long, it bears on its crown, the two sharp spurs with which each wing is armed, and its elongated toes. Its plumage is plain in color, being of an almost uniform grayish black above, the space round the eyes and a ring round the neck being variegated with white, and a patch of pale rufous appearing above the carpal joint, while the lower parts of the body are white. Closely related to this bird is another first described by Linnæus as a species of *Parra* (JACANA, vol. xiii. p. 541), to which group it certainly does not belong, but separated therefrom by Illiger to form the genus *Chauna*, and now known as *C. chavaria*, very generally in English as the "Crested Screamer,"[1] a name which was first bestowed on the SERIEMA (*q.v.*). This bird inhabits the lagoons and swamps of Paraguay and Southern Brazil, where it is called "Chajá" or "Chaka," and is smaller than the preceding, wanting its "horn," but having its head furnished with a dependent crest of feathers. Its face and throat are white, to which succeeds a blackish ring, and the rest of the lower parts are white, more or less clouded with cinereous. According to Mr. Gibson (*Ibis*, 1880, pp. 165, 166), its nest is a light construction of dry rushes, having its foundation in the water, and contains as many as six eggs, which are white tinged with buff. The young are covered with down of a yellowish brown color. A most singular habit possessed by this bird is that of rising in the air and soaring there in circles at an immense altitude, uttering at intervals the very loud cry of which its local name is an imitation. From a dozen to a score may be seen at once so occupying themselves. The young are often taken from the nest and reared by the people to attend upon and defend their poultry, a duty which is faithfully[2] and, owing to the spurs with which the Chaka's wings are armed, successfully discharged. Another very curious property of this bird, which was observed by Jacquin, who brought it to the notice of Linnæus,[3] is its emphysematous condition,—there being a layer of air-cells between the skin and the muscles, so that on any part of the body being pressed a crackling sound is heard. In Central America occurs another species, *C. derbiana*, chiefly distinguished by the darker color of its plumage. For this a distinct genus, *Ischyrornis*, was proposed, but apparently without necessity, by Reichenbach (*Syst. Avium*, p. xxi.).

The taxonomic position of the *Palamedeidæ*, for all will allow to the Screamers the rank of a Family at least, has been much debated, and cannot be regarded as fixed. Their Anserine relations were pointed out by Prof. Parker in the Zoological *Proceedings* for 1863 (pp. 511–518), and in the same work for 1867 Prof. Huxley placed the Family among his *Chenomorphæ*; but this view was contravened in 1876 by Garrod, who said, "The Screamers must have sprung from the primary avian stock as an independent offshoot at much the same time as did most of the other important families." Accordingly in 1880 Mr. Sclater regarded them as forming a distinct "Order," *Palamedeæ*, which he, however, placed next to the true *Anseres*, from the neighborhood of which, as has been already stated (ORNITHOLOGY, vol. xviii. p. 50), the present writer thinks the *Palamedeidæ* can hardly be removed. (A. N.)

SCREW. The screw is the simplest instrument for converting a uniform motion of rotation into a uniform motion of translation (see MECHANICS, vol. xv. p. 699). Metal screws requiring no special accuracy are generally cut by taps and dies. A tap is a cylindrical piece of steel having a screw on its exterior with sharp cutting edges; by forcing this with a revolving motion into a hole of the proper size, a screw is cut on its interior forming what is known as a nut or female screw. The die is a nut with sharp cutting edges used to screw upon the outside of round pieces of metal and thus produce male screws. More accurate screws are cut in a lathe by causing the carriage carrying the tool to move uniformly forward; thus a continuous spiral line is cut on the uniformly revolving cylinder fixed between the lathe centres. The cutting tool may be an ordinary form of lathe tool or a revolving saw-like disk. (See MACHINE TOOLS, vol. xv. p. 154.)

Errors of Screws.—For scientific purposes the screw must be so regular that it moves forward in its nut exactly the same distance for each given angular rotation around its axis. As the mountings of a screw introduce many errors, the final and exact test of its accuracy can only be made when it is finished and set up for use. A large screw can, however, be roughly examined in the following manner. (1) See whether the surface of the threads has a perfect polish. The more it departs from this, and approaches the rough torn surface as cut by the lathe tool, the worse it is. A perfect screw has a perfect polish. (2) Mount upon it between the centres of a lathe and the slip a short nut which fits perfectly. If the nut moves from end to end with equal friction, the screw is uniform in diameter. If the nut is long, unequal resistance may be due to either an error of run or a bend in the screw. (3) Fix a microscope on the lathe carriage and focus its single cross-hair on the edge of the screw and parallel to its axis. If the screw runs true at every point, its axis is straight. (4) Observe whether the short nut runs from end to end of the screw without a wabbling motion when the screw is turned and the nut kept from revolving. If it wabbles the screw is said to be drunk. One can see this error better by fixing a long pointer to the nut, or by attaching to it a mirror and observing an image in it with a telescope. The following experiment will also detect this error. (5) Put upon the screw two well-fitting and rather short nuts, which are kept from revolving by arms bearing against a straight edge parallel to the axis of the screw. Let one nut carry an arm which supports a microscope focused on a line ruled on the other nut. Screw this combination to different parts of the screw. If during one revolution the microscope remains in focus, the screw is not drunk; and, if the cross-hairs bisect the line in every position, there is no error of run.

Making Accurate Screws.—To produce a screw of a foot or even a yard long with errors not exceeding $\frac{1}{1000}$th of an inch is not difficult. Professor William A. Rogers of Harvard observatory has invented a process in which the tool of the lathe while cutting the screw is moved so as to counteract the errors of the lathe screw. The screw is then partly ground to get rid of local errors. But, where the highest accuracy is needed, we must resort in the case of screws, as in all other cases, to grinding. A long solid nut, tightly fitting the screw in one position, cannot be moved freely to another position unless the screw is very accurate. If grinding material is applied and the nut is constantly

[1] Under this name its curious habits have been well described by Mr. W. H. Hudson (*Gentleman's Magazine*, September, 1885, pp. 280–287.)

[2] Hence Latham's name for this species is "Faithful Jacana,"—he supposing it to belong to the genus in which Linnæus placed it.

[3] "Tacta manu cutis, sub pennis etiam lanosa, crepat ubique fortiter" (*Syst. Nat.*, ed. 12, i. p. 260).

tightened, it will grind out all errors of run, drunkenness, crookedness, and irregularity of size. The condition is that the nut must be long, rigid, and capable of being tightened as the grinding proceeds; also the screw must be ground longer than it will finally be needed so that the imperfect ends may be removed.

The following process will produce a screw suitable for ruling gratings for optical purposes. Suppose it is our purpose to produce a screw which is finally to be 9 inches long, not including bearings, and 1¼ inches in diameter. Select a bar of soft Bessemer steel, which has not the hard spots usually found in cast steel, about 1⅝ inches in diameter and 30 long. Put it between lathe centres and turn it down to 1 inch diameter everywhere, except about 12 inches in the centre, where it is left a little over 1¼ inches in diameter for cutting the screw. Now cut the screw with a triangular thread a little sharper than 60°. Above all, avoid a fine screw, using about 20 threads to the inch.

The grinding nut, about 11 inches long, has now to be made. Fig. 1 represents a section of the nut, which is made of brass, or better of Bessemer steel. It consists of four segments,—*a*, *a*, which can be drawn about the screw by two collars, *b*, *b*, and the screw *c*. Wedges between the segments prevent too great pressure on the screw. The final clamping is effected by the rings and screws, *d*, *d*, which enclose the flanges, *e*, of the segments. The screw is now placed in a lathe and surrounded by water whose temperature can be kept constant to 1° C., and the nut placed on it. In order that the weight of the nut may not make the ends too small, it must either be counterbalanced by weights hung from a rope passing over pulleys in the ceiling, or the screw must be vertical during the whole process. Emery and oil seem to be the only available grinding materials, though a softer

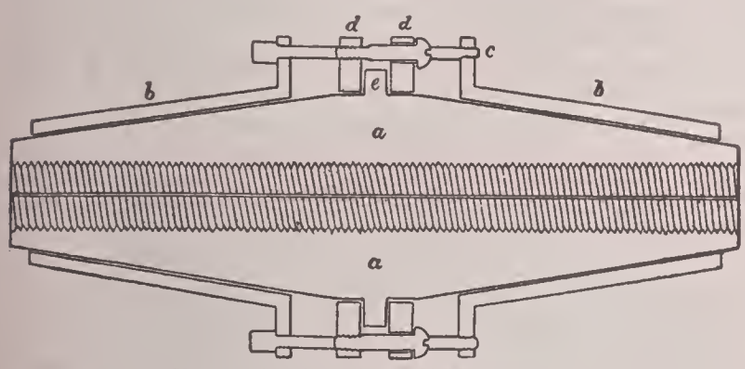


Fig. 1.—Section of grinding nut.

silica powder might be used towards the end of the operation to clean off the emery and prevent future wear. Now grind the screw in the nut, making the nut pass backwards and forwards over the screw, its whole range being nearly 20 inches at first. Turn the nut end for end every ten minutes and continue for two weeks, finally making the range of the nut only about 10 inches, using finer washed emery and moving the lathe slower to avoid heating. Finish with a fine silica powder or rouge. During the process, if the thread becomes too blunt, recut the nut by a *short* tap so as not to change the pitch at any point. This must of course not be done less than five days before the finish. Now cut to the proper length; centre again in the lathe under a microscope; and turn the bearings. A screw so ground has less errors than from any other system of mounting. The periodic error especially will be too small to be discovered, though the mountings and graduation and centering of the head will introduce it; it must therefore finally be corrected.

Mounting of Screws.—The mounting must be devised most carefully, and is indeed more difficult to make without error than the screw itself. The principle which should be adopted is that no workmanship is perfect; the design must make up for its imperfections. Thus the screw can never be made to run true on its bearings, and hence the device of resting one end of the carriage on the nut must be rejected. Also all rigid connection between the nut and the carriage must be avoided, as the screw can never be adjusted parallel to the ways on which the carriage rests. For many purposes, such as ruling optical gratings, the carriage must move accurately forward in a straight line as far as the horizontal plane is concerned, while a little curvature in the vertical plane produces very little effect. These conditions can be satisfied by making the ways V-shaped and grinding with a grinder somewhat shorter than the ways. By constant reversals and by lengthening or shortening the stroke, they will finally become nearly perfect. The vertical curvature can be sufficiently tested by a short carriage carrying a delicate spirit level. Another and very efficient form of ways is V-shaped with a flat top and nearly vertical sides. The carriage rests on the flat top and is held by springs against one of the nearly vertical sides. To determine with accuracy whether the ways are straight, fix a flat piece of glass on the carriage and rule a line on it by moving it under a diamond; reverse and rule another line near the first, and measure the distance apart at the centre and at the two ends by a micrometer. If the centre measurement is equal to the mean of the two end ones, the line is straight. This is better than the method with a mirror mounted on the carriage and a telescope. The screw itself must rest in bearings, and the end motion be prevented by a point bearing against its flat end, which is protected by hardened steel or a flat diamond. Collar bearings introduce periodic errors. The secret of success is so to design the nut and its connections as to eliminate all adjustments of the screw and indeed all imperfect workmanship. The connection must also be such as to give means of correcting any residual periodic errors or errors of run which may be introduced in the mountings or by the wear of the machine.

The nut is shown Fig. 2. It is made in two halves, of wrought iron filled with boxwood or lignum vitæ plugs, on

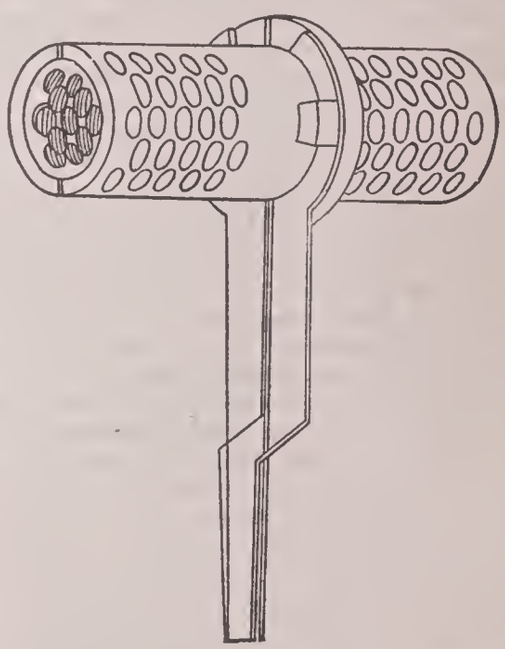


Fig. 2.

which the screw is cut. To each half a long piece of sheet steel is fixed which bears against a guiding edge, to be described presently. The two halves are held to the screw by springs, so that each moves forward almost independently of the other. To join the nut to the carriage, a ring is attached to the latter, whose plane is vertical and which can turn round a vertical axis. The bars fixed midway on the two halves of the nut bear against this ring at points 90° distant from its axis. Hence each half does its share independently of the other in moving the carriage forward. Any want of parallelism between the screw and the ways or eccentricity in the screw mountings thus scarcely affects the forward motion of the carriage. The guide against which the steel pieces of the nut rest can be made of such form as to correct any small error of run due to wear of the screw. Also, by causing it to move backwards and forwards periodically, the periodic error of the head and mountings can be corrected.

In making gratings for optical purposes the periodic error must be very perfectly eliminated, since the periodic displacement of the lines only one-millionth of an inch from their mean position will produce "ghosts" in the spectrum.[1] Indeed this is the most sensitive method of detecting the existence of this error, and it is practically impossible to mount the most perfect of screws without introducing it. A very practical method of determining this error is to rule a short grating with very long lines on a piece of common thin plate glass; cut it in two with a diamond and superimpose the two halves with the rulings together and displaced sideways over each other one-half the pitch of the screw. On now looking at the plates in a proper light so as to have the spectral colors show through it, dark lines will appear, which are wavy if there is a periodic error and straight if

[1] In a machine made by the present writer for ruling gratings the periodic error is entirely due to the graduation and centering of the head. The uncorrected periodic error from this cause displaces the lines $\frac{1}{3000000}$th of an inch, which is sufficient to entirely ruin all gratings made without correcting it.

there is none. By measuring the comparative amplitude of the waves and the distance apart of two lines, the amount of the periodic error can be determined. The phase of the periodic error is best found by a series of trials after setting the corrector at the proper amplitude as determined above.

A machine properly made as above and kept at a constant temperature should be able to make a scale of 6 inches in length, with errors at no point exceeding $\frac{1}{100000}$th of an inch. When, however, a grating of that length is attempted at the rate of 14,000 lines to the inch, four days and nights are required and the result is seldom perfect, possibly on account of the wear of the machine or changes of temperature. Gratings, however, less than 3 inches long are easy to make. (H. A. R.)

SCRIBE, Augustin Eugène (1791–1861), the most popular playwright of France, was born at Paris on 24th December, 1791, and died there on 20th February, 1861. His father was a silk merchant and he was well educated, being destined for the bar. But, having a real gift for the theatre (a gift which unfortunately was not allied with sufficient literary power to make his works last), he very soon broke away from professional study and at the age of twenty produced in collaboration, as is common in France, the first of a series of dramas which continued for fifty years. *Les Dervis* (1811) is usually cited as the first play in which he took a hand, though, as for some time he did not sign his work, identification is somewhat difficult. He achieved no distinct success till 1816, when *Une Nuit de Garde Nationale* made him in a way famous. Thenceforward his fertility was unceasing and its results prodigious. There may be in existence a complete list of Scribe's works, but we have never seen any that pretended to be such. He wrote every kind of drama—vaudevilles, comedies, tragedies, opera-libretti. To one theatre alone he is said to have furnished more than a hundred pieces. But his life was entirely uneventful, and his election to the Academy in 1835 is almost the only incident which deserves chronicling. It ought to be said to Scribe's credit that, although he was the least original of writers and was more an editor of dramas than a dramatist, although he was for many years an object of the bitterest envy to impecunious geniuses owing to his pecuniary success, and although he never has pleased and never can please any critic who applies purely literary tests, his character stands very high for literary probity and indeed generosity. He is said in some cases to have sent sums of money for "copyright in ideas" to men who not only had not actually collaborated with him but who were unaware that he had taken suggestions from their work. His industry was untiring and his knowledge both of the mechanism of the stage and of the tastes of the audience was wonderful. Nevertheless he hardly deserves a place in literature, his style being vulgar, his characters commonplace, even his plots lacking power and grasp. He wrote a few novels, but none of any mark. The best known of Scribe's pieces after his first successful one are *Une Chaîne* (1842), *Le Verre d' Eau* (1842),[1] *Adrienne Lecouvreur* (1849), and the libretti of many of the most famous operas of the middle of the century, especially those of Auber and Meyerbeer.

SCRIBES. See Israel, vol. xiii. p. 429.

SCRIVENER'S PALSY. See Cramp, vol. vi. p. 481–2.

SCROFULA or Struma (formerly known in England as "king's evil," from the belief that the touch of the sovereign could effect a cure [2]), a constitutional morbid condition generally exhibiting itself in early life, and characterized mainly by defective nutrition of the tissues and by a tendency to inflammatory affections of a low type with degenerative changes in their products. The subject has been considered in most of its features under Pathology (vol. xviii. p. 415), and only a further brief reference is here necessary. Scrofula may be either inherited or acquired. Heredity is of all causes the most potent, and naturally operates with greater certainty where both parents possess the taint. As in all hereditary diseases, however, the liability may be scarcely perceptible for one or two generations, but may then reappear. Other causes referable to parentage may readily produce this constitutional state in children, as weakness or ill-health in one or both parents, and, as seems probable, marriages of consanguinity. But, apart altogether from hereditary or congenital influences, the scrofulous habit is frequently developed, especially in the young, by such unfavorable hygienic conditions as result from overcrowded, cold, and dark dwellings, insufficient and improper food, exposure, and debauchery. Even among the old in such circumstances the evidences of scrofula may be seen to present themselves where before they had been absent.

There are two well-marked types of the scrofulous constitution to be often observed, especially among the young. In the one the chief features are a fair complexion with delicate thin skin, blue eyes, dilated pupils, long eyelashes, soft muscles, and activity of the circulatory and nervous system; while in the other the skin is dark, the features heavy, the figure stunted, and all the functions, physical and mental, inactive. In many instances, however, it will be found that both types are more or less mixed together in one individual. The manifestations of scrofula generally appear in early life, and are often exhibited in young children during the first dentition by inflammatory skin eruptions of obstinate character on the face and other parts; later on in youth there appear glandular swellings either externally, as on the neck, or affecting the gland structures of the chest or abdomen, while at the same time mucous membranes and bones may become implicated. The distinctive features of the scrofulous inflammatory affections are their tendency to chronicity and to suppurative and degenerative changes, the affected parts either healing slowly with resulting disfigurement, as on the neck, or continuing to retain traces of the products of the diseased action, which may set up serious disturbance of the health at some future time. Further, the scrofulous constitution always influences the duration and progress of any disease from which the individual may suffer, as well as its results. Thus in pneumonia, to which the scrofulous would seem to be specially liable, the products of the inflammation are not readily absorbed as in previously healthy persons, but, remaining in the lung-tissues, are apt to undergo caseous degenerative changes, which may issue in phthisis (see Pneumonia and Phthisis). The connection of scrofula with tubercle is pointed out in the article Pathology (*loc. cit.*).

Scrofula may under favorable circumstances tend to improvement as age advances, and it occasionally happens that persons who in early life showed unmistakable evidences of this condition appear ultimately to outgrow it, and become in all respects healthy and vigorous. The treatment is essentially similar to that described for rickets or phthisis, and is partly preventive and partly curative. It consists mainly in hygienic measures to promote the health and nutrition of the young, and of suitable diet, tonics, etc., where evidences of the disease have declared themselves. See Rickets, Phthisis.

SCRUB-BIRD, the name (for want of a better, since it is not very distinctive) conferred upon the members of an Australian genus, one of the most curious ornithological types of the many furnished by that country. The first examples were procured by the late Mr. Gilbert between Perth and Augusta in West Australia, and were described by Gould in the Zoological Society's *Proceedings* for 1844 (pp. 1, 2) as forming a new genus and species under the name of

[1] [Lorenz in *Cat. de la Librairie*, t. iv. 1871, gives as the date of publication of *Une Chaîne* 1841, and of *Le Verre d'Eau* 1840.—Am. Ed.]

[2] This superstition can be traced back to the time of Edward the Confessor in England, and to a much earlier period in France. Samuel Johnson was touched by Queen Anne in 1712, and the same prerogative of royalty was exercised by Prince Charles Edward in 1745.

Atrichia clamosa, the great peculiarity observed by that naturalist being the absence of any bristles around the gape, in which respect alone it seemed to differ from the already known genus *Sphenura*. In March, 1866, Mr. Wilcox obtained on the banks of the Richmond river on the eastern side of Australia some other examples, which proved the existence of a second species, described by Mr. Ramsay in the *Proceedings* for that year (pp. 438–440) as a *A. rufescens;* but still no suspicion of the great divergence of the genus from the ordinary Passerine type was raised, and it was generally regarded as belonging to the *Maluridæ* or Australian Warblers. However, the peculiar formation of the sternum in *Atrichia* attracted the present writer's attention almost as soon as that of *A. clamosa* was exhibited in the museum of the College of Surgeons, and at his request Mr. Ramsay a little later sent to the museum of the university of Cambridge examples in spirit of *A. rufescens*, which showed a common structure. One of the sternal peculiarities was noticed by Mr. Sclater (*Ibis*, 1874, p. 191, note); and in the present work (Birds, iii. p. 643) the Scrub-birds were declared to form a distinct Family, *Atrichiidæ*, standing, so far as was known, alone with the Lyre-birds (see vol. xv. p. 117) as "abnormal *Passeres.*" Much the same view was also taken the next year by Garrod, who, in the *Proceedings* for 1876 (pp. 516, 518, pl. lii. figs. 4–7), further dwelt on the taxonomic importance of the equally remarkable characters of the syringeal muscles exhibited alike by *Menura* and *Atrichia*, which he accordingly placed together in a division of the Acromyodian *Passeres*, differing from

West-Australian Scrub-bird (*Atrichia clamosa*).

all the rest and since recognized, as has been said (Ornithology, vol. xviii. pp. 44, 45), by Mr. Sclater as a Sub-order *Pseudoscines*. A detailed anatomical description of *Atrichia* has, however, yet to be given, and a comparison of many other Australian types is needed[1] before it can be certainly said to have no nearer ally than *Menura*. Both the known species of Scrub-bird are about the size of a small Thrush—*A. clamosa* being the larger of the two. This species is brown above, each feather barred with a darker shade; the throat and belly are reddish white, and there is a large black patch on the breast; while the flanks are brown and the lower tail-coverts rufous. *A. rufescens* has the white and black of the fore-parts replaced by brown, barred much as is the upper plumage. Both species are said to inhabit the thickest "scrub" or brushwood forest; but little has been ascertained as to their mode of life except that the males are noisy, imitative of the notes of other birds, and given to violent gesticulations. The nest and eggs seem never to have been found, and indeed no example of the female of either species is known to have been procured, whence that sex may be inferred to escape observation by its inconspicuous appearance and retiring habits. (A. N.)

[1] Forbes showed that Orthonyx (vol. xviii. p. 56), did not belong to the group as at one time supposed.

SCUDÉRY is the name of a family which is said to have been of Italian origin and to have transferred itself to Provence, but which is only known by the singular brother and sister who represented it during the 17th century.

Georges de Scudéry (1601–1667), the elder of the pair, was born at Havre, whither his father had moved from Provence, in 1601. He served in the army for some time, and, though in the vein of gasconading which was almost peculiar to him he no doubt exaggerated his services, there seems little doubt that he was a stout soldier. But he conceived a fancy for literature before he was thirty, and during the whole of the middle of the century he was one of the most characteristic figures of Paris. Despite his own merit, which was not inconsiderable, and his sister's, which was more, he was unlucky in his suits for preferment. Indeed from some stories told by men not his friends he seems to have hurt his own chances by independence of spirit. He received, however, the governorship of the fortress of Notre Dame de la Garde near Marseilles in 1643, and in 1650 was elected to the Academy. Long before he had made himself conspicuous by a letter attacking Corneille's *Cid*, which he addressed to that body. He was himself an industrious dramatist, *L'Amour Tyrannique* being the chief piece which (and that only partially) has escaped oblivion. His other most famous work was the epic of *Alaric* (1654). He lent his name to his sister's first romances, but did little beyond correcting the proofs. His death occurred at Paris on 14th May, 1667. Scudéry's swashbuckler affectations (he terminates his introduction to the works of Théophile de Viaud by something like a challenge in form to any one who does not admit the supremacy of the deceased poet), the bombast of his style, and his various oddities have been rather exaggerated by literary gossip and tradition. Although probably not quite sane, he had some poetical power, a fervent love of literature, a high sense of honor and of friendship.

His sister Madeleine (1607–1701), born also at Havre in 1607, was a writer of much more ability and of a much better regulated character. She was very plain and had no fortune, but her abilities were great and she was very well educated. Establishing herself at Paris with her brother, she was at once admitted to the Rambouillet coterie, afterwards established a salon of her own under the title of the *Société du Samedi*, and for the last half of the 17th century, under the pseudonym of "Sapho" or her own name, was acknowledged as the first blue-stocking of France and of the world. Her celebrated novels, *Artamène ou le Grand Cyrus*, *Clélie*, *Ibrahim ou l'Illustre Bassa*, *Almahide*, and others are known by quotation to every one, and were the delight of all Europe, including persons of the wit and sense of Madame de Sévigné. But for at least a century and a half they have lain unread, and their immense length has often been satirized even by persons well read in letters with the term "folio," when in fact they were originally issued in batches of small octavos, sometimes (allowing for two parts to each volume) running to a score or so. Neither in conception nor in execution will they bear criticism as wholes. With classical or Oriental personages for nominal heroes and heroines, the

whole language and action are taken from the fashionable ideas of the time, and the personages can be identified either really or colorably with Mademoiselle de Scudéry's contemporaries. The interminable length of the stories is made out by endless conversations and, as far as incidents go, chiefly by successive abductions of the heroines, conceived and related in the most decorous spirit, for Mademoiselle de Scudéry is nothing if not decorous. Nevertheless, although the books can hardly now be read through, it is still possible to perceive their attraction for the wits, both male and female, of a time which certainly did not lack wit. In that early day of the novel prolixity did not repel. "Sapho" had really studied mankind in her contemporaries and knew how to analyze and describe their characters with fidelity and point. She was a real mistress of conversation, a thing quite new to the age at least as far as literature was concerned, and proportionately welcome. She could moralize—a favorite employment of the time—with sense and propriety, and the purely literary merits of the style which clothed the whole were considerable. Madeleine survived her brother more than thirty years (scandal says that she was not sorry to be relieved from his humors), and in her later days published numerous volumes of conversations (to a great extent extracted from her novels) and short moral writings. Dryden says that he had heard of an intention on her part to translate the *Canterbury Tales*, and it is not impossible. She never lost either her renown or her wits or her good sense, and died at Paris on 2d June, 1701. It is unfortunate and rather surprising that no one has recently attempted an anthology from her immense work.

SCULPTURE.

THE present article is confined to the sculpture of the Middle Ages and Modern times; classical sculpture has been already treated of under ARCHÆOLOGY (CLASSICAL), vol. ii. p. 300 *sq.*, and in the articles on the several individual artists.

In the 4th century A.D., under the rule of Constantine's successors, the plastic arts in the Roman world reached the lowest point of degradation to which they ever fell. Coarse in workmanship, intensely feeble in design, and utterly without expression or life, the pagan sculpture of that time is merely a dull and ignorant imitation of the work of previous centuries. The old faith was dead, and the art which had sprung from it died with it. In the same century a large amount of sculpture was produced by Christian workmen, which, though it reached no very high standard of merit, was at least far superior to the pagan work. Although it shows no increase of technical skill or knowledge of the human form, yet the mere fact that it was inspired and its subjects supplied by a real living faith was quite sufficient to give it a vigor and a dramatic force which raise it æsthetically far above the expiring efforts of paganism. Fig. 1 shows a very fine Christian relief of the 4th century, with a noble figure of an archangel holding an orb and a sceptre. It is a leaf from an ivory consular diptych, inscribed at the top ΔΕΧΟΥ ΠΑΡΟΝΤΑ ΚΑΙ ΜΑΘωΝ ΤΗΝ ΑΙΤΙΑΝ, "Receive these presents and having learnt the occasion . . ." A number of large marble sarcophagi are the chief existing specimens of this early Christian sculpture. In general design they are close copies of pagan tombs, and are richly decorated outside with reliefs. The subjects of these are usually scenes from the Old and New Testaments. From the former those subjects were selected which were supposed to have some typical reference to the life of Christ: the Meeting of Abraham and Melchisedec, the Sacrifice of Isaac, Daniel among the Lions, Jonah and the Whale, are those which most frequently occur. Among the New Testament scenes no representations occur of Christ's sufferings;[1] the subjects chosen illustrate His power and beneficence: the Sermon on the Mount, the Triumphal Entry into Jerusalem, and many of His miracles are frequently repeated. The Vatican and Lateran museums are rich in examples of this sort. One of the finest in the former collection was taken from the crypt of the old basilica of St. Peter; it contained the body of a certain Junius Bassus, and dates from the year 359.[2] Many other similar sarcophagi were made in the provinces of Rome, especially Gaul; and fine specimens exist in the museums of Arles, Marseilles, and Aix; those found in Britain are of very inferior workmanship.

Early Christian.

In the 5th century other plastic works similar in style were still produced in Italy, especially reliefs in ivory (to a certain extent imitations of the later consular diptychs), which were used to decorate episcopal thrones or the bindings of MSS. of the Gospels.

FIG. 1.—Relief in ivory of the 4th century. (British Museum.)

[1] A partial exception to this rule is the scene of Christ before Pilate, which sometimes occurs.

[2] See Dionysius, *Sac. Vat. Bas. Crypt.*, and Bunsen, *Besch. d. Stadt Rom.*, 1840.

The so-called chair of St. Peter, still preserved (though hidden from sight) in his great basilica, is the finest example of the former class; of less purely classical style, dating from about 550, is the ivory throne of

Fig. 2.—Reliefs in ivory of the Baptist and the Four Evangelists in front of the episcopal throne of Maximianus in Ravenna cathedral.

Bishop Maximianus in Ravenna cathedral (see Fig. 2). Another very remarkable work of the 5th century is the series of small panel reliefs on the doors of S. Sabina on the Aventine Hill at Rome. They are scenes from Bible history carved in wood, and in them much of the old classic style survives.[1]

Byzantine.

In the 6th century, under the Byzantine influence of Justinian, a new class of decorative sculpture was produced, especially at Ravenna. Subject reliefs do not often occur, but large slabs of marble, forming screens, altars, pulpits, and the like, were ornamented in a very skilful and original way with low reliefs of graceful vine-plants, with peacocks and other birds drinking out of chalices, all treated in a very able and highly decorative manner (see Fig. 3 and the upper band of Fig. 2). Byzantium, however, in the main, became the birthplace and seat of all the mediæval arts soon after the transference thither of the headquarters of the empire. The plastic arts of Byzantium were for a while dominated by the survival of the dull classic art of the extreme decadence, but soon fresh life and vigor of conception were gained by a people who were not without the germinating seeds of a new æsthetic development. The bronze statue of St. Peter in his Roman basilica is an early work which shows some promise of what was to come in the far-off future; though classical in its main lines and stiff in treatment, it possesses a simple dignity and force which were far beyond the powers of any mere copyist of classic sculpture.[2] Very early in the 5th or 6th century a school of decorative sculpture arose at Byzantium which produced work, such as carved foliage on capitals and bands of ornament, possessed of the very highest decorative power and executed with unrivalled spirit and vigor. The early Byzantine treatment of the acanthus or thistle, as seen in the capitals of S. Sophia at Constantinople, the Golden Gate at Jerusalem, and many other buildings in the East, has never since been surpassed in any purely decorative sculpture; and it is interesting to note how it grew out of the dull and lifeless ornamentation which covers the degraded Corinthian capital used so largely in Roman buildings of the time of Constantine and his sons. It was, however, especially in the production of Metal-work (*q.v.*) that the early Byzantines were so famous, and this notably in the manipulation of the precious metals, which were then used in the most lavish way to decorate and furnish the great churches of the empire. This extended use of gold and silver strongly influenced their sculpture, even when the material was marble or bronze, and caused an amount of delicate surface-ornament to be used which was sometimes injurious to the breadth and simplicity of their reliefs. For many centuries the art of Byzantium, at least in its higher forms, made little or no progress, mainly owing to the tyrannical influence of the church and its growing suspicion of anything like sensual beauty. A large party in the Eastern Church decided that all representations of Christ must be "without form or comeliness," and that it was impious to carve or paint Him with any of the beauty and nobility of the pagan gods. Moreover, the artists of Byzantium were fettered by the strictest rules as to the proper way in which to portray each sacred figure: every saint had to be represented in a certain attitude, with one fixed cast of face and arrangement of drapery, and even in certain definitely prescribed colors. No deviation from these rules was permitted, and thus stereotyped patterns were created and followed in the most rigid and conventional manner. Hence in Byzantine art from the 6th to the 12th century a miniature painting in an illuminated MS. looks like a reduced copy of a colossal glass mosaic; and no design had much special relation to the material it was to be executed in: it was much the same whether it was intended to be a large relief sculptured in stone or a minute piece of silver-work for the back of a textus.

Fig 3.—Sixth-century capital from S. Vitale at Ravenna.

Till about the 12th century, and in some places much later, the art of Byzantium dominated that of the whole Christian world in a very remarkable way. From Russia to Ireland and from Norway to Spain any given work of art in one of the countries of Europe might almost equally well have been designed in any other. Little or no local peculiarities can be detected, except of course in the methods of execution, and even these were wonderfully similar everywhere. The dogmatic unity of the Catholic Church and its great monastic system, with constant interchange of monkish craftsmen between one country and another, were the chief causes of this widespread monotony of style. An additional reason was the unrivalled technical skill of the early Byzantines, which made their city widely resorted to by the artist-craftsmen of all Europe,—the great school for learning any branch of the arts.

Influence of Byzantine art.

The extensive use of the precious metals for the chief works of plastic art in this early period is one of the reasons why so few examples still remain,—their great intrinsic value naturally causing their destruction. One of the most important existing examples, dating from the 8th century, is a series of colossal wall reliefs executed in hard stucco in the church of Cividale (Friuli) not far from Trieste. These represent rows of female saints bearing jewelled crosses, crowns, and wreaths, and closely resembling in costume, attitude, and arrangement the gift-bearing mosaic figures of Theodora and her ladies in S. Vitale at Ravenna. It is a striking instance of the almost petrified state of

[1] Various dates have been assigned to these interesting reliefs by different archæologists, but the costumes of the figures are strong evidence that they are not later than the 5th century.

[2] There is no ground for the popular impression that this is an antique statue of Jupiter transformed into that of St. Peter by the addition of the keys.

Byzantine art that so close a similarity should be possible between works executed at an interval of fully two hundred years. Some very interesting small plaques of ivory in the library of St. Gall show a still later survival of early forms. The central relief is a figure of Christ in Majesty, and closely resembles those in the colossal apse mosaic of S. Apollinare in Classe and other churches of Ravenna; while the figures below the Christ are survivals of a still older time, dating back from the best eras of classic art. A river-god is represented as an old man holding an urn, from which a stream issues, and a reclining female figure with an infant and a cornucopia is the old Roman Tellus or Earth-goddess with her ancient attributes.[1]

It will be convenient to discuss the sculpture of the mediæval and modern periods under the heads of the chief countries of Europe.

England.—During the Saxon period, when stone buildings were rare and even large cathedrals were built of wood, the plastic arts were mostly confined to the use of gold, silver, and gilt copper. The earliest existing specimens of sculpture in stone are a number of tall churchyard crosses, mostly in the northern provinces and apparently the work of Scandinavian sculptors. One very remarkable example is a tall monolithic cross, cut in sandstone, in the churchyard of Gosforth in Cumberland. It is covered with rudely carved reliefs, small in scale, which are of special interest as showing a transitional state from the worship of Odin to that of Christ. Some of the old Norse symbols and myths sculptured on it occur modified and altered into a semi-Christian form. Though rich in decorative effect and with a graceful outline, this sculptured cross shows a very primitive state of artistic development, as do the other crosses of this class in Cornwall, Ireland, and Scotland, which are mainly ornamented with those ingeniously intricate patterns of interlacing knotwork designed so skilfully by both the early Norse and the Celtic races.[2] They belong to a class of art which is not Christian in its origin, though it was afterwards largely used for Christian purposes, and so is thoroughly national in style, quite free from the usual widespread Byzantine influence. Of special interest from their early date—probably the 11th century—are two large stone reliefs now in Chichester cathedral, which are traditionally said to have come from the pre-Norman church at Selsey. They are thoroughly Byzantine in style, but evidently the work of some very ignorant sculptor; they represent two scenes in the Raising of Lazarus;[3] the figures are stiff, attenuated, and ugly, the pose very awkward, and the drapery of exaggerated Byzantine character, with long thin folds. To represent the eyes pieces of glass or colored enamel were inserted; the treatment of the hair in long ropelike twists suggests a metal rather than a stone design (see Fig. 4).

Churchyard crosses.

During the Norman period sculpture of a very rude sort was much used, especially for the tympanum reliefs over the doors of churches. Christ in Majesty, the Harrowing of Hell, and St. George and the Dragon occur very frequently. Reliefs of the zodiacal signs were a common decoration of the richly sculptured arches of the 12th century, and are frequently carved with much power. The later Norman sculptured ornaments are very rich and spirited, though the treatment of the human figure is still very weak.[4]

Norman period.

The best-preserved examples of monumental sculpture of the 12th century are a number of effigies of knights-templars in the round Temple church in London.[5] They are laboriously cut in hard Purbeck marble, and much resemble bronze in their treatment; the faces are clumsy, and the whole figure stiff and heavy in modelling; but they are valuable examples of the military costume of the time, the armor being purely chain-mail. Another effigy in the same church cut in stone, once decorated with painting, is a much finer piece of sculpture of about a century later. The head, treated in an ideal way with wavy curls, has much simple beauty, showing a great artistic advance. Another of the most remarkable effigies of this period is that of Robert, duke of Normandy (d. 1134), in Gloucester cathedral, carved with much spirit in oak, and decorated with painting (Fig. 5). Most rapid progress in all the arts, especially that of sculpture, was made in England in the second half of the 13th and the beginning of the 14th century, largely under the patronage of Henry III., who employed and handsomely rewarded a large number of English artists, and also imported others from Italy and Spain, though these foreigners took only a secondary position among the painters and sculptors of England. The end of the 13th century was in fact the culminating period of English art, and

Effigies.

FIG. 4.—Relief of Christ at the tomb of Lazarus, now in Chichester cathedral; 11th century, Byzantine style.

FIG. 5.—Effigy in oak of Robert, duke of Normandy, in Gloucester cathedral; once painted and gilt.

[1] On early and mediæval sculpture in ivory consult Gori, *Thesaurus Veterum Diptychorum*, Florence, 1759; Westwood, *Diptychs of Consuls*, London, 1862; Didron, *Images ouvrantes du Louvre*, Paris, 1871; Maskell, *Ivories in the South Kensington Museum*, London, 1872; Wieseler, *Diptychon Quirinianum zu Brescia*, Göttingen, 1868; Wyatt and Oldfield, *Sculpture in Ivory*, London, 1856.

[2] See O'Neill, *Sculptured Crosses of Ireland*, London, 1857.

[3] One of these reliefs is imperfect and has been clumsily mended with a fragment of a third relief, now lost.

[4] In Norway and Denmark during the 11th and 12th centuries carved ornament of the very highest merit was produced, especially the framework round the doors of the wooden churches; these are formed of large pine planks, sculptured in slight relief with dragons and interlacing foliage in grand sweeping curves—perfect masterpieces of decorative art, full of the keenest inventive spirit and originality.

[5] See Richardson, *Monumental Effigies of the Temple Church*, London, 1843.

at this time a very high degree of excellence was reached by purely national means, quite equalling and even surpassing the general average of art on the Continent, except perhaps in France. Even Niccola Pisano could not have surpassed the beauty and technical excellence of the two bronze effigies in Westminster Abbey modelled and cast by William Torell, a goldsmith and citizen of London, shortly before the year 1300. These are on the tombs of Henry III. and Queen Eleanor, and, though the tomb itself of the former is an Italian work of the Cosmati school, there is no trace of foreign influence in the figures. At this time portrait effigies had not come into general use, and both figures are treated in an ideal way.[1] The crowned head of Henry III., with noble well-modelled features and crisp wavy curls, resembles the conventional royal head on English coins of this and the following century, while the head of Eleanor is of remarkable, almost classic, beauty, and of great interest as showing the ideal type of the 13th century (see Fig. 6). In both

William Torell.

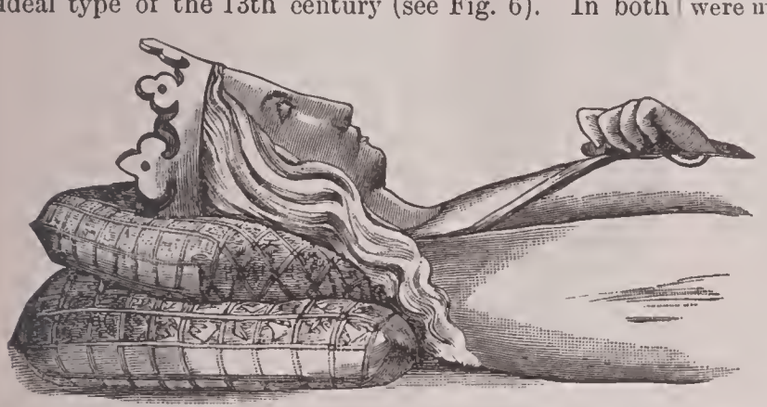


FIG. 6.—Head of the effigy of Queen Eleanor in Westminster Abbey; bronze gilt, by William Torell.

cases the drapery is well conceived in broad sculpturesque folds, graceful and yet simple in treatment. The casting of these figures, which was effected by the *cire perdue* process, is technically very perfect. The gold employed for the gilding was got from Lucca in the shape of the current florins of that time, which were famed for their purity. Torell was highly paid for this, as well as for two other bronze statues of Queen Eleanor, probably of the same design.

Much of the fine 13th-century sculpture was used to decorate the façades of churches. The grandest example is the west end of Wells cathedral, of about the middle of the century. It is covered with more than 600 figures in the round or in relief, arranged in tiers, and of varying sizes. The tympana of the doorways are filled with reliefs, and above them stand rows of colossal statues of kings and queens, bishops and knights, and saints both male and female, all treated very skilfully with nobly arranged drapery, and graceful heads designed in a thoroughly architectonic way, with due regard to the main lines of the building they are meant to decorate. In this respect the early mediæval sculptor inherited one of the great merits of the Greeks of the best period; his figures or reliefs form an essential part of the design of the building to which they are affixed, and are treated in a subordinate manner to their architectural surroundings—very different from the sculpture on modern buildings, which usually looks as if it had been stuck up as an afterthought, and frequently by its violent and incongruous lines is rather an impertinent excrescence than an ornament.[2] Peterborough, Lichfield, and Salisbury cathedrals have fine examples of the sculpture of the 13th century; in the chapter-house of the last the

Architectural sculpture.

spandrels of the wall-arcade are filled with sixty reliefs of subjects from Bible history, all treated with much grace and refinement. To the end of the same century belong the celebrated reliefs of angels in the spandrels of the choir arches at Lincoln, carved in a large massive way with great strength of decorative effect. Other fine reliefs of angels, executed about 1260, exist in the transepts of Westminster Abbey: being high from the ground, they are broadly treated without any high finish in the details.[3]

It may here be well to say a few words on the technical methods employed in the execution of mediæval sculpture, which in the main were very similar in England, France, and Germany. When bronze was used—in England as a rule only for the effigies of royal persons or the richer nobles—the metal was cast by the delicate *cire perdue* process, and the whole surface of the figure was then thickly gilded. At Limoges in France a large number of sepulchral effigies were produced, especially between 1300 and 1400, and exported to distant places. These were not cast, but were made of hammered (*repoussé*) plates of copper, nailed on a wooden core and richly decorated with champlevé enamels in various bright colors. Westminster Abbey possesses a fine example, executed about 1300, in the effigy of William of Valence (d. 1296).[4] The ground on which the figure lies, the shield, the border of the tunic, the pillow, and other parts are decorated with these enamels very minutely treated. The rest of the copper was gilt, and the helmet was surrounded with a coronet set with jewels, which are now missing. One royal effigy of later date at Westminster, that of Henry V. (d. 1422), was formed of beaten silver fixed to an oak core, with the exception of the head, which appears to have been cast. The whole of the silver disappeared in the time of Henry VIII., and nothing now remains but the rough wooden core; hence it is doubtful whether the silver was decorated with enamel or not; it was probably of English workmanship.

Technical methods and materials.

In most cases stone was used for all sorts of sculpture, being decorated in a very minute and elaborate way with gold, silver, and colors applied over the whole surface. In order to give additional richness to this coloring the surface of the stone, often even in the case of external sculpture, was covered with a thin skin of *gesso* or fine plaster mixed with size; on this, while still soft, and over the drapery and other accessories, very delicate and minute patterns were stamped with wooden dies (see MURAL DECORATION, Fig. 17), and upon this the gold and colors were applied; thus the gaudiness and monotony of flat smooth surfaces covered with gilding or bright colors were avoided.[5] In addition to this the borders of drapery and other parts of stone statues were frequently ornamented with crystals and false jewels, or, in a more laborious way, with holes and sinkings filled with polished metallic foil, on which very minute patterns were painted in transparent varnish colors; the whole was then protected from the air by small pieces of transparent glass, carefully shaped to the right size and fixed over the foil in the cavity cut in the stone. It is difficult now to realize the extreme splendor of this gilt, painted, and jewelled sculpture, as no perfect example exists, though in many cases traces remain of all these processes, and show that they were once very widely applied.[6] The architectural surroundings of the figures were treated in the same elaborate way. In the 14th century in England alabaster came into frequent use for monumental sculpture; it, too, was decorated with gold and color, though in some cases the whole surface does not appear to have been so treated. In his wide use of colored decoration, as in other respects, the mediæval sculptor came far nearer to the ancient Greek than do any modern artists. Even the use of inlay of colored glass was common at Athens during the 5th

[1] The effigy of King John in Worcester cathedral of about 1216 is an exception to this rule; though rudely executed, the head appears to be a portrait.

[2] The sculpture on the new Paris opera-house is a striking instance of this; and so, in a small way, are the statues in the new reredos of Westminster Abbey and Gloucester cathedral.

[3] On the whole, Westminster possesses the most completely representative collection of English mediæval sculpture in an unbroken succession from the 13th to the 16th century.

[4] Other effigies from Limoges were imported into England, but no other example now exists in the country.

[5] In the modern attempts to reproduce the mediæval polychromy these delicate surface reliefs have been omitted; hence the painful results of such coloring as that in Notre Dame and the Sainte Chapelle in Paris and many other "restored" churches, especially in France and Germany.

[6] On the tomb of Aymer de Valence (d. 1326) at Westminster a good deal of the stamped *gesso* and colored decoration is visible on close inspection. One of the cavities of the base retains a fragment of glass covering the painted foil, still brilliant and jewel-like in effect.

century B.C.,—as, for example, in the plait-band of some of the marble bases of the Erechtheum,—and five or six centuries earlier at Tiryns and Mycenæ.

Another material much used by mediæval sculptors was wood, though, from its perishable nature, comparatively few early examples survive;[1] the best specimen is the figure of George de Cantelupe (d. 1273) in Abergavenny church. This was decorated with *gesso* reliefs, gilt and colored in the same way as the stone. The tomb of Prince John of Eltham (d. 1334) at Westminster is a very fine example of the early use of alabaster, both for the recumbent effigy and also for a number of small figures of mourners all round the arcading of the tomb. These little figures, well preserved on the side which is protected by the screen, are of very great beauty and are executed with the most delicate minuteness; some of the heads are equal to the best contemporary work of the son and pupils of Niccola Pisano. The tomb once had a high stone canopy of open work—arches, canopies, and pinnacles,—a class of architectural sculpture of which many extremely rich examples exist, as, for instance, the tomb of Edward II. at Gloucester, the De Spencer tomb at Tewkesbury, and, of rather later style, the tomb of Lady Eleanor de Percy at Beverley. This last is remarkable for the great richness and beauty of its sculptured foliage, which is of the finest Decorated period and stands unrivalled by any Continental example.

Fourteenth century.

In England purely decorative carving in stone reached its highest point of excellence about the middle of the 14th century,—rather later, that is, than the best period of figure sculpture. WOOD-CARVING (*q.v.*), on the other hand, reached its artistic climax a full century later under the influence of the fully developed Perpendicular style.

Effigies.

The most important effigies of the 14th century are those in gilt bronze of Edward III. (d. 1377) and of Richard II. and his queen (made in 1395), all at Westminster. They are all portraits, but are decidedly inferior to the earlier work of William Torell. The effigies of Richard II. and Anne of Bohemia were the work of Nicolas Broker and Godfred Prest, goldsmith citizens of London. Another fine bronze effigy is at Canterbury on the tomb of the Black Prince (d. 1376); though well cast and with carefully modelled armor, it is treated in a somewhat dull and conventional way. The recumbent stone figure of Lady Arundel, with two angels at her head, in Chichester cathedral is remarkable for its calm peaceful pose and the beauty of the drapery. A very fine but more realistic work is the tomb figure of William of Wykeham (d. 1404) in the cathedral at Winchester. The cathedrals at Rochester, Lichfield, York, Lincoln, Exeter, and many other ecclesiastical buildings in England are rich in examples of 14th century sculpture, used occasionally with great profusion and richness of effect, but treated in strict subordination to the architectural background.

The finest piece of bronze sculpture of the 15th century is the effigy of Richard Beauchamp (d. 1439) in his family chapel at Warwick,—a noble portrait figure, richly decorated with engraved ornaments. The modelling and casting were done by William Austen of London, and the gilding and engraving by a Netherlands goldsmith who had settled in London, named Bartholomew Lambespring, assisted by several other skilful artists.

Sixteenth century.

At the beginning of the 16th century sculpture in England was entering upon a period of rapid decadence, and to some extent had lost its native individuality. The finest series of statues of this period are those of life-size high up on the walls of Henry VII's chapel at Westminster and others over the various minor altars. These ninety-five figures, which represent saints and doctors of the church, vary very much in merit; some show German influence, others that of Italy, while a third class are, as it were, "archaistic" imitations of older English sculpture[2] (see fig. 7). In some cases the heads and general pose are graceful, and the drapery dignified, but in the main they are coarse both in design and in workmanship compared with the better plastic art of the 13th and 14th centuries. This decadence of English sculpture caused Henry VII. to invite the Florentine Torrigiano (1472?–1522) to come to England to model and cast the bronze figures for his own magnificent tomb, which still exist in almost perfect preservation. The recumbent effigies of Henry VII. and his queen are fine specimens of Florentine art, well modelled with life-like portrait heads and of very fine technique in the casting. The altar-tomb on which the effigies lie is of black marble, decorated with large medallion reliefs in gilt bronze, each with a pair of saints—the patrons of Henry and Elizabeth of York—of very graceful design. The altar and its large baldacchino and reredos were the work of Torrigiano, but were destroyed during the 17th century. The reredos had a large relief of the Resurrection of Christ executed in painted terra-cotta, as were also a life-sized figure of the dead Christ under the altar-slab and four angels on the top angles of the baldacchino; a number of fragments of these figures have recently been found in the "pockets" of the nave vaulting, where they had been thrown after the destruction of the reredos. Torrigiano's bronze effigy of Margaret of Richmond in the south aisle of the same chapel is a very skilful but too realistic portrait, apparently taken from a cast of the dead face and hands. Another terra-cotta effigy in the Rolls chapel is also, from internal evidence, attributed to the same able Florentine. Another talented Florentine sculptor, Benedetto da Maiano, was invited to England by Cardinal Wolsey to make his tomb; of this only the marble sarcophagus now exists and has been used to hold the body of Admiral Nelson in St. Paul's Cathedral. Another member of the same family, named Giovanni, was the sculptor of the colossal terra-cotta heads of the Cæsars affixed to the walls of the older part of Hampton Court Palace.

FIG. 7.—Statue (life-size) of St. Thomas of Canterbury in Henry VII's chapel, Westminster, once richly colored.

Torrigiano.

During the troublous times of the Reformation sculpture, like the other arts, continued to decline. Of 17th-century monumental effigies that of Sir Francis Vere (d. 1607) in the north transept at Westminster is one of the best, though its design—a recumbent effigy overshadowed by a slab covered with armor, upborne by four kneeling figures of men-at-arms—is almost an exact copy of the tomb of Engelbert II. of Vianden-Nassau.[3] The finest bronze statues of this century are those of Charles Villiers, duke of Buckingham (d. 1634),[4] and his wife at the northeast of Henry VII's chapel. The effigy of the duke, in rich armor of the time of Charles I., lies with folded hands in the usual mediæval pose. The face is fine and well modelled and the casting very good. The allegorical figures at the foot are caricatures of the style of Michelangelo, and are quite devoid

Seventeenth century.

[1] The South Kensington Museum possesses a magnificent colossal wood figure of an angel not English, but Italian work of the 14th century. A large stone statue of about the same date, of French workmanship, in the same museum is a most valuable example of the use of stamped *gesso* and inlay of painted and glazed foil.

[2] There were once no less than 107 statues in the interior of this chapel, besides a large number on the exterior; see J. T. Micklethwaite in *Archæologia*, vol. xlvii. pl. x.–xii.

[3] See Arendt, *Château de Vianden*, Paris, 1884.

[4] [This date refers to the erection of the monument. George Villiers, the duke in question, died 1628; his wife, who erected the monument, died in 1643. See Gardiner, *England under Buckingham*, vol. ii. pp. 337 and 345.—AM. ED.]

of merit, but the kneeling statues of the duke's children are designed with grace and pathos. A large number of very handsome marble and alabaster tombs were erected throughout England during the 17th century. The effigies are poor and coarse, but the rich architectural ornaments are effective and often of beautiful materials, alabaster being mixed with various richly colored marbles in a very skilful way. Nicholas Stone (d. 1647), who worked under the supervision of Inigo Jones, appears to have been the chief English sculptor of his time. The De Vere and Villiers monuments are usually attributed to him.[1] One of the best public monuments of London is the bronze equestrian statue of Charles I. at Charing Cross, which was overthrown and hidden during the protectorate of Cromwell, but replaced at the Restoration in 1660. It is very nobly modelled and was produced under Italian influence by a French sculptor called Hubert Le Sœur (d. 1670). The standing bronze statue of James II. behind the Whitehall banqueting room, very poorly designed but well executed, was the work of Grinling Gibbons (1648–1721), a native of Holland, who was chiefly famed for his extraordinary skill in carving realistic fruit and flowers in pear and other white woods. Many rich and elaborate works of his exist at Trinity College, Oxford, at Cambridge, Chatsworth, and several other places in England. In the early part of the 18th century he worked for Sir Christopher Wren, and carved the elaborate friezes of the stalls and screens in St. Paul's Cathedral and in other London churches.

Eighteenth century.

During the 18th century English sculpture was mostly in the hands of Flemish and other foreign artists, of whom Roubiliac (1695–1762), Scheemakers (1691–1773), and Rysbrack (1694–1770) were the chief. The ridiculous custom of representing Englishmen of the 18th and 19th centuries in the toga or in the armor of an ancient Roman was fatal alike to artistic merit and eikonic truth; and when, as was often the case, the periwig of the Georgian period was added to the costume of a Roman general the effect is supremely ludicrous. Nollekens (1737–1823), a pupil of Scheemakers, though one of the most popular sculptors of the 18th century, was a man of very little real ability.[2] John Bacon (1740–1799) was in some respects an abler sculptor. John Flaxman[3] (1755–1826) was in England the chief initiator of the classical revival. For many years he worked for Josiah Wedgwood, the potter, and designed for him an immense number of vases covered with delicate cameo-like reliefs. Many of these, taken from antique gems and sculpture, are of great beauty, though hardly suited to the special necessities of fictile ware. Flaxman's large pieces of sculpture are of less merit, but some of his marble reliefs are designed with much spirit and classical purity. His illustrations in outline to the poems of Homer, Æschylus, and Dante, based on drawings on Greek vases, have been greatly admired, but they are unfortunately much injured by the use of a thicker outline on one side of the figures,—an unsuccessful attempt to give a suggestion of shadow. Flaxman's best pupil was Baily (1788–1867), chiefly celebrated for his nude marble figure of Eve.

Nineteenth century.

During the first half of the 19th century the prevalence of a cold lifeless pseudo-classic style was fatal to individual talent, and robbed the sculpture of England of all real vigor and spirit. Francis Chantrey (1782–1841) produced a great quantity of sculpture, especially sepulchral monuments, which were much admired in spite of their very limited merits. Allan Cunningham and Henry Weekes worked in some cases in conjunction with Chantrey, who was not wanting in technical skill, as is shown by his clever marble relief of two dead woodcocks. John Gibson (1790–1866) was perhaps after Flaxman the most successful of the English classic school, and produced some works of real merit. He strove eagerly to revive the polychromatic decoration of sculpture in imitation of the *circumlitio* of classical times. His Venus Victrix, shown at the exhibition in London of 1862 (a work of about six years earlier), was the first of his colored statues which attracted much attention. The prejudice, however, in favor of white marble was too strong, and both the popular verdict and that of other sculptors were strongly adverse to the "tinted venus." The fact was that Gibson's coloring was timidly applied: it was a sort of compromise between the two systems, and thus his sculpture lost the special qualities of a pure marble surface, without gaining the richly decorative effect of the polychromy either of the Greeks or of the mediæval period.[4] The other chief sculptors of the same very inartistic period were Banks, the elder Westmacott (who modelled the Achilles in Hyde Park), R. Wyatt (who cast the equestrian statue of Wellington, lately removed from London), Macdowell, Campbell, Marshall, and Bell.

During the last hundred years a large number of honorary statues have been set up in the Houses of

Fig. 8.—Bronze group by Alfred Stevens from the Wellington monument.

Parliament, Westminster Hall and Abbey, and in other public places in London. Most of these, though mod-

[1] The Villiers monument is evidently the work of two sculptors working in very opposite styles.

[2] An interesting account of many English sculptors of this time is given by Smith, *Nollekens and his Time*, London, 1829.

[3] See Flaxman, *Lectures at the Royal Academy*, London, 1829. His designs on a small scale are the best of his works, as, for example, the silver shield of Achilles covered with delicate and graceful reliefs.

[4] Gibson bequeathed his fortune and the models of his chief works to the Royal Academy, where the latter are now crowded in an upper room adjoining the Diploma Gallery. See Lady Eastlake, *Life of Gibson*, London, 1870.

elled as a rule with some scholastic accuracy, are quite dull and spiritless, and whilst free from the violently bad taste of such men as Bernini or Roubiliac they lack the force and vigorous originality which go far to redeem what is offensive in the sculpture of the 17th and 18th centuries. The modern public statues of London and elsewhere are as a rule tamely respectable and quite uninteresting. One brilliant exception is the Wellington monument in St. Paul's Cathedral, probably the finest plastic work of modern times. It was the work of Alfred Stevens (1817–1875), a sculptor of the highest talent, who lived and died almost unrecognized by the British public. The commission for this monument was given to Stevens after a public competition; and he agreed to carry it out for £20,000 [$97,200],—a quite inadequate sum, as it afterwards turned out. The greater part of his life Stevens devoted to this grand monument, constantly harassed and finally worn out by the

Stevens.

FIG. 9.—Bronze statue of an athlete and python, by Sir Frederick Leighton, P.R.A., in the South Kensington Museum.

interference of Government, want of money, and other difficulties. Though he completed the model, Stevens did not live to see the monument set up,—perhaps fortunately for him, as it has been placed in a small side chapel, where the effect of the whole is utterly destroyed, and its magnificent bronze groups hidden from view. The monument consists of a sarcophagus supporting a recumbent bronze effigy of the duke, over which is an arched marble canopy of late Renaissance style on delicately enriched shafts. At each end of the upper part of the canopy is a large bronze group, one representing Truth tearing the tongue out of the mouth of Falsehood, and the other Valor trampling Cowardice under foot (see Fig. 8). The two virtues are represented by very stately female figures modelled with wonderful beauty and vigor; the vices are two nude male figures treated in a very massive way. The whole is composed with great skill and largeness of style. The vigorous strength and sculpturesque nobility of these groups recall the style of Michelangelo, but they are far from being a mere imitation of him or any other master. Stevens's work throughout is original and has a very distinct character of its own. He also designed an equestrian statue of the duke to stand on the summit of the monument, but in its present cramped position there is not sufficient room for this.[1] Owing to the many years he spent on this one work Stevens did not produce much other sculpture. In Dorchester House, Park Lane, there is some of his work, especially a very noble mantelpiece supported by nude female caryatids in a crouching attitude, modelled with great largeness of style. He also designed mosaics to fill the spandrels under the dome of St. Paul's. The value of Stevens's work is all the more conspicuous from the feebleness of most of the sculpture of his contemporaries.

In the present generation there are some signs of the development of a better state of the plastic arts. A bronze statue of an Athlete struggling with a Python, by Sir Frederick Leighton, is a work of great merit, almost worthy to rank with the best examples of any period, and remarkable for a profound knowledge of human anatomy (see Fig. 9). Unfortunately the real *cire perdue* process for metal casting is seldom practiced in England, and this statue, as well as all other bronze works produced in England, suffers much from the disagreeable surface which results from the rude method of forming the moulds in sand. The colossal bronze lions in Trafalgar Square, designed by Sir Edwin Landseer, are a melancholy example of this.[2]

France.—During the 12th and 13th centuries the sculpture of France was, on the whole, the finest in the world, and was there used in the greatest profusion. The façades of large cathedrals were completely covered with sculptured reliefs and thick-set rows of statues in niches. The whole of the front was frequently one huge composition of statuary, with only sufficient purely architectural work to form a background and frame for the sculptured figures. A west end treated like that of Wells cathedral, which is almost unique in England, is not uncommon in France. Even the shafts of the doorways and other architectural accessories were covered with minute sculptured decoration,—the motives of which were often, especially during the 12th century, obviously derived from the metal-work of shrines and reliquaries studded with rows of jewels. The west façade of Poitiers cathedral is one of the richest examples. It has large surfaces covered with foliated carving and rows

Cathedral façades.

FIG. 10.—Statues on jamb of central west door of Chartres cathedral, 12th century; specially designed to suit vertical lines of columns behind; all once covered with painting and gold.

[1] The great merit of this work can now only be seen at the South Kensington Museum, which possesses Stevens's models and (on a small scale) his designs for the whole monument.

[2] On English sculpture, see Carter, *Specimens of Ancient Sculpture*, London, 1780; Aldis, *Sculpture of Worcester Cathedral*, London, 1874; Cockerell, *Iconography of Wells Cathedral*, Oxford, 1851; Stothard, *Monumental Effigies of Britain*, London, 1817; Westmacott, "Sculpture in Westminster Abbey," in *Old London* (pub. by Archæological Institute) 1866, p. 159 *sq.*; G. G. Scott, *Gleanings from Westminster*, London, 1862; Colling, *Art Foliage*, London, 1865, with good examples of mediæval decorative sculpture; W. B. Scott, *British School of Sculpture*, London, 1872; W. M. Rossetti, "British Sculpture," in *Fraser's Mag.*, April, 1861; many good illustrations of English mediæval sculpture are scattered throughout the volumes of *Archæologia*, the *Archæological Journal*, and other societies' "Proceedings."

of colossal statues, both seated and standing, reaching high up the front of the church. Of the same century (the 12th), but rather later in date, is the very noble sculpture on the three western doors of Chartres cathedral, with fine tympanum reliefs and colossal statues attached to the jamb-shafts of the opening (see Fig. 10). These latter figures, with their exaggerated height and the long straight folds of their drapery, are designed with great skill to assist and not to break the main upward lines of the doorways. The sculptors have willingly sacrificed the beauty and proportion of each separate statue for the sake of the architectonic effect of the whole façade. The heads, however, are full of nobility, beauty, and even grace, especially those that are softened by the addition of long wavy curls, which give relief to the general stiffness of the form. The sculptured doors of the north and south aisles of Bourges cathedral are fine examples of the end of the 12th century, and so were the west doors of Notre Dame in Paris till they were hopelessly injured by "restoration." The early sculpture at Bourges is specially interesting from the existence in many parts of its original colored decoration.

In France, as in England, the 13th century was the golden age of sculpture; while still keeping its early dignity and subordination to its architectural setting, the sculpture reached a very high degree of graceful finish and even sensuous beauty. Nothing could surpass the loveliness of the angel statues round the Parisian Sainte Chapelle, and even the earlier work on the facade of Laon cathedral is full of grace and delicacy. Amiens cathedral is especially rich in sculpture of this date,—as, for example, the noble and majestic statues of Christ and the Apostles at the west end; the sculpture on the south transept of about 1260–70, of more developed style, is remarkable for dignity combined with soft beauty.[1] The noble row of kings on the west end of Notre Dame at Paris has, like the earlier sculpture, been ruined by "restoration," which has robbed the statues of both their spirit and their vigor. To the latter years of the 13th century belong the magnificent series of statues and reliefs round the three great western doorways of the same church, among which are no less than thirty-four life-sized figures. On the whole, the single statues throughout this period are finer than the reliefs with many figures. Some of the statues of the Virgin and Child are of extraordinary beauty, in spite of their being often treated with a certain mannerism,—a curved pose of the body, which appears to have been copied from ivory statuettes in which the figure followed the curve of the elephant's tusk. The north transept at Rheims is no less rich: the central statue of Christ is a work of much grace and nobility of form; and some nude figures—for example, that of St. Sebastian—show a knowledge of the human form which was very unusual at that early date. Many of these Rheims statues, like those by Torell at Westminster, are quite equal to the best work of Niccola Pisano. The abbey church of St. Denis possesses the largest collection of French 13th-century monumental effigies, a large number of which, with supposed portraits of the early kings, were made during the rebuilding of the church in 1264; some of them appear to be "archaistic" copies of older contemporary statues.[2]

Thirteenth century.

In the 14th century French sculpture began to decline, though much beautiful plastic work was still produced. Some of the reliefs on the choir screen of Notre Dame at Paris belong to this period, as does also much fine sculpture on the transepts of Rouen cathedral and the west end of Lyons. At the end of this century an able sculptor from the Netherlands, called Claux Sluter, executed much fine work, especially at Dijon, under the patronage of Philip the Bold, for whose newly founded Carthusian monastery in 1399 he sculptured the great "Moses fountain" in the cloister, with six life-size statues of prophets in stone, painted and gilt in the usual mediæval fashion. Not long before his death in 1411 Sluter completed a very magnificent altar tomb for Philip the Bold, now in the museum at Dijon. It is of white marble, surrounded with arcading, which contains about forty small alabaster figures representing mourners of all classes, executed with much dramatic power. The recumbent portrait effigy of Philip in his ducal mantle with folded hands is a work of great power and delicacy of treatment.

Fourteenth century.

Fifteenth century.

The latter part of the 15th century in France was a time of transition from the mediæval style, which had gradually been deteriorating, to the more florid and realistic taste of the Renaissance. To this period belong a number of rich reliefs and statues on the choir-screen of Chartres cathedral. Those on the screen at Amiens are later still, and exhibit the rapid advance of the new style. Fig. 11 shows a statuette in the costume of the end of the 15th century, a characteristic example of the later mediæval method of treating saints in a realistic way.

FIG. 11.—Statuette of St. Mary Magdalene, late 15th century; French work, painted and gilt.

In the 16th century Italian influence, especially that of Benvenuto Cellini, was paramount in France. Jean Goujon (d. 1572) was the ablest French sculptor of the time; he combined great technical skill and refinement of modelling with the florid and affected style of the age. His nude figure of Diana reclining by a Stag, now in the Louvre, is a graceful and vigorous piece of work, superior in sculpturesque breadth to the somewhat similar bronze relief of a nymph by Cellini. Between 1540 and 1552 Goujon executed the fine monument at Rouen to Duke Louis de Brézé, and from 1555 to 1562 was mainly occupied in decorating the Louvre with sculpture. One of the most pleasing and graceful works of this period, thoroughly Italian in style, is the marble group of the Three Graces bearing on their heads an urn containing the heart of Henry II., executed in 1560 by Germain Pilon for Catherine de' Medici. The monument of Catherine and Henry II. at St. Denis, by the same sculptor, is an inferior and coarser work. Maître Ponce, probably the same as the Italian Ponce Jacquio, chiselled the noble monument of Albert of Carpi (1535), now in the Louvre. Another very fine portrait effigy of about 1570, a recumbent figure in full armor of the duke of Montmorency, preserved in the Louvre, is the work of Barthélemy Prieur. François Duquesnoy of Brussels (1594–1644), usually known as Il Fiamingo, was a clever sculptor, thoroughly French in style, though he mostly worked in Italy. His large statues are very poor, but his reliefs in ivory of boys and cupids are modelled with wonderfully soft realistic power and graceful fancy.

Sixteenth century.

No sculptor of any great merit appears to have arisen in France during the 17th century, though some, such as the two Coustous, had great technical skill. Pierre Puget (1622–1694) produced vigorous but coarse and tasteless work, such as his Milo devoured by a Lion. Other sculptors of the time were Simon Guillain, François and Michel Anguier, and Chas. Ant. Coyzevox (1640–1720), the last a sculptor of Lyons

Seventeenth century.

[1] See Ruskin, *The Bible of Amiens*, 1878.
[2] See Félibien, *Histoire de l'Abbaye de Saint-Denys*, Paris, 1706.

who produced some fine portrait busts. Fig. 12 shows a group by Clodion, whose real name was Claude Michel (*c.* 1745–1814). He worked largely in terra-cotta, and modelled with great spirit and invention,

FIG. 12.—Bacchanal group by Clodion in terra-cotta.

though in the sensual unsculpturesque manner prevalent in his time.

Eighteenth century.

In the following century Jean Antoine Houdon (1740–1828), a sculptor of most exceptional power, produced some works of the highest merit at a time when the plastic arts had reached a very low ebb. His standing colossal statue of S. Bruno in S. Maria degli Angeli at Rome is a most noble and stately piece of portraiture, full of commanding dignity and expression. His seated statue of Voltaire in the *foyer* of the Théâtre Français, though sculpturesque in treatment, is a most striking piece of lifelike realism. Houdon may in fact be regarded as the precursor of the modern school of French sculpture of the better sort. About the middle of the 18th century a revolution was brought about in the style of sculpture by the suddenly revived taste for antique art. A period of dull pseudo-classicism succeeded, which in most cases stifled all original talent and reduced the plastic arts to a lifeless form of archæology. Regarded even as imitations the works of this period are very unsuccessful; the sculptors got hold merely of the dry bones not of the spirit of classic art; and their study of the subject was so shallow and unintelligent that they mostly picked out what was third-rate for special admiration and ignored the glorious beauty of the best works of true Hellenic art. Thus in sculpture, as in painting and architecture, a study which might have been stimulating and useful in the highest degree became a serious hindrance to the development of modern art, and this not only in France but in the other countries of Europe; in France, however, the victories of Napoleon I. and his arrogant pretension to create a Gaulish empire on the model of that of ancient Rome caused the taste for pseudo-Roman art to be more pronounced than elsewhere. Among the first sculptors of this school were Antoine Chaudet (1763–1810) and Joseph Bosio (1769–1845). The latter was largely employed by Napoleon I.: he executed with some ability the bronze spiral reliefs round the column of the Place Vendôme and the statue of Napoleon on the top, and also modelled the classical quadriga on the triumphal arch in the Place du Carrousel. Jacques Pradier of Geneva (1790–1852) produced the Chained Prometheus of the Louvre and the Niobe group (1822). He possessed great technical ability, but aimed in most of his works at a soft sensuous beauty which is specially unsuited to sculpture. François Rude (1784–1855) worked in a style modelled on Græco-Roman sculpture treated with some freedom. His bronze Mercury in the Louvre is a clever work, but his statues of Marshal Ney in the Luxembourg Gardens and of General Cavaignac (1847) in the cemetery of Montmartre are conspicuously bad. The reliefs on the pediment of the Panthéon are by Pierre Jean David of Angers (1789–1856); his early works are of dull classic style, but later in life he became a realist and produced the most unsculpturesque results. A bronze statue of a Dancing Fisher-lad modelled by François Joseph Duvet, now in the Luxembourg collection, is an able work of the *genre* class. Other French sculptors who were highly esteemed in their time were Ottin, Courtet, Simart, Etex, and Carpeaux.[1] The last was an artist of great ability, and produced an immense number of clever but often very offensive statues. He obtained the highest renown in France, and was a typical example of the sad degradation of taste which prevailed under the rule of Napoleon III.

Modern era.

The existing schools of French sculpture are by far the most important in the world. Technical skill and intimate knowledge of the human form are possessed by several living sculptors of France to a degree which has probably never been surpassed, and some of them produce works of very great power, beauty, and originality. Many of their works have a similar fault to that of one class of French painters: they are much injured by an excess of sensual realism; in many cases nude statues are simply life-studies with all the faults and individual peculiarities of one model. Very unsculpturesque results are produced by treating a statue as a representation of a *naked* person,—one, that is, who is obviously in the habit of wearing clothes,—a very different thing from the purity of the ancient Greek treatment of the nude. Thus the great ability of many French sculptors is degraded to suit the taste of the voluptuary. An extravagance of attitude and an undignified arrangement of the figures do much to injure some of the large groups which are full of technical merit, and executed with marvellous anatomical knowledge. This is specially the case with much of the sculpture that is intended to decorate the buildings of Paris. The group of nude dancers by Carpeaux outside the new opera-house is a work of astonishing skill and prurient imagination, utterly unsculpturesque in style and especially unfitted to decorate the comparatively rigid lines of a building. The egotism of modern French sculptors will not allow them to accept the necessarily subordinate reserve which is so necessary for architectonic sculpture. Other French works, on the other hand, err in the direction of a sickly sentimentalism, or a petty realism, which is fatal to sculpturesque beauty. The real power and merits of the modern French school make these faults all the more conspicuous.[2]

Germany.—Till the 12th century sculpture in Germany continued to be under the lifeless influence of

[1] See Chesneau, *J. B. Carpeaux, sa vie*, etc., Paris, 1880.

[2] On French sculpture see Adams, *Recueil de Sculptures Gothiques*, Paris, 1858; Cerf, *Description de Notre Dame de Reims*, Rheims, 1861; Émeric-David, *L'Art Statuaire*, Paris, 1805, and *Histoire de la Sculpture Française*, Paris, 1853; Guilhebaud, *L'Architecture et la Sculpture du Vme au XVIme Siècle*, Paris, 1851–59; Ménard, *Sculpture Antique et Moderne*, Paris, 1867; Didron, *Annales Archéologiques*, various articles; Félibien, *Histoire de l'Art en France*, Paris, 1856; Mrs. Pattison, *Renaissance of Art in France*, London, 1879; Montfaucon, *Monumens de la Monarchie Française*, Paris, 1729–33; Jouy, *Sculptures Modernes du Louvre*, Paris, 1855; Reveil, *Œuvre de Jean Goujon* Paris, 1868; Viollet-le-Duc, *Dictionnaire de l'Architecture*, Paris, 1868, art. "Sculpture," vol. viii. pp. 97–279; Claretie, *Peintres et Sculpteurs Contemporains*, Paris, in progress.

Byzantium, tempered to some extent by an attempt to return to classical models. This is seen in the bronze pillar reliefs and other works produced by Bishop Bernward after his visit to Rome (see METAL-WORK, vol. xvi. p. 83). Hildesheim, Cologne, and the whole of the Rhine provinces were the most active seats of German sculpture, especially in metal, till the 12th century. Many remarkable pieces of bronze sculpture were produced at the end of that period, of which several specimens exist. The bronze font at Liége, with figure-subjects in relief of various baptismal scenes from the New Testament, by Lambert Patras of Dinant, cast about 1112, is a work of most wonderful beauty and perfection for its time; other fonts in Osnabrück and Hildesheim cathedrals are surrounded by spirited reliefs, fine in conception, but inferior in beauty to those on the Liége font. Fine bronze candelabra exist in the abbey church of Comburg and at Aix-la-Chapelle, the latter of about 1165. Merseburg cathedral has a strange realistic sepulchral figure of Rudolf of Swabia, executed about 1100; and at Magdeburg is a fine effigy, also in bronze, of Bishop Frederick (d. 1152), treated in a more graceful way. The last figure has a peculiarity which is not uncommon in the older bronze reliefs of Germany: the body is treated as a relief, while the head sticks out and is quite detached from the ground in a very awkward way. One of the finest plastic works of this century is the choir screen of Hildesheim cathedral, executed in hard stucco, once rich with gold and colors; on its lower part is a series of large reliefs of saints modelled with almost classical breadth and nobility, with drapery of especial excellence.

Bronze work, 12th century.

In the 13th century German sculpture had made considerable artistic progress, but it did not reach the high standard of France. One of the best examples is the "golden gate" of Freiberg cathedral, with sculptured figures on the jambs after the French fashion. The statues of the apostles on the nave pillars, and especially one of the Madonna at the east end (1260–70), possess great beauty and sculpturesque breadth. The statues both inside and outside Bamberg cathedral, of the middle of the 13th century, are nobly designed; and an equestrian statue of Conrad III. in the market-place at Bamberg, supported by a foliated corbel, exhibits startling vigor and originality, and is designed with wonderful largeness of effect, though small in scale. The statues of Henry the Lion and Queen Matilda at Brunswick, of about the same period, are of the highest beauty and dignity of expression. Strasburg cathedral, though sadly damaged by restoration, still possesses a large quantity of the finest sculpture of the 13th century. One tympanum relief of the Death of the Virgin, surrounded by the sorrowing Apostles is a work of the very highest beauty, worthy to rank with the best Italian sculpture of even a later period. Of its class nothing can surpass the purely decorative carving at Strasburg, with varied realistic foliage studied from nature, evidently with the keenest interest and enjoyment.

Thirteenth century.

Nuremberg is rich in good sculpture of the 14th century. The church of St. Sebald, the Frauenkirche, and the west façade of St. Lawrence are lavishly decorated with reliefs and statues, very rich in effect, but showing the germs of that mannerism which grew so strong in Germany during the 15th century. Of special beauty are the statuettes which adorn the "beautiful fountain," executed by Heinrich der Balier (1385–1396), and richly decorated with gold and color by the painter Rudolf.[1] A number of colossal figures were executed for Cologne cathedral between 1349 and 1361, but they are of no great merit. Augsburg produced several sculptors of ability about this time; the museum possesses some very noble wooden statues of this school, large in scale and dignified in treatment. On the exterior of the choir of the church of Marienburg castle is a very remarkable colossal figure of the Virgin of about 1340–50. Like the Hildesheim choir screen it is made of hard stucco and is decorated with glass mosaics. The equestrian bronze group of St. George and the Dragon in the market-place at Prague is excellent in workmanship and full of vigor, though much wanting dignity of style. Another fine work in bronze of about the same date is the effigy of Archbishop Conrad (d. 1261) in Cologne cathedral, executed many years after his death. The portrait appears truthful, and the whole figure is noble in style. The military effigies of this time in Germany as elsewhere were almost unavoidably stiff and lifeless from the necessity of representing them in plate armor; the ecclesiastical chasuble, in which priestly effigies nearly always appear, is also a thoroughly unsculpturesque form of drapery, both from its awkward shape and its absence of folds. Fig. 13 shows a characteristic example of these sepulchral effigies in slight relief. It is interesting to compare this with a somewhat similarly treated Florentine effigy, executed in marble at the beginning of the next century, but of very superior grace and delicacy of treatment (see Fig. 16 below).

Nuremberg schools.

Fourteenth century.

FIG. 13.—Sepulchral effigy in low relief of Günther of Schwarzburg (d. 1349), in Frankfort cathedral.

The 15th century was one of great activity and originality in the sculpture of Germany and produced many artists of very high ability. One speciality of the time was the production of an immense number of wooden altars and reredoses, painted and gilt in the most gorgeous way and covered with subject-reliefs and statues, the former often treated in a very pictorial style.[2] Wooden screens, stalls, tabernacles, and other church fittings of the greatest elaboration and clever workmanship were largely produced in Germany at the same time, and on

Fifteenth century.

[1] See Baader, *Beitrage zur Kunstgessh. Nürnbergs*; and Rettberg, *Nürnbergs Kunstleben*, Stuttgart, 1854.

[2] This class of large wooden retable was much imitated in Spain and Scandinavia. The metropolitan cathedral of Röskilde in Denmark possesses a very large and magnificent example covered with subject-reliefs enriched with gold and colors.

into the 16th century.[1] Jörg Syrlin, one of the most able of these sculptors in wood, executed the gorgeous choir-stalls in Ulm cathedral, richly decorated with statuettes and canopied work, between 1469 and 1474; his son and namesake sculptured the elaborate stalls in Blaubeuren church of 1493 and the great pulpit in Ulm cathedral. Veit Stoss of Nuremberg, though a man of bad character, was a most skilful sculptor in wood; he carved the high altar, the tabernacle, and the stalls of the Frauenkirche at Cracow, between 1472 and 1495. One of his finest works is a large piece of wooden panelling, nearly 6 feet square, carved in 1495, with central reliefs of the Doom and the Heavenly Host, framed by minute reliefs of scenes from Bible history. It is now in the Nuremberg town-hall. Wohlgemuth (1434–1519), the master of A. Dürer, was not only a painter but also a clever wood-carver, as was also Dürer himself (1471–1528), who executed a tabernacle for the Host with an exquisitely carved relief of Christ in Majesty between the Virgin and St. John, which still exists in the chapel of the monastery of Landau. Dürer also produced miniature reliefs cut in boxwood and hone-stone, of which the British Museum (print room) possesses one of the finest examples. Adam Krafft (*c.* 1455–1507) was another of this class of sculptors, but he worked also in stone; he produced the great Schreyer monument (1492), for St. Sebald's at Nuremberg,—a very skilful though mannered piece of sculpture, with very realistic figures in the costume of the time, carved in a way more suited to wood than stone, and too pictorial in effect. He also made the great tabernacle for the Host, 80 feet high, covered with statuettes, in Ulm cathedral, and the very spirited "Stations of the Cross" on the road to the Nuremberg cemetery.

Vischer family.

The Vischer family of Nuremberg for three generations were among the ablest sculptors in bronze during the 15th and 16th centuries. Hermann Vischer the elder worked mostly between 1450 and 1505, following the earlier mediæval traditions, but without the originality of his son. Among his existing works the chief are the bronze font at Wittenberg church (1457) and four episcopal effigies in relief, dated from 1475 to 1505, in Bamberg cathedral; this church also contains a fine series of bronze sepulchral monuments of various dates throughout the 15th and 16th centuries. Hermann's son Peter Vischer was the chief artist of the family; he was admitted a master in the sculptor's guild in 1489, and passed the greater part of his life at Nuremberg, where he died in 1529. In technique few bronze sculptors have ever equalled him; but his designs are marred by an excess of mannered realism and a too exuberant fancy. His chief early work was the tomb of Archbishop Ernest in Magdeburg cathedral (1495), surrounded with fine statuettes of the apostles under semi-Gothic canopies; it is purer in style than his later works, such as the magnificent shrine of St. Sebald at Nuremberg, a tall canopied bronze structure, crowded with reliefs and statuettes in the most lavish way. The general form of the shrine is Gothic,[2] but the details are those of the 16th-century Italian Renaissance treated with much freedom and originality. Some of the statuettes of saints attached to the slender columns of the canopy are modelled with much grace and even dignity of form. A small portrait figure of Peter himself, introduced at one end of the base, is a marvel of clever realism: he has represented himself as a stout, bearded man, wearing a large leathern apron and holding some of the tools of his craft. In this work, executed from 1508 to 1519, Peter was assisted by his sons, as is recorded in an inscription on the base—"Petter Vischer, Purger zu Nürmberg, machet das Werck mit seinen Sunnen, und ward folbracht im Jar MDXIX . . ." This gorgeous shrine is a remarkable example of the uncommercial spirit which animated the artists of that time, and of the evident delight which they took in their work. Dragons, grotesques, and little figures of boys, mixed with graceful scroll foliage, crowd every possible part of the canopy and its shafts, designed in the most free and unconventional way and executed with an utter disregard of the time and labor which were lavished on them. Other existing works by Peter Vischer and his sons are the Entombment relief, signed "P. V. 1522," in the Aegidienkirche, the monument of Cardinal Albert (1525) in the church at Aschaffenburg, and the fine tomb of Frederick the Wise (1527) in the castle chapel at Wittenberg.

Next to Nuremberg, the chief centres of bronze sculpture were Augsburg and Lübeck.

Innsbruck.

Innsbruck possesses one of the finest series of bronze statues of the first half of the 16th century, namely twenty-eight colossal figures round the tomb of the emperor Maximilian, which stands in the centre of the nave, representing a succession of heroes and ancestors of the emperor. The first of the statues which was completed cost 3000 florins [$1419], and so Maximilian invited the help of Peter Vischer, whose skill was greater and whose work less expensive than that of the local craftsmen. Most of them, however, were executed by sculptors of whom little is now known. They differ much in style, though all are of great technical merit. The finest (see Fig. 14)

FIG. 14.—Bronze statue of King Arthur at Innsbruck.

is an ideal statue of King Arthur of Britain, in plate armor of the 14th or early 15th century, very remarkable for the nobility of the face and pose. That of Theodoric is also a very fine conception. Some of the portrait figures of the Hapsburgs are almost ludicrously realistic, and are disfigured by the ugly German armor of the time.

From sixteenth century onwards.

In the latter part of the 16th century the influence of the later Italian Renaissance becomes very apparent, and many elaborate works in bronze were produced, especially at Augsburg, where Hubert Gerhard cast the fine "Augustus fountain" in 1593, and Adrian de Vries made the "Hercules fountain" in

[1] See Waagen, *Kunst und Künstler in Deutschland*, Leipsic, 1843–1845.

[2] This great work is really a canopied pedestal to support and enclose the shrine, not the shrine itself, which is a work of the 14th century, having the gabled form commonly used in the Middle Ages for metal reliquaries.

1599; both were influenced by the style of Giovanni di Bologna, as shown in his magnificent fountain at Bologna.

In the following century Andreas Schlüter of Hamburg (b. about 1662) produced smaller bronze reliefs and accessories of great merit. His colossal statue of Frederick III. on the bridge at Berlin is less successful. On the whole the 17th and 18th centuries in Germany, as in England, were periods of great decadence in the plastic art; little of merit was produced, except some portrait figures. In the second half of the 18th century there was a strong revival in sculpture, especially in the classic style; and since then Germany has produced an immense quantity of large and pretentious sculpture, mostly dull in design and second-rate in execution. Johann Gottfried of Berlin (1764–1850) finished a number of portrait figures, some of which are ably modelled, as did also Friedrich Tieck (1776–1851) and Christian Rauch (1777–1857); the works of Rauch are, however, mostly weak and sentimental in style, as, for example, his recumbent statue of Queen Louisa at Charlottenburg (1813) and his statues of Generals Bülow and Scharnhorst at Berlin. Friedrich Drake was the ablest of Rauch's pupils, but he lived at a very unhappy period for the sculptor's art. His chief work is perhaps the colossal bronze equestrian statue of King William of Prussia at Cologne. Albert Wolff was a sculptor of more ability; he executed the equestrian portrait of King Ernest Augustus at Hanover, and a Horseman attacked by a Lion now in the Berlin Museum. Augustus Kiss (1802–1865) produced the companion group to this, the celebrated Amazon and Panther in bronze, as well as the fine group of St. George and the Dragon in a courtyard of the royal palace at Berlin. The St. George and his horse are of bronze; the dragon is formed of gilt plates of hammered iron. Kiss worked only in metal. The bad taste of the first half of the present century is strongly shown by many of the works of Theodore Kalidè, whose Bacchanal sprawling on a Panther's Back is a marvel of awkwardness of pose and absence of any feeling for beauty. Rietschel was perhaps the best German sculptor of this period, and produced work superior to that of his contemporaries, such as Haagen, Wichmann, Fischer, and Hiedel. Some revival of a better style is shown in some sculpture, especially reliefs, by Hähnel, whose chief works are at Dresden. Schwanthaler (1802–1848), who was largely patronized by King Louis of Bavaria, studied at Rome and was at first a feeble imitator of antique classic art, but later in life he developed a more romantic and pseudo-mediæval style. By him are a large number of reliefs and statues in the Glyptothek at Munich and in the Walhalla, also the colossal but feeble bronze statue of Bavaria, in point of size one of the most ambitious works of modern times.[1] Since the beginning of the second half of the century the sculpture of Germany has made visible progress, and several living artists have produced works of merit and originality, far superior to the feeble imitations of classic art which for nearly a century destroyed all possible vigor and individuality in the plastic productions of most European countries.[2]

Spain.—In the early mediæval period the sculpture of northern Spain was much influenced by contemporary art in France. From the 12th to the 14th century many French architects and sculptors visited and worked in Spain. The cathedral of Santiago de Compostella possesses one of the grandest existing specimens in the world of late 12th-century architectonic sculpture; this, though the work of a native artist, Mastei Mateo,[3] is thoroughly French in style; as recorded by an inscription on the front, it was completed in 1188. The whole of the western portal with its three doorways is covered with statues and reliefs, all richly decorated with color, part of which still remains. Round the central arch are figures of the twenty-four elders, and in the tympanum a very noble relief of Christ in Majesty between Saints and Angels. As at Chartres, the jamb-shafts of the doorways are decorated with standing statues of saints,—St. James the elder, the patron of the church, being attached to the central pillar. These noble figures, though treated in a somewhat rigid manner, are thoroughly subordinate to the main lines of the building. Their heads, with pointed beards and a fixed mechanical smile, together with the stiff drapery arranged in long narrow folds, recall the Æginetan pediment sculpture of about 500 B.C. This appears strange at first sight, but the fact is that the works of the early Greek and the mediæval Spaniard were both produced at a somewhat similar stage in two far distant periods of artistic development. In both cases plastic art was freeing itself from the bonds of a hieratic archaism, and had reached one of the last steps in a development which in the one case culminated in the perfection of the Phidian age, and in the other led to the exquisitely beautiful yet simple and reserved art of the end of the 13th and early part of the 14th century,—the golden age of sculpture in France and England.

Twelfth to fourteenth century.

Fourteenth and fifteenth centuries.

In the 14th century the silversmiths of Spain produced many works of sculpture of great size and technical power. One of the finest, by a Valencian called Peter Bernec, is the great silver retable at Gerona cathedral. It is divided into three tiers of statuettes and reliefs, richly framed in canopied niches, all of silver, partly cast and partly hammered.

In the 15th century an infusion of German influence was mixed with that of France, as may be seen in the very rich sculptural decorations which adorn the main door of Salamanca cathedral, the façade of S. Juan at Valladolid, and the church and cloisters of S. Juan de los Reyes at Toledo, perhaps the most gorgeous examples of architectural sculpture in the world. The carved foliage of this period is of especial beauty and spirited execution; realistic forms of plant-growth are mingled with other more conventional foliage in the most masterly manner. The very noble bronze monument of Archdeacon Pèlayo (d. 1490) in Burgos cathedral was probably the work of Simon of Cologne, who was also architect of the Certosa at Miraflores, 2 miles from Burgos. The church of this monastery contains two of the most magnificently rich monuments in the world, especially the altar-tomb of King John II. and his queen by Gil de Siloe,—a perfect marvel of rich alabaster canopy-work and intricate under-cutting. The effigies have little merit.

Sixteenth century.

In the early part of the 16th century a strong Italian influence superseded that of France and Germany, partly owing to the presence in Spain of the Florentine Torrigiano and other Italian artists. The magnificent tomb of Ferdinand and Isabella in Granada cathedral is a fine specimen of Italian Renaissance sculpture, somewhat similar in general form to the tomb of Sixtus IV. by Ant. Pollaiuolo in St. Peter's, but half a century later in the style of its detail. It looks as if it had been executed by Torrigiano, but the design which he made for it is said to have been rejected. Some of the work of this period, though purely Italian in style, was produced by Spanish sculptors,—for example, the choir reliefs at Toledo cathedral, and those in the Collegio Mayor at Salamanca by Alonso Berruguete, who obtained his artistic training in Rome and Flor-

[1] In size, but not in merit, this enormous statue has recently been surpassed by the figure of Liberty made in Paris and erected as a beacon on an island in the harbor of New York City.

[2] On German sculpture see Foerster, *Denkmale deutscher Baukunst*, Leipsic, 1855; Wanderer, *Adam Kraft and his School*, Nuremberg, 1868; Rabe, *Das Grabmal des J. von Brandenburg . . . von P. Vischer*, Berlin, 1843; Reindel, *Vischer's Shrine of St. Sebaldus*, Nuremberg, 1855; Lübke, *Hist. of Sculpt.*, Eng. trans., London, 1872.

[3] A kneeling portrait-statue of Mateo is introduced at the back of the central pier. This figure is now much revered by the Spanish peasants, and the head is partly worn away with kisses.

ence. Esteban Jordan, Gregorio Hernandez, and other Spanish sculptors produced a large number of elaborate retables, carved in wood with subjects in relief and richly decorated in gold and colors. These sumptuous masses of polychromatic sculpture resemble the 15th century retables of Germany more than any Italian examples, and were a sort of survival of an older mediæval style. Alonso Cano (1600–1667), the painter, was remarkable for clever realistic sculpture, very highly colored and religious in style. Montañes, who died in 1614, was one of the ablest Spanish sculptors of his time. His finest works are the reliefs of the Madonna and Saints on an altar in the university church of Seville, and in the cathedral, in the chapel of St. Augustine, a very nobly designed Conception, modelled with great skill. In later times Spain has produced little or no sculpture of any merit.

Italy.—Till the great revival of plastic art took place in the middle of the 13th century, the sculpture of Italy was decidedly inferior to that of other more northern countries. Much of it was actually the work of northern sculptors,—as, for example, the very rude sculpture on the façade of S. Andrea at Pistoia, executed about 1186 by Gruamons and his brother Adeodatus.[1] Fig. 15 shows a relief by Antelami of Parma of the year 1178. Unlike the sculpture of the Pisani and later artists, these early figures are thoroughly secondary to the architecture they are designed to decorate; they are evidently the work of men who were architects first and sculptors in a secondary degree. After the 13th century the reverse was usually the case, and, as at the west end of Orvieto cathedral, the sculptured decorations are treated as being of primary importance,—not that the Italian sculptor-architect ever allowed his statues or reliefs to weaken or damage their architectural surroundings, as is unfortunately the case with much modern sculpture. In southern Italy, during the 13th century, there existed a school of sculpture resembling that of France, owing probably to the Norman occupation. The pulpit in the cathedral of Ravello, executed by Nicolaus di Bartolomeo di Foggia in 1272, is an important work of this class; it is enriched with very noble sculpture, especially a large female head crowned with a richly foliated coronet, and combining lifelike vigor with largeness of style in a very remarkable way. The bronze doors at Monreale, Pisa, and elsewhere, which are among the chief works of plastic art in Italy during the 12th century, are described in MONREALE and METAL-WORK. The history of Italian sculpture of the best period is given to a great extent in the separate articles on the PISANI (*q.v.*) and other Italian artists. During the 13th century Rome and the central provinces of Italy produced very few sculptors of ability, almost the only men of note being the Cosmati (see ROME, vol. xx. p. 856).

Thirteenth century.

During the 14th century Florence and the neighboring cities were the chief centres of Italian sculpture, and there numerous sculptors of successively increasing artistic power lived and worked, till in the 15th century Florence had become the æsthetic capital of the world, and reached a pitch of artistic wealth and perfection which Athens alone in its best days could have rivalled. The similarity between the plastic arts of Athens in the 5th or 4th century B.C., and of Florence in the 15th century, is not one of analogy only. Though free from any touch of copyism, there are many points in the works of such men as Donatello, Luca della Robbia, and Vittore Pisanello which strongly recall the sculpture of ancient Greece, and suggest that, if a sculptor of the later Phidian school had been surrounded by the same types of face and costume as those among which the Italians lived, he would have produced plastic works closely resembling those of the great Florentine masters. In the 14th century, in northern Italy, various schools of sculpture existed, especially at Verona and Venice, whose art differed widely from the contemporary art of Tuscany; but Milan and Pavia, on the other hand, possessed sculptors who followed closely the style of the Pisani. The chief examples of the latter class are the magnificent shrine of St. Augustine in the cathedral of Pavia, dated 1362, and the somewhat similar shrine of Peter the Martyr (1339), by Balduccio of Pisa, in the church of St.

Fourteenth century.

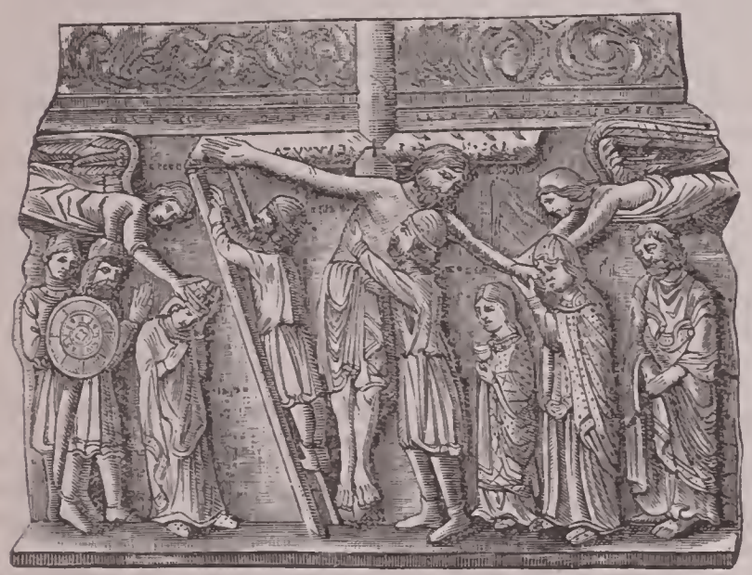


FIG. 15.—Relief by Benedetto Antelami for the pulpit of Parma cathedral in 1178; Byzantine style.

FIG. 16.—Florentine marble effigy in low relief in the church of the Certosa near Florence.

[1] The other finest examples of this early class of sculpture exist at Pisa, Parma, Modena, and Verona; in most of them the old Byzantine influence is very strong

Eustorgio at Milan, both of white marble, decorated in the most lavish way with statuettes and subject reliefs. Many other fine pieces of the Pisan school exist in Milan. The well-known tombs of the Scaliger family at Verona show a more native style of design, and in general form, though not in detail, suggest the influence of transalpine Gothic. In Venice the northern and almost French character of much of the early 15th-century sculpture is more strongly marked, especially in the noble figures in high relief which decorate the lower story and angles of the doge's palace;[1] these are mostly the work of a Venetian named Bartolomeo Bon. A magnificent marble tympanum relief by Bon has recently been added to the South Kensington Museum; it has a noble colossal figure of the Madonna, who shelters under her mantle a number of kneeling worshippers; the background is enriched with foliage and heads, forming a "Jesse tree," designed with great decorative skill. The cathedral of Como, built at the very end of the 15th century, is decorated with good sculpture of almost Gothic style, but on the whole rather dull and mechanical in detail, like much of the sculpture in the extreme north of Italy. A large quantity of rich sculpture was produced in Naples during the 14th century, but of no great merit either in design or in execution. The lofty monument of King Robert (1350), behind the high altar of S. Chiara, and other tombs in the same church are the most conspicuous works of this period. Very beautiful sepulchral effigies in low relief were produced in many parts of Italy, especially at Florence. The tomb of Lorenzo Acciaioli (see Fig. 16), in the Certosa near Florence, is a fine example of about the year 1400, which has absurdly been attributed to Donatello. Rome was very remarkable during the 14th century for its extraordinary poverty in the production of sculpture. The clumsy effigies at the northeast of S. Maria in Trastevere are striking examples of the degradation of the plastic art there about the year 1400; and it was not till nearly the middle of the century that the arrival of able Florentine sculptors, such as Filarete, Mino da Fiesole, and the Pollaiuoli, initiated a brilliant era of artistic activity, which, however, for about a century continued to depend on the presence of sculptors from Tuscany and other northern provinces. It was not, in fact, till the period of full decadence had begun that Rome itself produced any notable artists.

[1] See Ruskin, *Stones of Venice;* and Mothes, *Gesch. der Bauk. u. Bildh. Venedigs*, Leipsic, 1859.

FIG. 17.—Statue of St. George by Donatello, outside the church of Or San Michele at Florence.

For the great sculptors of Florence during the 14th and 15th centuries we refer the reader to the separate biographical notices on the subject. The Pisani and Arnolfo del Cambio were succeeded by Orcagna and others, who carried on and developed the great lessons these pioneers of the Renaissance had taught. Ghiberti, the sculptor of the world-famed baptistery gates; Donatello, the master of delicate relief and dignified realism (see Fig. 17); Luca della Robbia, with his classic purity of style and sweetness of expression, came next in order. Unsensual beauty elevated by religious spirit was attained in the highest degree by Mino da Fiesole, the two Rossellini, Benedetto, da Maiano, and other sculptors of Florence. Two of the noblest equestrian statues the world has probably ever seen are the Gattamelata statue at Padua by Donatello and the statue of Colleoni at Venice by Verrocchio and Leopardi (see Fig. 18). A third, which was probably of equal beauty, was modelled in clay by Leonardo da Vinci, but it no longer exists. Finally came Michelangelo, who raised the sculpture of the modern world to its highest pitch of magnificence, and at the same time sowed the seeds of its rapidly approaching decline; the head of his David (see Fig. 19) is a work of unrivalled force and dignity. His rivals and imitators, Baccio Bandinelli, Giacomo della Porta, Montelupo, Ammanati, Vincenzo de' Rossi, and others, copied and exaggerated his faults without possessing a touch of his gigantic genius. In other parts of Italy, such as Pavia, the traditions of the 15th century lasted longer, though gradually fading. The statuary and reliefs which make the Certosa near

Fifteenth century.

Florence.

FIG. 18.—Bronze colossal statue of Colleoni at Venice, modelled by Verrocchio and cast by Leopardi.

Pavia one of the most gorgeous buildings in the world are free from the influence of Michelangelo, which at Florence and Rome was overwhelming. Though much of the sculpture was begun in the second half of the 15th century, the greater part was not executed till much later. The magnificent tomb of the founder, Giovanni Galeazzo Visconti, was not completed till

FIG. 19.—Head of the colossal statue of David by Michelangelo at Florence.

about 1560, and is a gorgeous example of the style of the Renaissance grown weak from excess of richness and from loss of the simple purity of the art of the 15th century. Everywhere in this wonderful building the fault is the same; and the growing love of luxury and display, which was the curse of the time, is reflected in the plastic decorations of the whole church. The old religious spirit had died out and was succeeded by unbelief or by an affected revival of paganism. Monuments to ancient Romans, such as those to the two Plinys on the façade of Como cathedral, or "heroa" to unsaintly mortals, such as that erected at Rimini by Sigismondo Pandolfo in honor of Isotta,[1] grew up side by side with shrines and churches dedicated to the saints. We have seen how the youthful vigor of the Christian faith vivified for a time the dry bones of expiring classic art, and now the decay of this same belief brought with it the destruction of all that was most valuable in mediæval sculpture. Sculpture like the other arts became the bond-slave of the rich and ceased to be the natural expression of a whole people. Though for a long time in Italy great technical skill continued to exist, the vivifying spirit was dead, and at last a dull scholasticism or a riotous extravagance of design became the leading characteristics.

Sixteenth century.

The 16th century was one of transition to this state of degradation, but nevertheless produced many sculptors of great ability who were not wholly crushed by the declining taste of their time. John of Douay (1524–1608), usually known as Giovanni da Bologna, one of the ablest, lived and worked almost entirely in Italy. His bronze statue of Mercury flying upwards, in the Uffizi, one of his finest works, is full of life and movement. By him also is the Carrying off of a Sabine Woman in the Loggia de' Lanzi. His great fountain at Bologna, with two tiers of boys and mermaids, surmounted by a colossal statue of Neptune, a very noble work, is composed of architectural features combined with sculpture, and is remarkable for beauty of proportion. He also cast the fine bronze equestrian statue of Cosimo de' Medici at Florence and the very richly decorated west door of Pisa cathedral, the latter much injured by the over-crowding of its ornaments and the want of sculp-

[1] See Yriarte, *Rimini au XVme Siècle*, Paris, 1880; also the article RIMINI.

turesque dignity in the figures; it is a feeble copy of Ghiberti's noble production. One of Giovanni's best works, a group of two nude figures fighting, is now lost.

FIG. 20.—Group by Giovanni da Bologna, formerly in Brasenose College, Oxford; destroyed in 1881.

A fine copy in lead existed till recently in the front quadrangle of Brasenose College, Oxford, of which it was the chief ornament (see Fig. 20). In 1881 it was sold for old lead by the master and fellows of the college, and was immediately melted down by the plumber who bought it—a quite irreparable loss, as the only other existing copy is very inferior; the destruction was an utterly inexcusable act of vandalism. The sculpture on the western façade of the church at Loreto and the elaborate bronze gates of the Santa Casa are works of great technical merit by Girolamo Lombardo and his sons, about the middle of the 16th century. Benvenuto Cellini (1500–1569), though in the main a poor sculptor, produced one work of great beauty and dignity,—the colossal bronze Perseus at Florence (see Fig. 21). His large bust of Cosimo de' Medici in the Bargello is mean and petty in style. A number of very clever statues and groups in terra-cotta were modelled by Antonio Begarelli of Modena (d. 1565), and were enthusiastically admired by Michelangelo; the finest are a Pietà in S. Maria Pomposa and a large Descent from the Cross in S. Francesco, both at Modena. The colossal bronze seated statue of Julius III. at Perugia, cast in 1555 by Vincenzo Danti, is one of the best portrait-figures of the time.

FIG. 21.—Bronze statue of Perseus and Medusa by Cellini, in the Loggia de' Lanzi at Florence.

Seventeenth century.

The chief sculptor and architect of the 17th century was the Neapolitan Bernini (1598–1680), who, with the aid of a large school of assistants, produced an almost incredible quantity of sculpture of the most varying degrees of merit and hideousness. His chief early group, the Apollo and Daphne in the Borghese casino, is a work of wonderful technical skill and delicate high finish, combined with soft beauty and grace, though too pictorial in style. In later life Ber-

nini turned out work of brutal coarseness,[1] designed in a thoroughly unsculpturesque spirit. The churches of Rome, the colonnade of St. Peter's, and the bridge of S. Angelo are crowded with his clumsy colossal figures, half draped in wildly fluttering garments,—perfect models of what is worst in the plastic art. And yet his works received perhaps more praise than those of any other sculptor of any age, and after his death a scaffolding was erected outside the bridge of S. Angelo in order that people might walk round and admire his rows of feeble half-naked angels. For all that, Bernini was a man of undoubted talent, and in a better period of art would have been a sculptor of the first rank; many of his portrait-busts are works of great vigor and dignity, quite free from the mannered extravagance of his larger sculpture. Stefano Maderna (1571–1636) was the ablest of his contemporaries; his clever and much admired statue, the figure of the dead S. Cecilia under the high altar of her basilica, is chiefly remarkable for its deathlike pose and the realistic treatment of the drapery. Another clever sculptor was Alessandro Algardi of Bologna (1598?–1654).

Eighteenth century.

In the next century at Naples Queirolo, Corradini, and Sammartino produced a number of statues, now in the chapel of S. Maria de' Sangri, which are extraordinary examples of wasted labor and ignorance of the simplest canons of plastic art. These are marble statues enmeshed in nets or covered with thin veils, executed with almost deceptive realism, perhaps the lowest stage of tricky degradation into which the sculptor's art could possibly fall.[2] In the 18th century Italy

FIG. 22.—Colossal marble group of Theseus and a centaur, by Canova, at Vienna.

was naturally the headquarters of the classical revival, which spread thence throughout most of Europe. Canova (1757–1822), a Venetian by birth, who spent most of his life in Rome, was perhaps the leading spirit of this movement, and became the most popular sculptor of his time. His work is very unequal in merit, mostly dull and uninteresting in style, and is occasionally marred by a meretricious spirit very contrary to the true classic feeling. His group of the Three Graces, the Hebe, and the very popular Dancing-Girls, copies of which in plaster disfigure the stairs of countless modern hotels and other buildings on the Continent, are typical examples of Canova's worst work. Some of his sculpture is designed with far more of the purity of antique art; his finest work is the colossal group of Theseus slaying a Centaur at Vienna (see Fig. 22). Canova's attempts at Christian sculpture are singularly unsuccessful, as, for example, his pretentious monument to Pope Clement XIII. in St. Peter's at Rome, that to Titian at Venice, and Alfieri's tomb in the Florentine church of S. Croce. Fiesole has in this century produced one sculptor of great talent, named Bastianini. He worked in the style of the great 15th-century Florentine sculptors, and followed especially the methods of his distinguished fellow-townsman Mino da Fiesole. Many of Bastianini's works are hardly to be distinguished from genuine sculpture of the 15th century, and in some cases enormous prices have been paid for them under the supposition that they were mediæval productions. These frauds were, however, perpetrated without Bastianini's knowledge.

Scandinavia, etc.—By far the greatest sculptor of the classical revival was Bertel Thorwaldsen (1770–1844), an Icelander by race, whose boyhood was spent at Copenhagen, and who settled in Rome in 1797, when Canova's fame was at its highest point.[3] He produced an immense quantity of groups, single statues, and reliefs, chiefly Greek and Roman deities, many of which show more of the true spirit of antique art than has been attained by any other modern sculptor. His group of the Three Graces is for purity of form and sculpturesque simplicity far superior to that of the same subject by Canova. No sculptor's works have ever been exhibited as a whole in so perfect a manner as Thorwaldsen's; they are collected in a fine building which has been specially erected to contain them at Copenhagen; he is buried in the courtyard. The Swedish sculptors Tobias Sergell and Johann Byström belonged to the classic school; the latter followed in Thorwaldsen's footsteps. Another Swede named Fogelberg was famed chiefly for his sculptured subjects taken from Norse mythology. W. Bissen and Jerichau[a] of Denmark have produced some able works,—the former a fine equestrian statue of Frederick VII. at Copenhagen, and the latter a very spirited and widely known group of a Man attacked by a Panther.

Scandinavian sculptors.

Within recent years Russia, Poland, and other countries have produced many sculptors, most of whom belong to the modern German or French schools. Rome is still a favorite place of residence for the sculptors of all countries, but can hardly be said to possess a school of its own. The sculptors of America almost invariably study at one of the great European centres of plastic art, especially in Paris. Hiram Powers,[4] of Cincinnati, who produced one work of merit, a nude female figure, called the Greek Slave, exhibited in London in 1851, lived and worked in Florence. A number of living American sculptors now reside both there and in Rome.[5]

America, Russia, etc.

[1] The Ludovisi group of Pluto carrying off Proserpine is a striking example, and shows Bernini's deterioration of style in later life. It has nothing in common with the Cain and Abel or the Apollo and Daphne of his earlier years.

[2] In the present century an Italian sculptor named Monti won much popular repute by similar unworthy tricks; some veiled statues by him in the London Exhibition of 1851 were greatly admired.

[3] See Eug. Plon, *Vie de Thorwaldsen*, Paris, 1867.

[4] [For another estimate of Powers's work see vol. xix, p. 670; for American Sculpture *cf.* S. G. W. Benjamin, *Art in America*, chap. v. (N. Y., 1880), an article which first appeared in Harper's Magazine, April, 1879.—AM. ED.]

[5] On Italian and Spanish sculpture, see Vasari, *Trattato della Scultura*, Florence, 1568, vol. i., and his *Vite dei Pittori*, etc., ed Milanesi, Florence, 1880; Rumohr, *Italienische Forschungen*, Leipsic, 1827–31; Dohme, *Kunst und Künstler Italiens*, Leipsic, 1879; Perkins, *Tuscan Sculptors* London (1865), *Italian Sculptors* (1868), and *Hand-book of Italian Sculpture* (1883); Robinson, *Italian Sculpture*, London, 1862; Gruner, *Marmor-Bildwerke der Pisaner*, Leipsic, 1858; Ferreri, *L'Arco di S. Agostina*, Pavia. 1832; Symonds, *Renaissance in Italy*, London, 1877, vol. iii.; Crowe and Cavalcaselle, *Hist. of Painting in Italy*, London, 1866, vol. i.; Selvatico, *Arch. e Scultura in Venezia*, Venice, 1847; Ricci, *Storia dell' Arch. in Italia*, Modena, 1857-60; Street (Arundel Society), *Sepulchral Monuments of Italy*, 1878; Gozzini, *Monumenti Sepolcrali della Toscana*, Florence, 1819; De Montault, *La Sculpture Religeuse à Rome*, Rome, 1870—a French edition (with improved text) of Tosi and Becchio, *Monumenti Sacri di Roma*, Rome, 1842; Cavallucci and

[a] [Jens Adolf (1816–1883), a pupil of Thorwaldsen, director of the Copenhagen School of Beaux Arts. His wife, Elizabeth Baumann (1819–78), was a Polish genre painter. Their son, Harald A. N. (1852–78), was a painter.—AM. ED.]

Technical Methods of the Sculptor.

The production of bronze statues by the *cire perdue* process is described in the article Metal-work, vol. xvi. p. 78; this is now but little practiced out of Paris.

Cire perdue.

For the execution of a marble statue the sculptor first models a preliminary sketch on a small scale in clay or wax. He then, in the case of a life-sized or colossal statue, has a sort of iron skeleton set up, with stout bars for the arms and legs, fixed in the pose of the future figure. This is placed on a stand with a revolving top, so that the sculptor can easily turn the whole model round and thus work with the light on any side of it. Over this iron skeleton well-tempered modelling-clay is laid and is modelled into shape by the help of wood and bone tools; without the ironwork a soft clay figure, if more than a few inches high, would collapse with its own weight and squeeze the lower part out of shape. While the modelling is in progress it is necessary to keep the clay moist and plastic, by squirting water on to it with a sort of garden syringe capped with a finely perforated rose. When the sculptor is not at work the whole figure is kept wrapped up in damp cloths. A modern improvement is to mix the modelling-clay, not with water, but with stearin and glycerin; this, while keeping the clay soft and plastic, has the great advantage of not being wet, and so the sculptor avoids the chill and consequent risk of rheumatism which follow from a constant manipulation of wet clay. When the clay model is finished it is cast in plaster. A "picce-mould" [1] is formed by applying patches of wet plaster of Paris all over the clay statue in such a way that they can be removed piecemeal from the model, and then be fitted together again, forming a complete hollow mould. The inside is then rinsed out with plaster and water mixed to the consistency of cream till a skin of plaster is formed all over the inner surface of the mould, and thus a hollow cast is made of the whole figure. The "piece-mould" is then taken to pieces and the casting set free. If skilfully done by a good *formatore* or moulder the plaster cast is a perfect fac-simile of the original clay, very slightly disfigured by a series of lines showing the joints in the piece-mould, the sections of which cannot be made to fit together with absolute precision. Many sculptors have their clay model cast in plaster before the modelling is quite finished, as they prefer to put the finishing touches on the plaster cast,—good plaster being a very easy and pleasant substance to work on.

Clay model.

Plaster cast.

The next stage is to copy the plaster model in marble. The model is set on a large block called a "scale stone," while the marble for the future statue is set upon another similar block. The plaster model is then covered with a series of marks, placed on all the most salient parts of the body, and the front of each "scale stone" is covered with another series of points, exactly the same on both stones. An ingenious instrument called a pointing machine, which has arms ending in metal points or "needles" that move in ball-socket joints, is placed between the model and the marble block. Two of its arms are then applied to the model, one touching a point on the scale stone while the other touches a mark on the figure. The arms are fixed by screws in this position, and the machine is then revolved to the marble block, and set with its lower needle touching the corresponding point on the scale stone. The upper needle, which is arranged to slide back on its own axis, cannot reach the corresponding point on the statue because the marble block is in the way; a hole is then drilled into the block at the place and in the direction indicated by the needle, till the latter can slide forward so as to reach a point sunk in the marble block exactly corresponding to the point it touched on the plaster mould. This process is repeated both on the model and on the marble block till the latter is drilled with a number of holes, the bottoms of which correspond in position to the number of marks made on the surface of the model. A comparatively unskilled *scarpellino* or "chisel-man" then sets to work and cuts away the marble till he has reached the bottoms of all the holes, beyond which he must not cut. The statue is thus roughly blocked out, and a more skilled *scarpellino* begins to work. Partly by eye and partly with the constant help of the pointing machine, which is used to give any required measurements, the workman almost completes the marble statue, leaving only the finishing touches to be done by the sculptor.

Pointing the marble.

The scarpellino.

Among the ancient Greeks and Romans and in the mediæval period it was the custom to give the nude parts of a marble statue a considerable degree of polish, which really suggests the somewhat glossy surface of the human skin very much better than the dull loaf-sugar-like surface which is left on the marble by modern sculptors. This high polish still remains in parts of the pedimental figures from the Parthenon, where, at the back, they have been specially protected from the weather. The Hermes of the Vatican Belvidere is a remarkable instance of the preservation of this polish. Michelangelo carried the practice further still, and gave certain parts of some of his statues, such as the Moses, the highest possible polish in order to produce high lights just where he wanted them; the artistic legitimacy of this may perhaps be doubted, and in weaker hands it might degenerate into mere trickery. It is, however, much to be desired that modern sculptors should to some extent at least adopt the classical practice, and by a slight but uniform polish remove the disagreeable crystalline grain from all the nude parts of the marble.

Polish on marble.

A rougher method of obtaining fixed points to measure from was occasionally employed by Michelangelo and earlier sculptors. They immersed the model in a tank of water, the water being gradually allowed to run out, and thus by its sinking level it gave a series of contour lines on any required number of planes. In some cases Michelangelo appears to have cut his statue out of the marble without previously making a model—a most marvellous feat of skill.

In modelling bas-reliefs the modern sculptor usually applies the clay to a slab of slate on which the design is sketched; the slate forms the background of the figures, and thus keeps the relief absolutely true to one plane. This method is one of the causes of the dulness and want of spirit so conspicuous in most modern sculptured reliefs. In the best Greek examples there is no absolute fixed plane surface for the backgrounds. In one place, to gain an effective shadow, the Greek sculptor would cut below the average surface; in another he would leave the ground at a higher plane, exactly as happened to suit each portion of his design. Other differences from the modern mechanical rules can easily be seen by a careful examination of the Parthenon frieze and other Greek reliefs. Though the word "bas-relief" is now often applied to reliefs of all degrees of projection from the ground, it should, of course, only be used for those in which the projection is slight; "basso," "mezzo," and "alto rilievo" express three different degrees of salience. Very low relief is but little used by modern sculptors, mainly because it is much easier to obtain striking effects with the help of more projection. Donatello and other 15th-century Italian artists showed the most wonderful skill in their treatment of very low relief. One not altogether legitimate method of gaining effect was practiced by some mediæval sculptors: the relief itself was kept very low, but was "stilted" or projected from the ground, and then undercut all round the outline. A 15th-century tabernacle for the host in the Brera at Milan is a very beautiful example of this method, which as a rule is not pleasing in effect, since it looks rather as if the figures were cut out in cardboard and then stuck on.

Relief sculpture.

The practice of most modern sculptors is to do very little to the marble with their own hands; some, in fact, have never really learnt how to carve, and thus the finished statue is often very dull and lifeless in comparison with the clay model. Most of the great sculptors of the Middle Ages left little or nothing to be done by an assistant; Michelangelo especially did the whole of the carving with his own hands, and when beginning on a block of marble attacked it with such vigorous strokes of the hammer that large pieces of marble flew about in every direction. But skill as a carver, though very desirable, is not absolutely necessary for a sculptor. If he casts in bronze by the *cire perdue* process he may produce the most perfect plastic works without touching anything harder than the modelling-wax.

Sculptors' assistants.

Molinier, *Les Della Robbia*, Paris, 1884; Cicognara, *Monumenti di Venezia*, Venice, 1838–40; Burges and Didron, *Iconographie des Chapitaux du Palais Ducal à Venise*, Paris, 1857; Richter, "Sculpture of S. Mark's at Venice," *Macmillan's Mag.*, June, 1880; Temanza, *Vite degli Scultori Veneziani*, Venice, 1778; Dicdo and Zanotto, *Monumenti di Venezia*, Milan, 1839; Schulz, *Denkmäler der Kunst in Unter-Italien*, Dresden, 1860; Brinckmann, *Die Sculptur von B. Cellini*, Leipsic, 1867; Eug. Plon, *Cellini, sa Vie*, etc., Paris, 1882; Moses and Cicognara, *Works of Canova*, London, 1824–28; Piroli, Fontana, and others, a series of engraved *Plates of Canova's Works*, s. l. et a.; Giulliot, *Les Artistes en Espagne*, Paris, 1870; Cardercra y Solano, *Iconografia Española, Siglo XI.–XVII.*, Madrid, 1855–64; *Monumentos Arquitectonicos de España*, published by the Spanish Government, 1859, and still in progress.

[1] Moulds made in one or few pieces, from which the cast can only be extracted by destroying the mould, are called "spoil-moulds." A large number of casts can be made from a "piece-mould," but only one from a "spoil-mould."

The sculptor in marble, however, must be able to carve a hard substance if he is to be master of his art. Unhappily some modern sculptors not only leave all manipulation of the marble to their workmen, but they also employ men to do their modelling, the supposed sculptor supplying little or nothing but his name to the work. In some cases sculptors who are neither one nor the other, but who suffer under an excess of popularity, are induced to employ aid of this kind on account of their undertaking more work than any one man could possibly accomplish,—a state of things which is necessarily very hostile to the interests of true art. As a rule, however, the sculptor's *scarpellino*, though he may and often does attain the highest skill as a carver and can copy almost anything with wonderful fidelity, seldom develops into an original artist. The popular admiration for pieces of clever trickery in sculpture, such as the carving of the open meshes of a fisherman's net, or a chain with each link free and movable, would perhaps be diminished if it were known that such work as this is invariably done, not by the sculptor, but by the *scarpellino*. Unhappily at the present day there is, especially in England, little appreciation of what is valuable in plastic art; there is probably no other civilized country where the state does so little to give practical support to the advancement of monumental and decorative sculpture on a large scale—the most important branch of the art—which it is hardly in the power of private persons to further.

Literature.—On the general history of Christian sculpture, see Agincourt, *Histoire de l'Art*, Paris, 1823; Du Sommerard, *Les Arts au Moyen-Age*, Paris, 1839–46; Cicognara, *Storia della Scultura*, Prato, 1823–44; Westmacott, *Hand-book of Sculpture*, Edinburgh, 1864; Lübke, *History of Sculpture*, Eng. trans., London, 1872; Ruskin, *Aratra Pentelici* (six lectures on sculpture), London, 1872; Viardot, *Les Merveilles de la Sculpture*, Paris, 1869; Arsenne and Denis, *Manuel . . . du Sculpteur*, Paris, 1858; Clarac, *Musée de Sculpture*, Paris, 1826–53; Demmin, *Encyclopédie des Beaux-Arts plastiques*, Paris, 1872–75, vol. iii.; Didron, *Œuvres de Bronze du Moyen-Age*, Paris, 1859; Fortnum, *Bronzes in the South Kensington Museum*, 1877; Finochietti, *Scultura in Legno*, Florence, 1873; Anon., *Ornati del Coro di S. Pietro de' Cassinesi a Perugia*, Rome, 1845. See also the list of works given in the preceding pages, and those in the articles on individual sculptors and in that on METAL-WORK.

(J. H. M.)

SCURVY, or SCORBUTUS; a morbid condition of the blood, manifesting itself by marked impairment of the nutritive functions and by the occurrence of hæmorrhagic extravasations in the tissues of the body, and depending on the absence of certain essential ingredients in the food.

In former times this disease was extremely common among sailors, and gave rise to a frightful amount of mortality. It is now, however, of rare occurrence at sea, its cause being well understood and its prevention readily secured by simple measures. Scurvy has also frequently broken out among soldiers on campaign, in beleaguered cities, as well as among communities in times of scarcity, and in prisons, workhouses, and other public institutions. In all such instances it has been found to depend closely upon the character and amount of the food. It has been supposed that a too limited diet, either in amount or variety, might induce the disease; but an overwhelming weight of evidence goes to prove that the cause resides in the inadequate supply or the entire want of fresh vegetable matter. The manner in which this produces scurvy is not quite clear. Some high authorities have held that the insufficient supply of potash salts, in which vegetables are rich, is the procuring cause; but it has been found that the mere administration of these salts will neither prevent nor cure scurvy. Hence, while it is probable that this may be one of the factors concerned in the production of the disease, the want of other vegetable constituents, especially vegetable acids, is of still greater importance. Besides this essential defect, a diminution in the total amount of food, the large use of salted meat or fish, and all causes of a depressing kind, such as exposure, anxiety, bad hygiene, etc., will powerfully contribute to the development of the disease. See DIETETICS, vol. vii. p. 180.

The symptoms of scurvy come on gradually, and its onset is not marked by any special indications beyond a certain failure of strength, most manifest on making effort. Breathlessness and exhaustion are thus easily induced, and there exists a corresponding mental depression. The countenance acquires a sallow or dusky hue; the eyes are sunken; while pains in the muscles of the body and limbs are constantly present. The appetite and digestion may be unimpaired in the earlier stages and the tongue comparatively clean, but the gums are tender and the breath offensive almost from the first. These preliminary symptoms may continue for weeks, and in isolated cases may readily escape notice, but can scarcely fail to attract attention where they affect large numbers of men. In the further stages of the disease all these phenomena are aggravated in a high degree and the physical and mental prostration soon becomes extreme. The face looks haggard; the gums are livid, spongy, ulcerating, and bleeding; the teeth are loosened and drop out; and the breath is excessively fetid. Extravasations of blood now take place in the skin and other textures. These may be small like the petechial spots of purpura (see PURPURA), but are often of large amount and cause swellings of the muscles in which they occur, having the appearance of extensive bruises and tending to become hard and brawny. These extravasations are most common in the muscles of the lower extremities; but they may be formed anywhere, and may easily be produced by very slight pressure upon the skin or by injuries to it. In addition, there are bleedings from mucous membranes, such as those of the nose, eyes, and alimentary or respiratory tracts, while effusions of blood-stained fluid take place into the pleural, pericardial, or peritoneal cavities. Painful, extensive, and destructive ulcers are also apt to break out in the limbs. Peculiar disorders of vision have been noticed, particularly night-blindness (nyctalopia), but they are not invariably present, nor specially characteristic of the disease. The further progress of the malady is marked by profound exhaustion, with a tendency to syncope, and with various complications, such as diarrhœa and pulmonary or kidney troubles, any or all of which may bring about a fatal result. On the other hand, even in desperate cases, recovery may be hopefully anticipated when the appropriate remedy can be obtained. The composition of the blood is materially altered in scurvy, particularly as regards its albumen and its red corpuscles, which are diminished, while the fibrine is increased.

No disease is more amenable to treatment both as regards prevention and cure than scurvy, the single remedy of fresh vegetables or some equivalent securing both these ends. Potatoes, cabbages, onions, carrots, turnips, etc., and most fresh fruits, will be found of the greatest service for this purpose. Lime juice and lemon juice are recognized as equally efficacious, and even vinegar in the absence of these will be of some assistance. The regulated administration of lime juice in the British navy, which has been practiced since 1795, has had the effect of virtually extinguishing scurvy in the service, while similar regulations introduced by the British Board of Trade in 1865 have had a like beneficial result as regards the mercantile marine. It is only when these regulations have not been fully carried out, or when the supply of lime juice has become exhausted, that scurvy among sailors has been noticed in recent times. Besides the administration of lime or lemon juice and the use of fresh meat, milk, etc., which are valuable adjuvants, the local and constitutional conditions require the attention of the physician. The ulcers of the gums and limbs can be best treated by stimulating astringent applications; the hard swellings, which are apt to continue long, may be alleviated by fomentations and frictions; while the anæmia and debility are best overcome by the con-

tinued administration of iron tonics, aided by fresh air and other measures calculated to promote the general health.

SCUTAGE or ESCUAGE was one of the forms of knight-service (see KNIGHTHOOD, REAL ESTATE). It was practically a composition for personal service. When levied on a knight's fee it was called scutage uncertain, as its amount depended upon the present needs of the crown. Scutage certain was a socage tenure, and consisted in the payment of a sum fixed in amount and payable at regular times. Scutage appears to have been first imposed on the occasion of the Toulouse War in 1159. Magna Charta (§ 12) forbade the levy of scutage unless *per commune consilium regni*. It appears to have fallen into disuse in the reign of Edward II., and was finally done away with by the Act abolishing feudal tenures (12 Car. II. c. 24).

SCUTARI (Turkish, *Üsküdar*), anciently *Chrysopolis*, a seaport town of Turkey in Asia, on the eastern shore of the Bosphorus, opposite Constantinople (see plan, vol. vi. p. 272), of which it is regarded as a suburb. Climbing the slopes of several hills in the form of an amphitheatre, its houses generally painted in red, distinguished by a number of mosques adorned with numerous minarets, possessing some fine bazaars and public baths, and merging farther inland into burying-grounds, gardens, and villas, Scutari presents a very picturesque appearance, especially when viewed from the bridge of the Golden Horn or approached from the Straits of Constantinople right in front of its most prominent point. The inhabitants are largely engaged in the manufacture of saddlery and silk, muslin, and cotton stuffs; the town also contains granaries and is prized as a fruit-market, more particularly for grapes, lemons, and figs. The population is estimated at 60,000 (entirely Mohammedan, with the exception of some Jews). The streets, especially the main street leading from the pier to the barracks, are in general much wider than those of Constantinople. The city includes eight mosques. Behind the landing-place is the Büjük Jami (great mosque), surmounted by a cupola and a minaret, and presenting terraces mammillated by small leaden domes. The centre of the square is adorned by a fountain of simple architecture. The mosque of Selim III., farther in the interior of the city, is likewise flanked by two minarets and surmounted by a cupola. The most elegant mosque, however, is the Valide Jami, or mosque of the dowager sultana, surmounted by two minarets built in 1547 by the daughter of Solyman. Another prominent mosque, on the right of the main street and south of Büjük Jami, is Jeni Jami (new mosque). Other noticeable buildings are the barracks built by Selim III., forming a handsome and vast quadrangle surmounted by a tower at each angle, and whose corridors, etc., are calculated to have an aggregate length of four miles; an old large red building now used as a military hospital, and during the Crimean War as a hospital for the English sick and wounded; a seraglio of the sultans; a convent of howling dervishes, a simple wooden structure of two stories fronting a small cemetery. Other business quarters of the town deserving mention are Jeni Mahalle (new quarter) and the Dohanjilar Mejdani (tobacco merchants' square). The most characteristic feature, however, of Scutari is its immense cemetery, the largest and most beautiful of all the cemeteries in and around Constantinople, extending over more than three miles of undulating plain behind the town.[1] In the centre of the ground rises the magnificent dome, supported by six marble pillars, which Sultan Mohammed erected in memory of his favorite horse. Close to the barracks, on the Bosphorus, the scene of Miss Nightingale's labors, 8000 English dead are overshadowed by a large granite obelisk. Immediately behind the town is the mountain of Bulgurlu, clad in evergreen savins and red beeches, one of the plateaus of which is a favorite holiday resort. Its summit commands a very extensive view. In the plain of Haidar Pasha close by, between the cemetery and Kadikoi (judge's village, anciently Chalcedon), the English army lay encamped during the Crimean War. In front of Scutari, on a low-lying rock almost level with the water and about a cable's length from the shore, rises a white tower 90 feet high, now used as a lighthouse, called "Leander's Tower," and by the Turks Kiz-kulessi, or the "Maiden's Tower." The first printing press in Turkey was set up at Scutari in 1723.

Its ancient name Chrysopolis most probably has reference to the fact that there the Persian tribute was collected and reposited, as at a later date the Athenians levied there too a tenth on the ships passing from the Euxine. Its more modern name of Usküdai, signifying a courier who conveys the royal orders from station to station, commemorates the fact that formerly Scutari was the post station for Asiatic couriers, as it is still the great rendezvous and point of departure of caravans arriving from and destined for Syria, Persia, and other parts of Asia, and the spot whence all travellers and pilgrims from Constantinople to the East begin their journeys.

SCUTARI (Turkish, *Scodra*;[2] Slavic, *Skadar*), the capital of North Albania, at the south end of the lake of the same name, with a population of 24,500 in 1880 (mostly Mohammedans). There is only one street with any pretensions to regularity. The straggling town is built on the low flat promontory formed by the Bojana, which takes off the waters of the lake to the Adriatic, and the river which flows into the lake after crossing the plain between Scutari and the mountains of Biskassi. In winter the town is often flooded by the Bojana. The mosques and minarets are insignificant; the handsomest of the churches is the Catholic church at the northeast end. In the background is an old Venetian fortress perched on a lofty rock. The town is favorably situated for commerce, being connected by the Bojana with the Adriatic, whence its boats carry the products which descend by the Drina to the mountaineers in exchange for their wool, grain, and dyeing and building woods. There are some manufactures of arms and of cotton stuffs. In 1884, 330 ships of 123,923 tons entered the port, and 325 ships of 123,713 tons cleared.

Livy relates that *Scodra* was chosen as capital by the Illyrian king Gentius, who was here besieged in 168 B.C., and carried captive to Rome. In the 7th century Scutari fell into the hands of the Servians, from whom it was wrested by the Venetians, and finally, in 1479, the Turks acquired it by treaty. Early in 1885 a beginning was made with the construction of a highway from the roadstead of San Giovanni de' Medici to Scutari.

SCYLAX of Caryanda in Caria was employed by Darius I. to explore the course of the Indus. He started from Afghanistan, and is said by Herodotus (iv. 44) to have reached the sea and then sailed to the Gulf of Suez (comp. PERSIA, vol. xviii. p. 581). Scylax wrote an account of his explorations, which is referred to by Aristotle and other ancient writers, but must have been lost pretty early, and probably also a history of the Carian hero Heraclides, who distinguished himself in the revolt against Darius.[3] But Suidas, who mentions the second work, confounds the

[1] The cemetery is interseeted with numerous paved alleys, and the tombstones are inscribed with verses of the Koran gilded on a dark blue ground and bearing each simply the name of the deceased. The monuments of the men are distinguished each by a turban, those of the women each by a lotus leaf. The nature of the carved turban indicates the rank of the deceased and the fashion of the time to which it refers, so that the tombstones present the sculptured history of the Mohammedan head-dress from the date of the Turkish conquest. Each corpse is allowed a separate grave, never desecrated either by axe or spade. This cemetery lying in Asiatic ground, is on that account the more desired as a burial-place by pious Mohammedans, and holds half the generations of Stamboul (probably some 3,000,000 persons).

[2] [This is the classical form of the name; the Turkish is Skodar or Oskodar.—AM. ED.]

[3] See A. v. Gutschmidt, in *Rhein. Mus.*, 1854, p. 141 *sq.*

old Scylax with a much later author, who wrote a refutation of the history of Polybius, and is presumably identical with Scylax of Halicarnassus, a statesman and astrologer, the friend of Panætius spoken of by Cicero (*De Div.*, ii. 42). Neither of these, however, can be the author of the *Periplus* of the Mediterranean, which has come down to us under the name of Scylax of Caryanda in several MSS., of which the archetype is at Paris. This work is little more than a sailor's handbook of places and distances all round the coast of the Mediterranean and its branches, and then along the outer Libyan coast as far as the Carthaginians traded; but various notices of towns and the states to which they belong enable us to fix the date with considerable precision. Niebuhr gave the date 352–348 B.C., others bring it down a year or two later, and C. Müller as late as 338–335, which is only possible if the writer's information was sometimes rather stale. See the discussion in Müller's edition (*Geog. Gr. Min.*, vol. i. Paris, 1855), and against him Unger, in *Philologus*, 1874, p. 29 *sq.*, who concludes for the year 347. The latest edition is that of Fabricius (Leipsic, 1878).

SCYLLA AND CHARYBDIS. In Homer (*Od.*, xii. 73 *sq.*) Scylla is a dreadful sea-monster, daughter of Cratæis, with six heads, twelve feet, and a voice like the yelp of a puppy. She dwelt in a sea-cave looking to the west, far up the face of a huge cliff. Out of her cave she stuck her heads, fishing for marine creatures and snatching the seamen out of passing ships. Within a bowshot of this cliff was another lower cliff with a great fig-tree growing on it. Under this second rock dwelt Charybdis, who thrice a day sucked in and thrice spouted out the sea-water. Between these rocks Ulysses sailed, and Scylla snatched six men out of his ship. In later classical times Scylla and Charybdis were localized in the Strait of Messina, —Scylla on the Italian, Charybdis on the Sicilian side. In Ovid (*Metam.*, xiv. 1–74) Scylla appears as a beautiful maiden beloved by the sea-god Glaucus and changed by the jealous Circe into a sea-monster; afterwards she was transformed into a rock shunned by seamen. There are various other versions of her story. According to a late legend (Servius on Virgil, *Æn.*, iii. 420), Charybdis was a voracious woman who robbed Hercules of his cattle and was therefore cast into the sea by Jupiter, where she retained her old voracious nature. The well-known line

"Incidis in Scyllam cupiens vitare Charybdim"

occurs in the *Alexandreis* of Philip Gualtier (a poet of the 13th century), which was printed at Lyons in 1558.

Another Scylla, confounded by Virgil (*Ec.*, vi. 74 *sq.*) with the sea-monster, was a daughter of Nisus, king of Megara. When Megara was besieged by Minos, Scylla, who was in love with him, cut off her father's purple lock, on which his life depended. But Minos drowned the undutiful daughter (Æschylus, *Choeph.*, 613 *sq.*; Apollodorus, iii. 15, 8).

SCYMNUS of Chios, a Greek geographer of uncertain date, known to us only by a few references in later writers, but perhaps identical with the Scymnus Chius of a Delphic inscription of the beginning of the 2d century B.C.,[1] was commonly taken to be the author of an imperfect anonymous *Paraphrasis* in verse describing the northern coast of the Mediterranean, which in the first edition (Augsburg, 1600) was ascribed to Marcianus of Heraclea. Meineke showed conclusively that this piece cannot be by Scymnus. It is dedicated to a King Nicomedes, probably Nicomedes III. of Bithynia, and so would date from the beginning of the 1st century B.C. See Müller, *Geog. Gr. Min.*, vol. i., where the poem is edited with sufficient prolegomena.

SCYROS, a small rocky barren island in the Ægean Sea, off the coast of Thessaly, containing a town of the same name. In 469 B.C. it was conquered by the Athenians under Cimon, and it was probably about this time that the legends arose which connect it with the Attic hero Theseus, who was said to have been treacherously slain and buried there. A mythic claim was thus formed to justify the Athenian attack, and Cimon brought back the bones of Theseus to Athens in triumph. The inhabitants of Scyros before the Athenian conquest were Dolopes (Thuc., i. 98); but other accounts speak of Pelasgians or Carians as the earliest inhabitants. There was a sanctuary of Achilles on the island, and numerous traditions connect Scyros with that hero. He was concealed, disguised as a woman, in the palace of Lycomedes, king of the island, when his mother wished to keep him back from the Trojan War; he was discovered there by Odysseus, and gladly accompanied him to Troy. An entirely different cycle of legends relate the conquest of Scyros by Achilles. The actual worship on the island of a hero or god named Achilles, and the probable kinship of its inhabitants with a Thessalian people, whose hero Achilles also was, form the historical foundation of the legends. Scyros was left, along with Lemnos and Imbros, to the Athenians by the peace of Antalcidas (387 B.C.). It was taken by Philip, and continued under Macedonian rule till 196, when the Romans restored it to Athens, in whose possession it remained throughout the Roman period. It was sacked by an army of Goths, Heruli, and Peucini, in 269 A.D. The ancient city was situated on a lofty rocky peak, on the northeastern coast, where the modern town of St. George now stands. A temple of Athena, the chief goddess of Scyros, was on the shore near the town. The island has a small stream, called in ancient times Cephissus. Strabo mentions as its sole products its excellent goats and a species of variegated marble—the latter in great favor at Rome.

SCYTHE AND SICKLE. Till the invention of the reaping machine, which came into practical use only about the middle of the 19th century, scythes and sickles were the sole reaping implements. The scythe is worked with two hands with a swinging motion, while the sickle or reaping hook is held in one hand and the reaper bends and cuts the crop with a shearing or hitting motion. Of the two the sickle is the more ancient, and indeed there is some reason to conclude that its use is coeval with the cultivation of grain crops. Among the remains of the later Stone period in Great Britain and on the European continent curved flint knives have occasionally been found the form of which has led to the suggestion that they were used as sickles. Sickles of bronze occur quite commonly among remains of the early inhabitants of Europe. Some of these are deeply curved hooks, flat on the underside, and with a strengthening ridge or back on the upper surface, while others are small curved knives, in form like the ordinary hedge-bill. Among the ancient Egyptians toothed or serrated sickles of both bronze and iron were used. Ancient Roman drawings show that both the scythe and the sickle were known to that people and Pliny makes the distinction plain.[2] Although both implements have lost much of their importance since the general introduction of mowing and reaping machinery, they are still used very extensively, especially in those countries where small agricultural holdings prevail. The principal modern forms are the toothed hook, the scythe hook, the Hainault scythe, and the common scythe. The toothed hook, which was in general use till towards the middle of the 19th century, consists of a narrow-bladed curved hook, having on its cutting edge a series of fine close-set serratures cut like file-teeth, with their edges inclined

[1] See Rhode, in *Rhein. Mus.*, 1879, p. 153 *sq.*

[2] "Of the sickle there are two varieties, the Italian, which is the shorter and can be handled among brushwood, and the two-handed Gallic sickle, which makes quicker work of it when employed on their [the Gauls'] extensive domains; for there they cut their grass only in the middle, and pass over the shorter blades. The Italian mowers cut with the right hand only" (*H. N.*, xviii. 67).

towards the heft or handle. Such sickles were formerly made of iron edged with steel; but in recent times they came to be made of cast steel entirely. Towards the middle of the century the toothed hook was gradually supplanted by the scythe hook or smooth-edged sickle, a somewhat heavier and broader-bladed implement, having an ordinary knife edge. Both these implements were intended for "shearing" handful by handful, the crop being held in the left hand and cut with the tool held in the right. A heavy smooth-edged sickle is used for "bagging" or "clouting,"—an operation in which the hook is struck against the straw, the left hand being used to gather and carry along the cut swath. The Hainault scythe is an implement intermediate between the scythe and the sickle, being worked with one hand, and the motion is entirely a swinging or bagging one. The implement consists of a short scythe blade mounted on a vertical handle, and in using it the reaper collects the grain with a crook, which holds the straw together till it receives the cutting stroke of the instrument. The Hainault scythe is extensively used in Belgium. The common hay scythe consists of a slightly curved broad blade varying in length from 28 to 46 inches, mounted on a bent, or sometimes straight, wooden sned or snathe, to which two handles are attached at such distances as enable the workman, with an easy stoop, to swing the scythe blade along the ground, the cutting edge being slightly elevated to keep it clear of the inequalities of the surface. The grain-reaping scythe is similar, but provided with a cradle or short gathering rake attached to the heel and following the direction of the blade for about 12 inches. The object of this attachment is to gather the stalks as they are cut and lay them in regular swaths against the line of still-standing corn. The reaping scythe, instead of a long sned, has frequently two helves, the right hand branching from the left or main helve and the two handles placed about 2 feet apart. The best scythe blades are made from rolled sheets of steel, riveted to a back frame of iron, which gives strength and rigidity to the blade. On the Continent it is still common to mould and hammer the whole blade out of a single piece of steel, but such scythes are difficult to keep keen of edge. There is a great demand for scythes in Russia, chiefly supplied from the German empire and Austria. The principal manufacturing centre of scythes and sickles in the United Kingdom is Sheffield.

SCYTHIA, SCYTHIANS. When the Greeks began to settle the north coast of the Black Sea, about the middle of the 7th century B.C., they found the south Russian steppe in the hands of a nomadic race, whom they called Scythians. An exacter form of the name was Scoloti. The inhabitants of the steppe must always have been nomads; but the life of all nomads is so much alike that we cannot tell whether the Scythians are the race alluded to in *Il.*, xiii. 5 *sq.*

The name is first found in Hesiod (Strabo, vii. p. 300) about 800 B.C., and about 689 (Herod., iv. 15) Aristeas of Proconnesus knew a good deal about them in connection with the ancient trade route leading from their country to Central Asia. From the passage of the Tanais (Don) for fifteen marches northeast through the steppe the country belonged to the nomad Sarmatians, whose speech and way of life resembled those of the Scythians. Then came the wooded region of the Budini, who spread far inland and were probably a Finnish race of hunters with filthy habits.[1] In this region lay Gelonus, the Greek emporium of the fur trade, round which lived the half-Grecian Geloni, probably on the Volga and hardly farther south than Simbirsk. Seven more marches in the same line ran through desert, and then in the country of the Thyssagetæ the road turned southeast, and led first through the country of the Iyrcæ, whose way of hunting (Herod., iv. 22) indicates that they dwelt between the steppe and the forest, but belonged more to the former; the road perhaps crossed the river Ural near Orenburg, and ascending its tributary the Ilek crossed the Mugojar Mountains. Beyond this in the steppe as far as the Sir-Darya and Amu-Darya the traveller was again among Scythians, who were regarded as a branch of the European Scythians. Next came a long tract of rocky soil, till the bald-headed Argippæi were reached, a race esteemed holy and seemingly Mongolian, who dwelt on the slopes of impassable mountains, probably the Belur-tagh, and served as intermediaries in trade with the remoter peoples of Central Asia. The description of the fruit on which they subsisted (Herod., iv. 23) suits the *Elæagnus hortensis*, indigenous on the upper Zerafshan. Many notices of ancient writers about Scythia (*e.g.*, as to the eight months winter and the rainy summer) suit only the lands on the first part of this trade road; moreover, the Greeks soon began to extend the name of Scythians to all the nations beyond in a northerly or northeasterly direction. But such inaccuracy is not common till the fall of the Scythian race, when their name became a favorite designation of more remote and less known nations. Our best and chief informants, Herodotus and Hippocrates, clearly distinguish the Scolots or true Scythians from all their neighbors, and on them alone this article is based.

The boundaries of Scythia are, broadly speaking, those of the steppe, which had as wide a range in antiquity as at the present day, cultivable land having always been confined to the immediate neighborhood of the rivers. But to the west the Scythians went beyond the steppe, and held Great Wallachia between the Aluta and the Danube (Atlas and Ister). Here their northern neighbors were the Agathyrsians of Transylvania, who were perhaps Aryans, though in manners they resembled the Thracians. The Dniester was Scythian as far up the stream as the Greeks knew it. On the Bug were found first the mixed Græco-Scythian Callipidæ and Alazones as far as Exampæus (an eastern feeder of the Bug), then agricultural Scythians (Ἀροτῆρες), who grew corn for export, and therefore were not confined to the steppe. This points to southeast Podolia as their dwelling-place. Beyond them on the upper Bug and above the Dniester were the Neuri, who passed for were-wolves, a superstition still current in Volhynia and about Kieff. On the left bank of the Dnieper the "forest-land" (Ὑλαία) reached as far as the modern Bereslaff; then came the Scythians of the Dnieper (the Borysthenians), who tilled the soil (of course only close to the river), and extended inland to the Panticapes (Inguletz?)[2] and up the stream to the district of Gerrhi (near Alexandrovsk). Herodotus does not know the falls of the Dnieper; beyond Gerrhi he places a desert which seems to occupy the rest of the steppe. Still farther north were the wandering Androphagi (Cannibals), presumably hunters and of Mordvinian race.[3] The nomadic Scythians proper succeeded their agricultural brethren to the east as far as the Gerrhus (Konskaya), and their land was watered by the Hypacyris (Molotchnaya).[4] The royal horde was east of the Gerrhus and extended into the Crimea as far as the fosse which cut off Chersonesus Trachea from the rest of the peninsula, and remains of which can still be traced east of Theodosia. The southern neighbors of the royal Scythians were the savage Taurian mountaineers. Along the coast of the Sea of Azoff the royal horde stretched

[1] In Herod., iv. 109, φθειροτραγέουσι is to be taken literally. Plan de Carpin relates the same thing of the Mongols.

[2] Herodotus (iv. 54) makes it an eastern instead of a western feeder of the Dnieper.

[3] The eastern Mordvinians (Ersians) still passed for cannibals in the time of the Arabian travellers.

[4] Herodotus (iv. 56) represents the Gerrhus as a branch of the Dnieper flowing into the Hypacyris, which is not impossible (Von Baer, *Histor. Fr.*, p. 66). But Herodotus himself never travelled beyond Olbia, and what he there learned about the rivers was necessarily vague, except for the parts which the Eastern trade route from Olbia touched. He filled up this imperfect information on analogy, supposing that all these rivers came from lakes, as the Bug did, with which he knew a lake was connected called "mother" of that river (iv. 51, 52, 54, 55, 57).

eastward as far as Cremni (Taganrog); farther inland their eastern border was the Don. They extended inland for twenty marches, as far probably as the steppe itself, and here their neighbors were the Melanchlæni (Black-cloaks).

The true Scythians led the usual life of nomads, moving through the steppe from exhausted to fresh pasture-grounds, their women in wagons roofed with felt and drawn by oxen, the men on horseback, the droves of sheep, cattle, and horses following. They lived on boiled flesh, mare's milk, and cheese; they never washed, but enjoyed a narcotic intoxication in combination with a vapor bath by shutting themselves up within curtains of felt and strewing hemp seed on heated stones. The women, in place of washing, daubed themselves with a paste containing dust of fragrant woods and removed it on the second day. Like many other barbarians, the Scythians, at least in Hippocrates's time (ed. Littré, ii. 72), were not a specially hardy race; they had stout, fleshy, flabby bodies, the joints concealed by fat, their countenances somewhat ruddy. The observation of Hippocrates that they all looked alike is one that has often been made by travellers among lower races. They were liable to dysentery and rheumatism, which they treated by the actual cautery; impotence and sterility were common, and, though the accounts vary, it is probable that the race was not very numerous (Herod., iv. 81).

Hippocrates's description has led many writers to view the Scythians as Mongolian; but the life of the steppe impresses a certain common stamp on all its nomad inhabitants, and the features described are not sufficiently characteristic to justify the assumption of so distant a Mongol migration. What remains of the Scythian language, on the other hand, furnished Zeuss with clear proofs that they were Aryans and nearly akin to the settled Iranians. The most decisive evidence is found in Herodotus (iv. 117), viz., that Scythians and SARMATIANS (*q.v.*) were of cognate speech: for the latter were certainly Aryans, as even the ancients observed, supposing them to be a Median colony (Diod., ii. 43; Pliny, vi. 19). The whole steppe lands from the Oxus and the Jaxartes to the Hungarian pusztas seem to have been held at an early date by a chain of Arayan nomad races.

The Scythian deities have also an Aryan complection. The highest deity was Tabiti, goddess of the hearth; next came the heaven-god Papæus, with his wife the earth-goddess Apia: a son-god, Œtosyrus; a goddess of fecundity, Arippasa, who is compared with the Queen of Heaven at Ascalon; and two gods to whom Herodotus (iv. 59) gives the Greek names of Heracles and Ares. These deities were common to all Scythians. The royal horde had also a sea-god, Thamimasadas. In true Iranian fashion the gods were adored without images, altars, or temples, save only that Ares had as his symbol a sabre (Herod., iv. 62), which was set up on a huge altar piled up of fagots of brushwood. He received yearly sacrifices of sheep and oxen, as well as every hundredth captive. Ordinarily victims were strangled. Diviners were common, and one species of them, who came only from certain families, the Enarians or Anarians, were held in high honor. These supposed their race to have offended the goddess of heaven, who in revenge smote them with impotence: they assumed the dress and avocations of women and spoke with a woman's voice.[1] Divination was practiced with willow withes as among the Old Germans; the Enarians, however, used lime-tree bark. False prophets were tied on a wagon with burning brushwood, and the frightened team was driven forth. Oaths were sealed by drinking of a mixture of wine with the blood of the parties into which they had dipped their weapons. When the king was sick it was thought that some one had sworn falsely by the deities of his hearth,[2] and the man was beheaded whom the diviners or a majority of them, pronounced to be the culprit. When the king commanded the death of a man all his male offspring perished with him (for fear of blood-revenge). He who gained a suit before the king had the right to make a drinking-cup of his adversary's skull. Actions at law thus stood on the same footing with war, for this is what one did after slaying a foe. The Scythians fought always on horseback with bow and arrow, and the warrior drank the blood of the first man he slew in battle, probably deeming that his adversary's prowess thus passed into him. No one shared in booty who had not brought the king a foeman's head; the scalp was then tanned and hung on the bridle. Captive slaves were blinded on the absurd pretext that this kept them from stealing the mare's-milk butter they were employed to churn.

The government was strictly despotic, as appears most plainly in the hideous customs at the burial of kings. The corpse of an ordinary Scythian was carried about among all the neighbors for forty days, and a funeral feast was given by every friend so visited. But the royal corpse was embalmed and passed in like manner from tribe to tribe, and the people of each tribe joined the procession with their whole bodies disfigured by bloody wounds, till at length the royal tombs at Gerrhi were reached. Then the king was buried along with one of his concubines, his cupbearer, cook, groom, chamberlain, and messenger, all of whom were slain. Horses, too, and golden utensils were buried under the vast barrow that was raised over the grave. Many such tumuli (called in Tatar *kurgan*) have been found between the Dnieper and the sources of the Tokmak, a tributary of the Molotchnaya. Then, on the first anniversary, yet fifty horses and fifty free-born Scythian servants of the king were slain, and the latter were pinned upright on the stuffed horses as watchmen over the dead.

The Scythians deemed themselves autochthonous; their patriarch was Targitaus, a son of the god of heaven by a daughter of the river Dnieper. This legend, with the site of the royal graves, points to the lower Dnieper as the cradle of their kingdom. The further legend (Herod., iv. 5) of the golden plough, yoke, battle-axe, and cup (tokens of sovereignty over husbandmen and warriors) that fell from heaven, and burned when the two eldest sons of Targitaus approached them, but allowed the youngest son to take them and become king, has been well compared by Duncker with the Iranian conception of *hvarenó*, the halo of majesty, which refused to be grasped by the Turanian Frañraçé, but attached itself to pious kings like Thraétaóna. The eldest brother, Lipoxais, was ancestor of the Auchatæ; the second, Arpoxais, of the Catiari and Traspians; the youngest, Colaxais (whose name seems to be mutilated), was father of the royal tribe of Paralatæ, and from him, too, the whole nation had the name of Scolots. Pliny (*H.N.*, iv. 88) places the Auchatæ on the upper Bug, so this seems to be the proper name of the agricultural Scythians; if so, the Catiari and Traspians will be the Borysthenian and nomad Scythians who dwelt between the husbandmen and the royal horde. Colaxais divided his kingdom among his three sons, the chief kingdom being that in which the golden relics were kept; and these three sons correspond to the three kings of the Scythians in the time of Darius's invasion, viz., Scopasis, whose realm bordered the Sarmatians; Idanthyrsus, sovereign of the chief kingdom; and Taxacis,—the last two being neighbors of the Budini and the Geloni. According to the Scythians, Targitaus lived just a thousand years before the year 513 B.C.,—a legend which, taken with the tradition of autochthonism, indicates a much earlier date for the immigration of the Scythians than we should deduce from other narratives.

[1] Reineggs in 1776 observed the same symptoms, with the same consequence of relegation among the women, in certain Nogai Tatars on the Kuban.

[2] The plural (Herod., iv. 69) reminds us of the Fravashi of the king in the *Avesta*.

Aristeas of Proconnesus (Herod., iv. 13) had heard of a migration of the Scythians into their later settlement. The one-eyed Arimaspians, who, as neighbors of the gold-guarding griffins, may be sought near the gold-fields of the Tibetan plateau, had attacked the Issedones (whom later authors are probably right in placing in the region of Kashgar and Khotan), and the latter in turn fell on the Scythians and drove them from their seats, whereupon these occupied the lands held till then by the Cimmerians. It is a probable conjecture that the branch of the royal Scythians spoken of as dwelling north of the Oxus and Jaxartes was really a part of the nation that remained in their ancient home. Aristeas's story has much internal probability; but it is impossible to hold that the Scythian migration immediately preceded the first appearance of the expelled Cimmerians in Asia Minor, in Aristeas's own days (695 B.C.). The Scythians must have seized the steppe as far as the Dnieper centuries before, but the older inhabitants, who were probably of one race with the Thracians, remained their neighbors in the Crimea and the extreme west till the beginning of the 7th century.

Concerning the complete expulsion of the Cimmerians and the Scythian invasion of Asia that followed, Herodotus (iv. 11 *sq.*, i. 103–106, iv. 1, 3 *sq.*) gives an account, taken from several sources, which is intelligible only when we put aside the historian's attempts to combine these. A barbarian (*i.e.*, Median) account was that the Scythian nomads of Asia, pressed by the Massagetæ, crossed the Araxes (by which Herodotus here and in other places means the Amu-Darya) and fell on Media. Taking these Scythians for Scolots and assuming, therefore, that the reference was to their first migration, Herodotus had to place the expulsion of the Cimmerians between the crossing of the Araxes and the invasion of Media, and he had heard from Greeks (of Pontus) that on the Dniester was the grave of the Cimmerian kings, who had slain each other in single combat rather than share the migration of their people. This local tradition implies that the Cimmerians reached Asia Minor through Thrace, which, indeed, is the only possible route, except by sea; Herodotus, however, is led by his false presuppositions to conduct them eastwards from the Dniester by the Crimea (where many local names preserved their memory), and so along the Black Sea coast, and then westwards from the Caucasus to Asia Minor. The Scythians, he thinks, followed them, but, losing the trail, went east from the Caucasus, and so reached Media. This he gives only as his own inference from two things: (1) that the Cimmerians settled on the peninsula of Sinope, from which their forays into Asia Minor seem to have been conducted, and (2) that the Scythians invaded Media. The Median source spoke further of a great victory of the Scythians, after which they overran all Asia, and held it for twenty-eight years (634–606), levying tribute and plundering at will, till at length the Medes, under Cyaxares, destroyed most of them after making them drunk at a banquet.[1] Here a third, Egyptian, account comes in, viz., that King Psammetichus (d. 611) bought off certain northern invaders who had advanced as far as Philistæa; there is no reason to doubt that these are the Scythians of the Median account. Still more important is the evidence of certain prophecies of Jeremiah (comp. iii. 6) in the reign of Josiah (628–609), describing the approach from the north of an all-destroying nation of riders and bowmen (Jer. iv. 6 *sq.*, v. 15 *sq.*, vi. 1 *sq.*, 22 *sq.*).[2] Herodotus's twenty-eight years are simply the period between the accession of Cyaxares and the taking of Nineveh, which followed close on the overthrow of the Scythians; Justin, on the other hand, gives the Scythians eight years of sovereignty, which fits well with the interval between the first and the second siege of Nineveh (619–609).[3]

A fourth account in Herodotus, which connects the *θήλεια νόσος* of the Enarians with the plundering of the temple of Astarte at Ascalon, is entirely apocryphal, and must come from the Greek identification of this Astarte with the Scythian Arippasa. Yet it seems to have been chiefly this story that led Herodotus to take the Scythians of his Median source for Scolots. He is refuted by another account of Iranian origin: Ctesias (in Diod., ii. 34) tells of a long war between the Medes and the Sacæ, occasioned by the defection of Parthian subjects of Media to the latter nation in the time of Astibaras (Cyaxares); so that the Scythian conquerors actually came from the east, not from the north. Herodotus's Median source closed with Cyaxares recovering his power; the story which follows about the resistance of the slaves of the Scythians to their returning lords, who cowed them by using whips instead of arms, must have come from the Pontic Greeks, and is certainly a local legend,[4] which has nothing to do with the wars in Asia, and indeed is connected by Callistratus (Steph. Byz., *s.v.* Τάφραι) with a war between Scythians and Thracians.

From the expedition of Darius upwards Herodotus names five generations of Scythian kings, Idanthyrsus, Saulius, Gnurus, Lycus, Spargapeithes; the last may be contemporary with the foundation of Olbia (646 B.C.).[5] Under Idanthyrsus fell the invasion of Darius (513 B.C.). The motive for this invasion cannot possibly have been revenge for the Scythian invasion of Media. It is possible that a popular war against the chief nation of the nomads, who are so hated by the Iranian peasants, seemed to Darius a good way of stimulating common feeling among his scattered subjects, and it is certain that he had quite false ideas of the wealth of Scythia, due perhaps to export of grain from the Grecian cities of the Scythian coast. Herodotus's account of the campaign is made up in a puzzling way of several distinct narratives, retouched to smooth away contradictions. Here it must suffice to refer to the article PERSIA (vol. xviii. pp. 581–2), and to add that the geographical confusion in Herodotus and his exaggerated idea of the distance to which the Persians advanced seem to be due partly to a false combination between a Scythian account of the campaign and certain notices about the burning of Gelonus by enemies and about fortresses on the river Oarus which had come to him from the inland trade route, and had nothing to do with Darius, partly to a confusion between the desert reached by the Persians and that which lay between the Budini and Thyssagetæ.

While the Persian rule in the newly conquered districts of Europe was shaken by the Ionic revolt, the Scythians made plundering expeditions in Thrace, and in 495 penetrated into the Chersonesus, whose tyrant Miltiades fled, but was restored after their retreat by the Dolonci (Herod., vi. 40). Darius had Abydus and the other cities of the Propontis burned lest they should furnish a base for a projected Scythian expedition against Asia (Strabo, xiii. p. 591); this agrees with the fact known from Herodotus (v. 117), that Abydus had been retaken by Daurises a little before. In this connection the Scythian embassy to King Cleomenes at Sparta (Herod., vi. 84) to arrange a combined attack on Asia becomes credible; for, barbarians though they were, the Scythians had a political organization and many connections with the Ionians of the Pontic colonies, so that their envoys may well

[1] This story may be influenced by the myth about the feast of the Sacæa (Strabo, xi. p. 512). Ctesias has it that peace was made.

[2] This is Hitzig's discovery and must be sound. Before the fall of Nineveh the Chaldæans could not be a source of danger.

[3] Eusebius's date (634) for the Scythians in Palestine is deduced from Herodotus.

[4] It is meant to explain the origin of the fosse (Herod., iv. 3), which the slaves were said to have dug, and of a subject race in the same district (Pliny, *H. N.*, iv. 80), the Sindians (Amm. Mar., xxii. 8, 41: Val. Flac., vi. 86), or rather perhaps the Satarchæ.

[5] That the wise ANACHARSIS (*q.v.*) was brother of King Saulius (Caduidas of Diog. Laert., i. 101) seems to be a mere guess of Herodotus's Scythian informant Tanes. The story of Anacharsis's fate is colored by that of the later king Scyles.

have reached Sparta at the same time with Aristagoras (499) and served as decoys for his fantastic schemes.[1]

Our accounts of the Scythians begin to fail after the time of King Scyles, who affected Grecian habits and was deposed and finally slain for sharing in Bacchic orgies (Herod., iv. 78–80); his death fell a little before Herodotus's visit to Olbia (*c.* 456). We read in an unclear context (Diod., ii. 43) of a division of the Scythians into two great tribes, the Pali and the Napæ, the former of whom crossed the Don from the east and destroyed the latter and also the Tanaites.[2] These events seem to point to a change of dynasty in the royal horde.

The *Periplus* ascribed to Scylax (346 B.C.) knows the Scythians as still occupying almost exactly the same limits as in Herodotus's time; only in the east there is a small but significant change: the Sarmatians have already crossed the Don (§ 68). King Ateas still ruled Scythia in its old extent (Strabo, vii. 307), but all that we know of the events of his reign took place south of the Danube,—wars with the Triballi in Servia, with Byzantium, with the king of the Greek city of Istrus, and finally with his old ally Philip of Macedon. Philip defeated and slew Ateas near the Danube in 339 B. C. He was then over ninety years old.[3]

The Scythians appear once more in the region of the Dobrudja in 313, when they helped the citizens of Callatis against Lysimachus and were defeated by him (Diod., xix. 73). All this points to a considerable advance of their frontier southwards, and in fact Pseudo-Scymnus (Ephorus) gives Dionysopolis (a little to the west of the modern Baltchik) as the place where the Crobyzian and the Scythian territories met in his time (334 B. C.).[4] This apparent advance of the realm contrasts singularly with the distress to which Ateas was reduced by the king of the insignificant town of Istrus, an evidence that the Scythian power was really much decayed. Ateas indeed is sometimes painted as a rude barbarian lord of a poor but valiant and hardy race, and Ephorus, who mainly follows Herodotus about Scythia, yet speaks of the Scythians in contrast with the fierce Sarmatians as corresponding to Homer's description of a just and poor people feeding on milk (Strabo, vii. 302). But Aristotle, on the contrary (*Eth. Nic.*, vii. 8), speaks of the effeminacy of the Scythian monarchs as notorious; and indeed there can be little doubt that the Scythians crossed the Danube and settled in the Dobrudja under pressure of the Sarmatians behind them, and that the idyllic picture drawn by Ephorus presupposes the fall of their political system. Diodorus (ii. 43) tells us that the Sarmatians exterminated the inhabitants of most part of Scythia, and this must have taken place in the later years of Ateas, between 346 and 339.

At a later but uncertain date the great inferiority of the Scythians to the Sarmatians is illustrated by the story of Amage, the warlike consort of a debauched Sarmatian king, who with only 120 chosen horsemen delivered Chersonesus in Tauris from the neighboring Scythian king, slew him with all his followers, and gave the kingdom to his son (Polyæn., viii. 56). It is, however, not quite certain whether these were a remnant of the old Scythians; and it is still more doubtful whether the powerful Scythian kingdom of Scilurus, who brought the Greek cities of the Crimea to the verge of ruin, but was destroyed by Mithradates Eupator (105), was really a kingdom of Scolots. The last certain trace of true Scythians occurs about 100 B.C. in the Olbian *psephisma* in honor of Protogenes.[5]

[1] King Ariantas, whose primitive census is mentioned in Herodotus (iv. 81), seems to have flourished at this time.

[2] Pliny, *H.N.*, vi. 50, comp. vi. 22, where we must read "Asampatas, Palos, ab his Tanaitas et Napæos" and, below, "Satarchæos, Palæos."

[3] For Ateas, see Frontin., *Strateg.*, ii. 4, 20; Polyæn., vii. 44, 1; Aristocritus, in Clem. Al., *Strom.*, v. p. 239; Justin, ix. 2; Lucian, *Macrob.*, 10; Æschines, *C. Ctesiph.*, 128, p. 71.

[4] Comp. Pliny, *H.N.*, iv. 44, who calls the Scythians Aroteres.

[5] *C. I. Gr.*, ii. No. 2058; comp. Zippel, *Röm. Herrschaft in Illyrien*, p. 155.

Here they appear as a small nation west of Olbia between the Thisamatæ and Saudaratæ, who are anxious to take refuge in Olbia from the (Scordiscian) Galatians.

Sources.—Herodotus (iv. 1–82, 97–142) and Hippocrates (*De Aere*, etc., c. 17–22, in Littré's ed., ii. 66–82) are alone trustworthy, because they carefully distinguish the Scythians from the other northern nations. Ephorus (in Strabo, vii. p. 302 *sq.*, and Scymn., *Perieg.*, 773–873), Diodorus (ii. 43 *sq.*), and Trogus (in Justin, ii. 1–3, 5, 1–11, and Jordan., *Get.*, v.–vi., x.) do not do so, and must be used with great caution.

Helps.—Ukert, *Geog. d. Gr. und Römer*, iii. 2 (complete collection of materials from original sources); Niebuhr, *Kleine Schriften*, vol. i. (1828); Zeuss, *Die Deutschen und die Nachbarstämme* (1837)—an admirable discussion, which established the Aryan origin of the Scythians; Boeckh, in *C. Insc. Gr.*, ii. 81 *sq.*; K. Neumann, *Hellenen im Skythenlande* (1855)—the best book, in spite of certain fundamental errors, such as the ideas that great part of the steppe was once wooded and that the Scythians were Mongols; Müllenhoff, "Origin and Speech of the Pontic Scythians and Sarmatians," in *Monatsb. d. Berl. Ak* (1866). The best account of the trade route which in the 5th century B.C. passed through a great part of what is now Russian territory is by K. E. v. Baer, *Historische Fragen*, etc. (1873); comp. also Grote, *Hist. of Greece*, iii. 314 *sq.* (1850), and Duncker, ii. 430 *sq.* (5th ed.). There is a class of mere amateurs, especially in east Germany, who absurdly take the Scythians to have been Slavs. (A. V. G.)

SEA. Any part of the ocean marked off from the general mass of water may be called a sea. In geography the name is loosely applied: for instance, the Arabian Sea is an open bay, Hudson's Bay is an enclosed sea. Seas proper lie within the transitional area which divides the permanent continental masses from the permanent ocean basins, and their boundaries are consequently subject to geological change, and to alteration by subsidence and elevation occurring in historic times.

Inland Seas are seas entirely surrounded by land (see CASPIAN SEA, DEAD SEA, and, for general discussion, LAKE).

Enclosed Seas have communication with the ocean restricted to one opening, which may take the form of one, two, or more straits close to each other. The best known are the White Sea of the Arctic Ocean; the Baltic, Zuyder Zee, Hudson's Bay, Gulf of Mexico, and Mediterranean, with the Adriatic and Black Sea, of the Atlantic; the Red Sea and Persian Gulf of the Indian Ocean; and the Yellow Sea and Sea of Okhotsk of the Pacific.[6] They are all cut off from general oceanic circulation and very largely from tides, but the result is not stagnation. The Baltic and Black Sea are but slightly saline on account of the number of large rivers falling into them, and the fresh surface-water flows out as a regular current, liable indeed to be checked, and even reversed for a time, but in the main persistent; while the salt water flows in uniformly as an undercurrent. A state of equilibrium is arrived at, so that periodical fluctuations of salinity do not affect the average of a number of years. The water of the Mediterranean and Red Sea is much salter than that of the ocean, which therefore flows in as a surface-current, while the dense very salt water escapes below. In the case of the Baltic and Black Sea dilution by rivers, in that of the Mediterranean and Red Sea concentration by evaporation maintains a circulation. Winds and differences of barometric pressure are, as in inland seas, great factors in producing variable currents. (See BALTIC SEA, BLACK SEA, MEDITERRANEAN SEA, RED SEA, etc.).

Partially Enclosed Seas may be (*a*) comparatively shallow irregular channels through which strong tides sweep, or (*b*) ocean basins cut off by barriers barely rising to the surface, or remaining permanently submerged, in which case there may be no break of continuity in the ocean surface to indicate the sea. Seas of the first description are related to shallow enclosed seas, but are much affected by tides and ocean currents; the principal are the Kara Sea of the Arctic

[6] The prevalence of color names for these seas is noteworthy.

Ocean, Baffin Bay and North Sea of the Atlantic, Behring Sea and Japan Sea of the Pacific. They are subject to considerable temperature changes owing to their proximity to land. Seas coming under the second category combine the peculiarities of the open ocean and of deep inland seas. The Caribbean Sea of the Atlantic, the China Sea, Java Sea, and numerous small seas of the eastern archipelago of the Pacific are the best examples. Their chief peculiarity is that the temperature of the water instead of falling uniformly to the bottom becomes stationary at some intermediate position corresponding to the top of the barrier. They are usually very deep. (See NORTH SEA, NORWEGIAN SEA, and PACIFIC OCEAN.)

Other Seas.—Coral Sea, Arabian Sea, Sea of Bengal, are names now dropping out of use, to designate parts of the ocean. "Sargasso Sea" is an expression devoid of geographical meaning (see ATLANTIC OCEAN, vol. iii. p. 19).

Firths and Estuaries.—A river entering the sea by a short estuary flows over the surface, freshening it to a considerable extent, and, if the force of its current is not too great, the rising tide slowly forces a wedge of sea water up between river and river bed, withdrawing it rapidly when ebb sets in. In a firth that is large compared with the river falling into it, judging from results recently obtained in the Firth of Forth,[1] a state of equilibrium is arrived at, the water increasing in salinity more and more gradually as it proceeds seawards, the disturbing influence of the tide becoming less and less, and the vertical distribution of salinity more and more uniform until the river water meets the sea, diffused through a nearly homogeneous mass with a density little inferior to that of the ocean. Between the extreme cases there are numerous gradations of estuary depending on the ratio of river to sea inlet.

Deposits.—All seas within about 300 miles of continental land, whatever may be their depth, are paved with terrigenous débris, and all at a greater distance from shore are carpeted with true pelagic deposits (see PACIFIC OCEAN).

Marine Fauna and Flora.—The mixing of river with sea water produces a marked difference in the fauna and flora of seas. Where low salinity prevails diatoms abound, probably on account of the greater amount of silica dissolved in river water, and they form food for minute pelagic animals and larvæ, which are in turn preyed upon by larger creatures. In some seas, such as the North Sea, there are many celebrated fishing beds, on the shallow banks of which innumerable invertebrate animals live and form an inexhaustible food-supply for edible fishes. Naturalists have remarked that in temperate seas enormous shoals of relatively few species are met with, while in tropical seas species are very numerous and individuals comparatively few. Organisms, such as the corals, which secrete carbonate of lime, appear to flourish more luxuriantly in warmer and salter seas than in those which are colder and fresher.

The geological and dynamic aspects of seas are treated of in GEOLOGY (vol. x. p. 250 *sq.*) and GEOGRAPHY (PHYSICAL); and in ATLANTIC OCEAN, BALTIC SEA, BLACK SEA, INDIAN OCEAN, MEDITERRANEAN SEA, NORTH SEA, NORWEGIAN SEA, PACIFIC OCEAN, POLAR REGIONS, and RED SEA, the general geographical and physical characters of oceans and seas are described. In METEOROLOGY some account is given of the influence of the sea on climate, and chemical problems connected with the ocean are discussed in SEA WATER.

SEA-CAT. See SEA-WOLF, *infra*.

SEA-DEVIL. See FISHING-FROG, vol. ix. p. 235.

SEA-HORSE. Sea-horses (*Hippocampina*) are small marine fishes which, together with pipe-fishes (*Syngnathina*), form the order of Lophobranchiate fishes, as already noticed in ICHTHYOLOGY, vol. xii., p. 733. The gills of the members of this order are not arranged in leaf-like series as in other fishes, but form a convex mass composed of small rounded lobes attached to the branchial arches, as shown in the accompanying figure (Fig. 1) of the head of a sea-horse, in which the gill-cover has been pushed aside to show the interior of the gill-cavity. Sea-horses

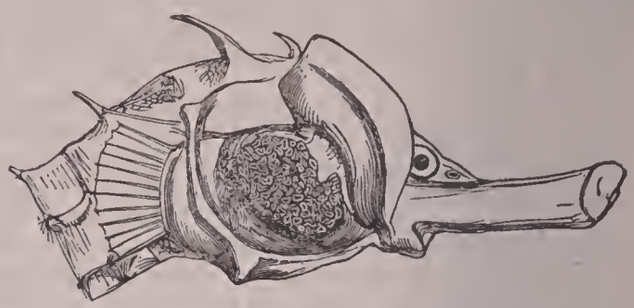


FIG. 1.—Gills of *Hippocampus abdominalis*.

differ from pipe-fishes by having a prehensile and invariably finless tail; it is long, slender, tapering, quadrangular in a transverse section, and, like the rest of the body, encased in a dermal skeleton, which consists of horny segments, allowing of ventral, and in a less degree of lateral, but not of dorsal, flexion. The typical sea-horse (*Hippocampus*) can coil up a great portion of its tail, and firmly attach itself by it to the stems of sea-weeds or other similar objects. The body is compressed and more or less elevated, and the head terminates in a long tubiform snout, at the end of which the small mouth is situated. The whole configuration of the fore part of the body, as well as the peculiar manner in which the head is joined to the neck-like part of the trunk, bears a striking resemblance to a horse's head; hence the name by which these fishes are generally known. Sea-horses are bad

FIG. 2.—*Phyllopteryx eques*.

swimmers and are unable to resist currents. With the aid of their single dorsal fin, which is placed about the middle of the fish's body and can be put into a rapid undulatory motion, they shift from time to time to some other object near them, remaining stationary among vegetation or coral where they find the requisite amount of food and sufficient cover. Their coloration and the tubercles or spines on the head and body, sometimes with the addition of skinny flaps and filaments, closely resemble their surroundings, and constitute the means by which these defenceless creatures escape detection by their enemies. These protective structures are most developed in the Australian genus *Phyllopteryx*, one of the most singular types of littoral fishes.

[1] Mill, *Proc. Roy. Soc. Ed.*, xiii. 29, 137, and 347.

Sea-horses belong to the tropics and do not extend so far north as pipe-fishes. They are abundant at suitable localities, chiefly on the coral-banks of the Indo-Pacific Ocean. Some thirty species are known, of which the majority belong to the genus *Hippocampus* proper. Their size varies from 2 to 12 inches in length; but in China and Australia a genus (*Solenognathus*) occurs the species of which attain to a length of nearly 2 feet; they, however, in form resemble pipe-fishes rather than sea-horses. The species which may be sometimes seen in aquaria in Great Britain is *Hippocampus antiquorum*, from the Mediterranean and the coasts of Portugal and France. The food of the sea-horses consists probably of very small invertebrates and the fry of other fishes. Like the other Lophobranchiates, they take great care of their progeny. The male *Hippocampus* carries the ova in a sac on the lower side of the tail, in which they are hatched; in the other genera no closed pouch is developed, and the ova are embedded in the soft and thickened integument of either the abdomen or the tail.

SEAL. In the article MAMMALIA (vol. xv. p. 449) will be found a general account of the distinguishing characteristics of the animals constituting the sub-order *Pinnipedia* of the order *Carnivora*, and their divisions into families and genera. It only remains to give some further details respecting those members of the group to which the term "seal" is properly restricted (the sub-family *Phocinæ*), especially those which inhabit the British coasts.

Although seals swim and dive with the greatest ease, often remaining as much as a quarter of an hour or more below the surface, and are dependent for their sustenance entirely on living prey captured in the water, all the species frequently resort to sandy beaches, rocks, or ice-floes, either to sleep or to bask in the sun, and especially for the purpose of bringing forth their young. The latter appears to be the universal habit, and, strange as it may seem, the young seals—of some species at least—take to the water at first very reluctantly, and have actually to be taught to swim by their parents. The number of young produced is usually one annually, though occasionally two. They are at first covered with a coat of very thick, soft, nearly white fur, and until it falls off they do not usually enter the water. This occurs in the Greenland and gray seal when from two to three weeks old, but in the common seal apparently much earlier. One of this species born in the London Zoological Gardens had shed its infantile woolly coat and was swimming and diving about in its pond within three hours after its birth. The movements of the true seals upon the ground or ice are very different from those of the *Otariæ* or eared seals, which walk and run upon all four feet, the body being raised as in the case of ordinary quadrupeds. The hinder limbs (by which mainly they propel themselves through the water) are on land always perfectly passive, stretched backwards, with the soles of the feet applied to each other, and often raised to avoid contact with the ground. Sometimes the fore limbs are equally passive, being placed close to the sides of the body, and motion is then effected by a shuffling or wriggling action produced by the muscles of the trunk. When, however, there is any necessity for a more rapid mode of progression, the animals use the fore paws, either alternately or simultaneously, pressing the palmar surface on the ground and lifting and dragging the body forwards in a succession of short jumps. In this way they manage to move so fast that a man has to step out beyond a walk to keep up with them; but such rapid action costs considerable effort, and they very soon become heated and exhausted. These various modes of progression appear to be common to all species as far as has been observed.

Most kinds of seals are gregarious and congregate, especially at the breeding season, in immense herds. Such is the habit of the Greenland seal (*Phoca grœnlandica*), which resorts in the spring to the ice-floes of the North Sea, around Jan Mayen Island, where about 200,000 are killed annually by the crews of the Scotch, Dutch, and Norwegian sealing vessels. Others, like the common seal of the British islands (*Phoca vitulina*), though having a wide geographical range, are never met with in such large numbers or far away from land. This species is stationary all the year round, but some have a regular season of migration, moving south in winter and north in summer. They are usually harmless, timid, inoffensive animals, though, being polygamous, the old males often fight desperately with each other, their skins being frequently found covered with wounds and scars. They are greatly attached to their young, and remarkably docile and easily trained

FIG. 1.—Common seal (*Phoca vitulina*).

when in captivity; indeed, although there would seem little in the structure and habits of the seal to fit it by nature to be a companion of man, there is perhaps no wild animal which attaches itself so readily to the person who takes care of and feeds it. They appear to have much curiosity, and it is a very old and apparently well-attested observation that they are strongly attracted by musical sounds. Their sense of smell is very acute, and their voice varies from a harsh bark or grunt to a plaintive bleat. Seals feed chiefly on fish, of which they consume enormous quantities; some, however, subsist largely on crustaceans, especially species of *Gammarus*, which swarm in the northern seas, also on molluscs, echinoderms, and even occasionally sea-birds, which they seize when swimming or floating on the water.

Although the true seals do not possess the beautiful under-fur ("seal-skin" of the furriers) which makes the skin of the sea-bears or *Otariæ* so precious, their hides are still sufficiently valuable as articles of commerce, together with the oil yielded by their fat, to subject them to a devastating persecution, by which their numbers are being continually diminished (see below, p. 581 *sq.*).

Two species of seals only are met with regularly on the British coasts, the common seal and the gray seal. The common seal (*Phoca vitulina*), is a constant resident in all suitable localities round the Scottish, Irish, and English coasts, from which it has not been driven away by the molestations of man. Although, naturally, the most secluded and out-of-the-way spots are selected as their habitual dwelling-places, there are few localities where they may not be occasionally met with. Within the writer's knowledge, one was seen not many years ago lying on the shingly beach at so populous a

place as Brighton, and another was lately caught in the river Welland, near Stamford, 30 miles from the sea. They frequent bays, inlets, and estuaries, and are often seen on sandbanks or mudflats left dry at low tide, and, unlike some of their congeners, are not found on the ice-floes of the open sea, nor, though gregarious, are very large numbers ever seen in one spot. The young are produced at the end of May or beginning of June. They feed chiefly on fish, and the destruction they occasion among the salmon is well known to Scottish fishermen. The common seal is widely distributed, being found not only on the European and American coasts bordering the Atlantic Ocean but also in the

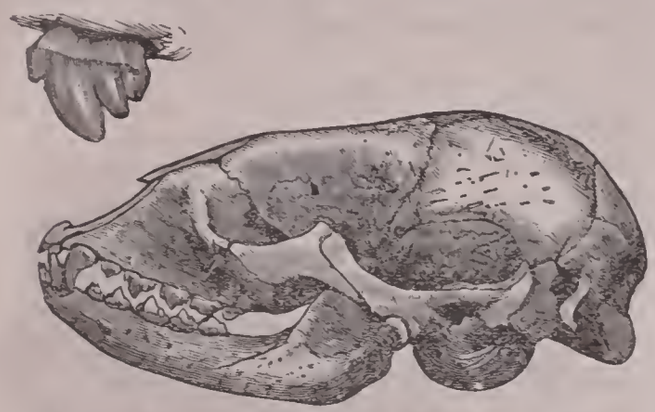


FIG. 2.—Skull of common seal, showing form of teeth.

North Pacific. It is from 4 to 5 feet in length, and variable in color, though usually yellowish gray, with irregular spots of dark brown or black above and yellowish white beneath. The gray seal (*Halichœrus grypus*) is of considerably larger size, the males attaining when fully adult a length of 8 feet from nose to end of hind feet. The form of the skull and the simple characters of the molar teeth distinguish it generically from the common seal. It is of a yellowish gray color, lighter beneath, and with dark gray spots or blotches, but, like most other seals, is liable to great variations of color according to age. The gray seal appears to be restricted to the North Atlantic, having been rarely seen on the American coasts, but not farther south than Nova Scotia; it is chiefly met with on the coasts of Ireland, England, Scotland, Norway and Sweden, including the Baltic and the Gulf of Bothnia, and Iceland, though it does not appear to range farther north. It is apparently not migatory, and its favorite breeding places are rocky islands, the young being born in the end of September or beginning of October.

Other species of seals inhabiting the northern seas, of which stragglers have occasionally visited the British coasts, are the small ringed seal or "floe-rat" of the sealers (*Phoca hispida*), the Greenland or harp seal (*Phoca grœnlandica*), the hooded or bladder-nosed seal (*Cystophora cristata*), and possibly the Bearded seal (*Phoca barbata*), though of the last there is no certain evidence. The general characters and geographical distribution of the remaining species of the group are indicated in the article MAMMALIA, vol. XV. p. 449. (W. H. F.)

SEAL FISHERIES.

From a commercial point of view seals may be divided into two groups,—hair seals and fur seals. The former are valued for the oil they yield and for their skins, which are converted into leather, and the latter for their skins alone. The fur seals are provided with a dense soft under-fur like velvet and a quantity of long loose exterior hair, which has to be removed in dressing the hides. Hair seals are either entirely without under-fur or possess it in too small a quantity to render the skins of much commercial value as furs. The two groups correspond to the two divisions of eared seals and earless seals described above (see also vol. XV. pp. 449–450).[1]

[1] Some naturalists have proposed the name *Trichophocinæ* for the hair seals and *Oulophocinæ* for the fur seals, in allusion to the different character of the skin in the two groups.

Hair Seals.—The principal hair seal fisheries are those of Newfoundland and Labrador (area about 200 miles), the Gulf of St. Lawrence, Jan Mayen and the adjacent seas, Nova Zembla, the White Sea and Arctic Ocean, the Caspian, and the North and South Pacific. The first-named is by far the most important. To the immense icefields borne past these shores during the spring months great herds of seals resort for the purpose of bringing forth and suckling their young. These are usually produced in the last week of February and increase rapidly in size. When born they weigh about 5 lb; in four weeks the fat beneath the skin has increased to a depth of 3 to 4 inches, and with the adhering skin weighs from 40 to 50 lb. At this age the animals are in the best condition for being taken, as the oil then yielded is of the best quality. They remain on the ice attended by their dams for about six weeks, when they begin to take to the water, and it becomes much more difficult to capture them. When a floe containing young seals is reached, the hunters take to the ice armed with a pole or "gaff," having a hook at one end and shod with iron at the other. A blow on the nose from this quickly despatches the animal; by means of the "scalping-knife" the skin with the fat adhering is then rapidly detached. The fat and skins are rolled into bundles and dragged to the ship. When the ship reaches port the skins are separated from the fat and salted for export to Great Britain, where they are converted into leather. Of late years furriers have succeeded in converting a few of the finer skins into ladies' tippets. The fat was formerly thrown into huge vats, where its own weight and the heat of the sun extracted the oil, but in the improved modern process the fat is ground into minute pieces by machinery and then steamed; the oil, after being exposed for a time in glass-covered tanks to the action of the sun's rays, is barrelled for exportation. The greater part of it goes to England, where it is largely employed both as an illuminant and as a lubricant. It is also used for tanning purposes and in the manufacture of the finer kinds of soap.

From 8000 to 10,000 men embark annually from Newfoundland on this pursuit. The steamers, which are rapidly superseding sailing vessels, are stoutly timbered, sheathed with iron and wood, and provided with iron-plated stems; they carry from 150 to 300 men each, and make two, and sometimes when very successful even three, trips in the season. From 20 to 25 steamships in all are engaged in this industry, 6 of these being from Dundee, Scotland. The Dundee vessels arrive in Newfoundland in February and there ship their crews; at the close of the sealing season they proceed to the northern whale fishery and return home in October. A "close time" for seals is now established by law. Sailing vessels cannot clear for this fishery before 1st March, nor can steamers before 10th March. After the young seals have taken to the water, the steamers in their second trips engage in the pursuit of the old breeding seals till the middle or end of May. These are taken either by shooting them or clubbing them when congregated in herds on the ice. This practice, which is most injurious to the fishery, has of late been partially abandoned, by an agreement among the owners of vessels not to continue operations beyond 30th April. The failures and disappointments of the voyage are numerous, many vessels returning to port with few seals or even with none. The prizes, however, are so numerous that there is no hesitation in embarking capital in the enterprise. It is no uncommon event for a steamer to return two or three weeks after leaving port laden to the gunwale with seals. As many as 42,000 have been brought in by a single steamer, the value at two and a half dollars per seal being $105,000 (£21,875). The men on board the steamers share one-third of the proceeds of the voyage among them; the remainder goes to the owners who equip and provision the vessels. In sailing vessels the men get one-half the proceeds. The number of seals taken annually ranges from 350,000 to 500,000. In the three years 1877, 1878, and 1881 the average take was 436,413, valued at £213,937 [$1,039,733.82]. Between 1881 and 1886 the returns fell below this average owing to the heavy ice, which comparatively few vessels succeeded in penetrating. The large number of young seals which escaped during these years will improve the fishery in the future.

In the seas around Newfoundland and Labrador there are four species of seals,—the bay seal, the harp, the hood, and the square flipper. The first of these frequents the mouths of rivers and harbors and is never found on the ice. The harp, so called from a curved line of dark spots on its back making a figure somewhat resembling an ancient harp, is by far the most numerous, and is *par excellence* the seal of commerce. The hoods, which owe their name to a bag or hood on the nose of the males, which they can inflate at pleasure for protection, are much larger than the harps, but their oil is not of such good quality. But few square flip-

pers are taken; they are large seals from 12 to 16 feet in length, and are believed to be identical with the great Greenland seals. The seals frequenting these seas are migratory. In May, attended by their young, they commence their northerly movements to the Greenland seas, where they spend two or three months, and in September begin their southerly migration, moving along the coast of Labrador, feeding in its fiords and bays. One division passes through the Straits of Belle Isle into the Gulf of St. Lawrence, the other along the east coast of Newfoundland. By the close of the year they reach the Great Banks, their southern headquarters, and early in February commence their northerly movement to meet the ice on which their young are to be brought forth.

The Newfoundland fishery was of slight importance till the beginning of the 19th century. At first the seals were taken in nets; the next method was shooting them from large boats, which left shore about the middle of April. Afterwards small schooners were employed, and a rapid expansion of the fishery followed. Over 100 of these small vessels used to leave the port of St. John's, and as many more the ports of Conception Bay. In 1795 the whole catch of seals was but 5000. In 1805 it reached 81,000; in 1815, 126,000; in 1822, 306,983. The largest catches on record were in 1830, when 558,942 seals were taken; in 1831, 686,836; 1843, 651,370; and in 1844, 685,530. The following table shows the number of seals taken in some recent years:

Years.	No. of Seals.	Years.	No. of Seals.
1856	361,317	1881	447,903
1861	375,282	1882	200,500
1869	359,821	1863	300,350
1876	500,000	1884	238,587
1880	223,793		

Of late years an increasing number of steamers from St. John's have resorted to the Gulf of St. Lawrence as well as small sailing vessels from the southern ports of Newfoundland. A few residents of the Magdalen Islands also pursue the seals on the Gulf ice, and the Canadians carry on a seal fishery along the shore by means of nets both in spring and autumn. The nets are made of strong hempen cord, some of them very large and costing with the anchors and gear as much as £1500 [$7290] each. This fishery is carried on from Blanc Juberlis Bay to Cape Whittle. The number taken averages about 70,000 to 80,000.

Next in importance is the seal fishery carried on between Greenland, Spitzbergen, and the island of Jan Mayen,—between 68° and 74° N. lat. and 3° E. and 17° W. long. In most years, however, the seals are taken mainly in the vicinity of Jan Mayen. The fishery is carried on by the British, Norwegians, Swedes, Danes, and Germans. The number taken by the British vessels about equals that taken by all the others together. The species taken are the same as on the Newfoundland coast, the harp or saddleback and the hood or bladder-nose. The breeding season is about three weeks later than in the case of the Newfoundland seals, the young being brought forth between the 16th and the 22d of March. The method of capture is almost the same as that of the Newfoundland hunters. Steamers are now almost exclusively employed. The only British ports now engaged in the enterprise are Dundee and Peterhead. During the twelve years 1873 to 1885 the number of British vessels taking part in it was from 14 to 21, the number of men varying from 900 to 1200, and the number of seals taken ranging from 35,000 to 75,000. The total number of seals taken by these vessels during the ten years ending 1884 was 452,013. Formerly, from 1500 to 2700 men were employed, and the number of seals taken ranged from 50,000 to 125,000. The decline has been largely caused by the reckless and barbarous way in which the fishery has been conducted, the practice of seal-hunters of all nations having been to reach the seals soon after the young were born, and then to watch for the mothers as they came to suckle them and shoot them without mercy, leaving the young to die in thousands of starvation on the ice. The consequence is that the herds are not now a twentieth part of their former size. Newfoundland hunters, on the other hand, do not disturb the seals till they are grown and about to leave their mothers, the old seals not being killed till a later date. By an international treaty between England and Norway—the two nations most interested—a "close season" has been established in the Jan Mayen fishery. The Dundee and Peterhead steamers are chiefly manned by Shetlanders, who are taken on board at Lerwick. The vessels make the ice from the 15th to the 20th March and commence the chase in the destructive way already described. They follow up the capture of the young seals in April, when they are better worth taking. Then they proceed to separate the skins from the fat. The former are salted on board, and the fat is stowed in tanks. In May the pursuit of the old seals on the ice commences and continues till the 16th, when it is time to proceed to the whale fishery. The oil is not manufactured till the vessels reach home late in the autumn. As the blubber undergoes decay in the tanks, the oil is not so good in quality as that made in Newfoundland from the fresh fat.

The Jan Mayen fishery commenced in 1840. In that year 13 British vessels and 650 men engaged in it, and 17,300 seals were taken. The Norwegians and other nationalities also took part in it. Steamers were introduced in 1858. The following table shows the growth and decline of the fishery:

Year.	No. of British Vessels.	No. of Men.	Seals taken.	Year.	No. of British Vessels.	No. of Men.	Seals taken.
1840	13	650	17,300	1875	20	1200	71,640
1845	39	1950	94,830	1880	14	840	41,468
1850	32	1600	74,058	1881	14	840	23,984
1856	54	2700	81,500	1882	15	900	21,092
1861	46	2300	10,350	1883	17	1020	49,806
1865	26	1300	112,000	1884	20	1200	42,120
1870	22	1320	128,000				

The Norwegian vessels are all steamers, sheathed with wood and iron, the crews averaging forty-six men. They belong principally to Tönsberg, but Tromsö also sends out a number of small vessels to hunt adult seals. The total annual product has reached $300,000. Over twenty Norwegian and Swedish steamers are engaged in this fishery. Since about the year 1873 or 1874 the Norwegians and Swedes have discovered a new fishing-ground for adult seals off the coast of Greenland between Iceland and Cape Farewell. It is carried on in the months of June and July. The seals taken are all of the hood kind. At one time the Jan Mayen fishery averaged 200,000 seals annually among all the nationalities engaged. It does not now exceed 120,000 to 130,000.

The Danes, the Eskimo, and the half-breeds carry on a seal-fishery off the western coast of Greenland between Cape Farewell and 79° N. lat. The seals taken are chiefly the floe or spotted seal and the square flipper. Rink, in his *Greenland*, estimates the annual number taken at 89,000, but at present it does not exceed 50,000, as the seals are becoming scarcer. The oil is made at the Danish settlements on the coast, and the skins are dried, not salted, and both are shipped to Denmark.

The fisheries of Nova Zembla, once productive, have declined in value, and are now carried on by only five vessels, which reach the island about the end of June. The fishermen commence with hunting the seal and the walrus and afterwards fish for the common trout. Five kinds of seals are found here, the chief being the *Phoca vitulina* and the *Phoca grœnlandica*. The number taken is small.

The Russians carry on a seal-fishery on the eastern and western coasts of the White Sea, in the bays of the Dwina and the Mezen and on the coast of Kanin. The species is the *Phoca grœnlandica*. These seals live in the high regions of the polar seas from May till September, and appear later in the gulfs and bays of the Arctic Ocean, where the young are born on the floating ice early in February. Soon after the hunt commences and lasts till the end of March. On the eastern coast of the White Sea the chase is pursued over a space of 230 miles. Two thousand hunters assemble at Kedy, near Cape Voronoff. High wooden towers are erected along the shore, whence observers watch the movements of the seals. Hunting sheds for the men are also erected. When a herd of seals is observed, the men go out on the ice, drawing small boats after them, and kill the young and old with clubs and guns. To approach the seals without being discovered, the hunters muffle themselves in long white shirts and advance slowly and noiselessly over the snow. They are often exposed to the greatest dangers, owing to the sudden movements of the ice. In following up the chase in April they use sailing boats 22 feet long, with an iron-plated bottom, which they draw up on the ice, where a vast encampment is formed, and shooting-parties search for the seals. On the western shore of the White Sea the seal-hunt is less productive than on the eastern. The hunters meet at Devyatoe, a few miles north of the river Ponoi. About 500 men engage in the chase. The Russians take each year in the Arctic Ocean and the White Sea from 2,500,000 to 3,000,000 lb of seal blubber. Allowing an average of 40 lb per seal, this would imply the capture of 65,000 to 75,000 seals. The skins are made into leather.

The most extensive and valuable seal-fishery of the Russians is in the Caspian Sea, where the seals (*Phoca caspica*)

are plentiful. They pass the summer in deep water, and in the autumn resort to the eastern basin, where the ice forms earliest and breaks up latest. Here the pairing takes place on the ice in December and January. The seals are also hunted at the mouths of the Volga and the Ural, and in the southern part of the sea, on the islands of the Gulf of Apsheron. There are three methods of hunting the seals,—killing them with clubs (the commonest and most successful way), shooting them on the ice, and taking them in nets. From 130,000 to 140,000 are taken annually.

A few seals are taken off the coast of California and Washington Territory. In the South Pacific, off the coast of Chili, only a few are now taken where formerly they were captured by the thousand.

The elephant seal or sea elephant (*Macrorhinus leonina*) was formerly taken in great numbers at various places for the sake of its oil. This fishery is now almost a thing of the past; since about 1875 it has been carried on solely from New London in Connecticut, the fleet numbering only four or five vessels. The yield in 1880 was 42,000 gallons of oil, worth $21,420.

The average number of hair seals taken annually may be estimated as follows:

	Seals.
Newfoundland, including Labrador and the Gulf of St. Lawrence	400,000
Canadian net fishery, Gulf of St. Lawrence	75,000
Jan Mayen and the adjacent seas	130,000
Western Greenland	50,000
Nova Zembla, White Sea, and Arctic Ocean	75,000
Caspian Sea	140,000
North and South Pacific	5,000
Total number of hair seals	875,000
Value at $2.50 per seal	$2,187,500

Fur Seals.—The fur seals occupy two distinct areas. None exist on the shores of the North Atlantic. South of the equator they extend from near the tropics to the region of antarctic ice. By far the most important and valuable fur seal fisheries are those carried on at St. Paul's and St. George's Islands, belonging to the Pribyloff group,[1] off the coast of Alaska, at the Commander Islands in the Behring Sea, and that in the same sea 700 miles west of the Alaskan seal islets. The species found here is the northern fur seal (*Callorhinus ursinus*). The males attain mature size about the eighth year, when their length is from 7 to 8 feet, their girth from 7 to 8 feet, and their weight, when in full flesh, from 500 to 700 lb. The females are full grown at four years old, when they measure 4 feet in length, 2½ in girth, and weigh from 80 to 100 lb. The yearlings weigh from 30 to 40 lb. The seals resort to these islands late in spring chiefly for reproductive purposes, making their appearance from the southward. The number annually visiting St. Paul's and St. George's is estimated at five millions. About the middle of April the males begin to arrive and take their places along the shore in "the rookeries," as the breeding-grounds are called. The younger males are prevented from landing by the older, and are compelled either to stay in the water or to go to the uplands. By the middle of June all the males have assembled, and then the females begin to appear. Each old male seal collects from ten to fifteen or more females, whom he guards most jealously. The males fight furiously, "so that night and day the aggregated sound is like that of an approaching railway train." By the middle of July the family circle is complete. Soon after landing the female gives birth to one pup, weighing about 6 lb, which she nurses at wide intervals without any affection. Pairing takes place soon afterwards. No food is taken by the breeding males while on the rocks,—a period of three to four months. When the males leave after this long fast, they are reduced to half their former weight. In the end of October and middle of November all leave the island, the young males going last and by themselves.

The killing of the seals is carefully regulated. No females are killed, and only a certain number of young "bachelor" seals whose skins are of superior quality. These younger male seals are spread out on the slopes above the rookeries to rest. A party of men armed with clubs of hard wood quietly creep between them and the shore, and at a given signal start up with a shout and drive the seals inland. When they reach the killing-grounds near the villages, they select those that are two or three years old and seem likely to yield the most valuable fur. These they despatch with a club. The skins are carefully salted for exportation. Besides the skin each seal yields about a gallon and a half of oil. But it is not used, as its rank odor renders refining very costly. The value of the skins in the raw state varies from five to twenty-five dollars each; at times, when furs are specially fashionable, a higher price is obtained. The quality of the Alaska furs is superior, but those obtained in the South Shetland and antarctic regions are rated best. A cloak of the richest fur seal, a yard deep or more, will cost from £25 [$121.50] to £40 [$194.40]. The roots of the loose exterior hairs penetrate deeper into the skin than those of the fur or short hair, and can readily be cut by paring on the fleshy side, without touching the roots of the fur; the long hairs then drop off, leaving the valuable fur below in a sheet like pure velvet. The number of seals killed on the Pribyloff Islands is limited to 100,000 annually, and with the precautions taken they increase as fast as if left to themselves, "for when the number of males is in excess, the continual fighting on the rookeries destroys many of both females and young, which get trampled to death."

Alaska was purchased from Russia by the United States in 1867. The Pribyloff Islands were leased to the Alaska Commercial Company of San Francisco for twenty years, from 1st May, 1870, under Act of Congress approved 1st July, 1870. The annual rental is $55,000 with a tax of $2.62 on each skin taken,—making the total rental $317,000 per annum. The Alaska Commercial Company have leased the Commander Islands from the Russian Government. About 30,000 fur seals are annually taken there.

The fishery at the mouth of the Straits of Juan de Fuca and its vicinity is carried on by Americans and Canadians. The seals are captured in the waters, the largest number being secured at and about Cape Flattery, to the extent of 15,000 annually. The Lobos Islands, at the mouth of the Rio de la Plata, are under the protection of the Government of Uruguay, the number of seals annually taken being limited to about 12,000. Some of the numerous islands about Cape Horn are the breeding-places of fur seals, as are also the South Shetland Islands farther south. This Cape Horn region is visited by a fleet of seven to ten vessels belonging to New London and Stonington, Connecticut, and also by a few Chilian and other South American vessels. Only occasionally does a vessel visit the South Shetlands, though the quality of skins to be secured there is very superior. The headquarters for the fleet between seasons is at Punta Arenas, or Sandy Point, in the Straits of Magellan. The American fleet in 1880 numbered nine vessels of 1192 tons. The result of the fishery was 9275 skins, worth $90,431. Early in the 19th century the Falkland Islands abounded in fur seals, but they have been exterminated. The number now (1886) annually secured there does not average more than 500; in some years only 50 skins are taken.

There are annually received at London from the Cape of Good Hope about 10,000 sealskins taken at various islands in the Southern Indian Ocean and along the southwest coast of Africa. A few fur seals are taken in the Okhotsk Sea.

Nearly all the fur-seal skins find their way to London, where they are plucked, dressed, and dyed. A few, however, are prepared in New York. At the seal islands they are salted and baled with the fur inside, and in this manner shipped to London. The annual yield of the fur-seal fisheries of the world is about 185,000.

	Seals.
Pribyloff Islands, Alaska	100,000
Commander Islands	30,000
Straits of Juan de Fuca and vicinity	15,000
Lobos Islands, mouth of Rio de la Plata	12,000
Patagonia, including South Shetland Islands and Straits of Magellan	15,000
Falkland Islands	500
Cape of Good Hope, including southwest coast of Africa and islands in Southern Indian Ocean	10,000
Islands belonging to Japan	2,500
Total	185,000
At an average of $7 per skin the annual value would be	$1,295,000
Value of hair seals annually	2,187,500
Total value of hair and fur seals	$3,482,500

See Hatton and Harvey, *Newfoundland*, 1883; *Returns of the Jan Mayen Seal Fisheries*, by Captain Adams, 1885; *United States Fish Commission Reports* for 1873–74 and 1874–75; J. A. Allen, *Eared Seals*; Charles Bryant, *Habits of the Northern Fur Seal*; H. W. Elliott, *Seal Islands of Alaska*. (M. H.)

SEA LAWS, a title which came into use amongst writers on maritime law in the 16th century, and was applied by them to certain mediæval collections of usages of the sea which had been recognized as having the force of customary law, either by the

[1] The sea-lion (*Eumetopias stelleri*) is a characteristic pinniped of the Pribyloff Islands and other parts of Alaska. It has very little commercial value; but by the natives along the Behring Sea coast of Alaska, Kamchatka, and the Kuriles it is highly prized. From the hide they make coverings for their boats; the intestines are made into garments; the stomach walls are used as pouches for oil; the flesh is dried and eaten; and the whiskers are sold to the Chinese, who use them as pickers to their opium pipes, and in several ceremonies in their joss houses.

judgments of a maritime court or by the resolutions of a congress of merchants and shipmasters. To the former class belong the sea laws of Oléron, which embody the usages of the mariners of the Atlantic; under the latter come the sea laws of Wisby, which reflect the customs of the mariners of the North Sea and of the Baltic.

The earliest collection of such usages which was received in England is described in the *Black Book of the Admiralty* as the "Laws of Oléron," whilst the earliest known text is contained in the *Liber Memorandorum* of the corporation of the City of London, preserved in the archives of their Guildhall. These laws are in an early handwriting of the 14th century, and the title prefixed to them is *La Charte d' Oleroun des Juggementz de la Mier*. How and in what manner these "Judgments of the Sea" came to be collected is not altogether certain. Cleirac, a learned advocate in the parliament of Bordeaux, in the introduction to his work on *Les Us et Coustumes de la Mer*, first printed at Bordeaux in 1647, states that Eleanor, duchess of Guienne (the consort of Louis VII. of France, but subsequently divorced from him and married to Henry II. of England), having observed during her visit to the Holy Land, in company with Louis, that the collection of customs of the sea contained in *The Book of the Consulate of the Sea* (see vol. vi. p. 282) was held in high repute in the Levant, directed on her return that a record should be made of the judgments of the maritime court of the island of Oléron (at that time a peculiar court of the duchy of Guienne), in order that they might serve as law amongst the mariners of the Western Sea. He states further that Richard I. of England, on his return from the Holy Land, brought back with him a roll of those judgments, which he published in England and ordained to be observed as law. It is probable that the general outline of Cleirac's account is correct, as it accords with a memorandum on the famous roll of 12 Edw. III., "De Superioritate Maris Angliæ," which, having been for many years carefully preserved in the archives of the Tower of London, is now deposited in the Public Record Office. According to this memorandum, the king's justiciaries were instructed to declare and uphold the laws and statutes made by the kings of England, in order to maintain peace and justice amongst the people of every nation passing through the sea of England: "Quæ quidem leges et statuta per dominum Ricardum, quondam regem Angliæ, in reditu suo a Terra Sancta correcta fuerunt, interpretata, declarata, et in Insula Oleron publicata, et nominata in Gallica lingua La Leye Olyroun."

The earliest version of these Oléron sea laws, which, according to the memorandum above mentioned, were received in England in the latter part of the 12th century, comprised certain customs of the sea which were observed in the wine and the oil trade, as carried on between the ports of Guienne and those of Brittany, Normandy, England, and Flanders. No English translation seems to have been made before the *Rutter of the Sea*, printed in London by Thomas Petyt in 1536, in which they are styled "the Lawes of ye Yle of Auleron and ye Judgementes of ye See." French was, in fact, a tongue familiar to the English High Court of Admiralty down to the reign of Henry VI. A Flemish text, however, appears to have been made in the latter part of the 14th century, the *Purple Book of Bruges*, preserved in the archives of Bruges, in a handwriting somewhat later than that of the *Liber Memorandorum*. Prefixed to this Flemish version is the title, "Dit es de Coppie van den Rollen van Oleron van den Vonnesse van der Zee." Certain changes, however, have been made in the *Purple Book of Bruges* in the names of the ports mentioned in the original Gascon text. For instance, Sluys is in several places substituted for Bordeaux, just as in the *Rutter of the Sea* London replaces Bordeaux. That these sea laws were administered in the Flemish maritime courts may be inferred from two facts. First, a Flemish translation of them was made for the use of the maritime tribunal of Damme, which was the chief Flemish entrepôt of the wine trade in the 13th century. The text of this translation has been published by Adriaen Verwer under the title of the *Judgments of Damme*. In the second place, there is preserved in the archives of the senate of Dantzic, where there was a maritime court of old, famous for the equity of its judgments, an early manuscript of the 15th century, which contains a Flemish reproduction of the Judgments of Oléron headed "Dit is Twater Recht in Vlaenderen." So far there can be no doubt that the Judgments of Oléron were received as sea laws in Flanders as well as in England in the 14th century. Further inquiry enables us to trace them as they followed the course of the wine trade in the North Sea and the Baltic Sea. Boxhorn, in his *Chronyk van Zeelande*, has published a Dutch version of them, which Van Leeuwen has reproduced in his *Batavia Illustrata*, under the title of the *Laws of West-Capell* in Zealand. Verwer has also published a Dutch text of them in his *Nederlant's See-Rechten*, accompanied by certain customs of Amsterdam, of which other MSS. exist, in which those customs are described as usages of Stavoren, or as usages of Enkhuizen, both ports of active commerce in the 15th century. Of these customs of Amsterdam, or, as they were more generally styled "Ordinances of Amsterdam," further mention is made below.

A new and enlarged collection of sea laws, purporting to be an extract of the ancient laws of Oléron, made its appearance in the latter part of the 15th century in *Le Grant Routier de la Mer*, printed at Poitiers in France by Jan de Marnef, at the sign of the Pelican. The title page is without a date, but the dedication, which purports to be addressed by its author Pierre Garcie *alias* Ferrande to his godson, is dated from St. Gilles on the last day of May, 1483. It contains forty-seven articles, of which the first twenty-two are identical with articles of the "Judgments of the Sea," in the *Liber Memorandorum*, the remaining articles being evidently of more recent origin. A black-letter edition of this work in French, without a date, is preserved in the Bodleian Library at Oxford, and to the last article this colophon is appended: "Ces choses précédentes sont extraictes du très utille et profittable Roolle Doloyron par le dict Pierre Garcie alias Ferrande." An English translation is printed in the appendix to *A View of the Admiral Jurisdiction*, published in 1661 by Dr. John Godolphin, in which the laws are described as "an Extract of the Ancient Laws of Oléron rendered into English out of Garsias alias Ferrand." Although this new text had the recommendation of an advocate who had filled the office of judge of the Admiralty Court during the Commonwealth and been appointed king's advocate-general by Charles II., it seems to have been superseded in a short time by Cleirac's *Us et Coustumes de la Mer*, to which was appended the following clause of authentication: "Tesmoin le Seel de l'Isle d'Oléron, estably aux contracts de la dite Isle, le jour du Mardy apres la Feste Sainct André l'an mille deux cens soixant-six." Cleirac does not inform from what source or under what circumstances he procured his text, nor on what authority he has adopted in certain articles readings at variance with those of Garcie, whilst he retains the same number of articles, to wit, forty-seven. The clause of authentication cannot be accepted as a warranty above suspicion, as the identical clause of authentication with the same date is appended to the early Norman and Breton versions of the rolls, which contain only twenty-six articles. Cleirac's version, however, owing probably to the superior style in which it was edited, and to the importance of the other treatises on maritime matters which Cleirac had brought together for the first time in a single volume, seem to have obtained a preference

in England over Garcie's text, as it was received in the High Court of Admiralty during the judgeship of Sir Leoline Jenkyns, and an English translation of it was introduced into the English translation of the *Black Book of the Admiralty* made by John Bedford, the deputy registrar of the High Court, and dedicated to Sir Leoline Jenkyns. It seems to have been Bedford's intention to print this translation under the title of "Sea Laws;" but the manuscript passed into the hands of Sir Leoline Jenkyns, who gave it to the College of Advocates in 1685. The *Black Book* itself, which was missing for a long time from the Admiralty registry, has recently been discovered and has been replaced in the archives of the Admiralty Court. Of these two versions of the sea laws of Oléron the earlier obtained a world-wide reception, for it was translated into Castilian (*Fuero de Layron*) by order of King Alphonso X., and a Gascon text of it is still preserved in the archives of Leghorn, apparently in a handwriting of the 15th century, entitled "Asso es la copia deus Rolles de Leron de jucgemens de mar."

The parent stock of the Wisby sea laws would appear to have been a code preserved in the chancery of Lübeck, drawn up in the Old Saxon tongue, and dated 1240. This code contains amongst many others certain articles on maritime law which are identical with articles in the Gothland sea laws, Gothland being the island of which Wisby was the chief port. This collection comprises sixty-six articles, and it is now placed beyond a doubt by recent researches, especially of Professor Schlyter of Lund, that these Gothland sea laws are a compilation derived from three distinct sources, —a Lübeck, an Oléron, and an Amsterdam source. A Saxon or Low German text of this collection was printed for the first time in 1505 at Copenhagen by Godfrey de Gemen, a native of Gouda in Holland, who is reputed to have set up the earliest printing press in Copenhagen. This print has no title-page, and in this respect resembles the earliest known print of *The Consulate of the Sea;* but upon a blank leaf, which occupies the place of a frontispicce in one of two copies of Godfrey de Gemen's text, both preserved in the royal library of Copenhagen, there has been inserted with a pen in alternate lines of black and red ink the title "Dat hogheste Gotlansche Water-Recht gedrucket to Koppenhaven Anno Domini M.D.V.," and there has also been inserted on the first page of the text the introductory title "Her beghynt dat hogheste Water-Recht" (here begins the supreme sea law). Professor Schlyter has discovered a MS. (No. 3123) in the royal library at Copenhagen, which is written on parchment in a hand of the 15th century, and from which it seems probable that Godfrey de Gemen mainly derived his text, as it comprises the same number of articles, containing the same matter arranged in the same order, with this minor difference, that, whilst both the MS. and the print have the simple title "Water-Recht" prefixed to the first article, the MS. has also a similar title prefixed to the fifteenth. Further, as this article together with those that follow it in the MS., appears to be in a handwriting different from that of the articles that precede, the fifteenth article may justly be considered as the first of a distinct series, more particularly as they are numbered in Roman characters, beginning with § 1, and such characters are continued with a single interruption down to the end of the MS. Although, however, the numeration of the articles of this second series is continuous and the handwriting of the MS. from the fifteenth to the sixty-sixth articles is unchanged, the text of the series is not continuous, as the fortieth article commences with an introductory clause: "This is the ordinance which the skippers and merchants have resolved amongst themselves as ship law." There is no difficulty in recognizing the first division of this second series of sea laws as a Low German version of the Judgments of Oléron, transmitted most probably through a Flemish text. This hypothesis would account for the substitution in several articles of Sluys for Bordeaux. On the other hand, the introductory clause which ushers in the fortieth article is identical with the title that is generally prefixed to MSS. of the maritime Ordinances of Amsterdam, and the text of this and of the following articles down to the sixty-fifth inclusive is evidently of Dutch origin and more or less identical with Verwer's text of the usages of Amsterdam. M. Pardessus, in his valuable *Collection de Lois Maritimes*, published in Paris before Professor Schlyter made known the result of his researches, has justly remarked that the provisions of several articles of this last division of the sea laws are inconsistent with the theory that they originated at Wisby. It may be observed that the sixty-sixth article of the MS. is a Lübeck law identical with the first article of the first series, which is of Lübeck origin. No colophon is appended to this final article in the MS. Nevertheless, Godfrey de Gemen's edition of 1505, which breaks off in the middle of the sixty-sixth article of the MS., has the following colophon: "Here end the Gothland sea laws, which the community of merchants and skippers have ordained and made at Wisby, that all men may regulate themselves by them. Printed at Copenhagen, A.D. M.D.V." The question naturally suggests itself, To what MS. was Godfrey de Gemen indebted for this colophon, or is the alternative more probable that he devised it? There is no known MS. of this collection of an earlier date to which an appeal can be made as an authority for this colophon; on the contrary, the only known MSS. of which the date is earlier than Godfrey de Gemen's print, both of which are in the library of the university of Copenhagen, are without this colophon, and one of them, which purports to have been completed at Nyköping on the Eve of the Visitation of the Virgin in 1494, concludes with a colophon which precludes all idea that anything has been omitted by the scribe, viz., "Here ends this book, and may God send us his grace, Amen." We are disposed to think that Gemen himself devised this colophon. He was engaged in printing for the first time other collections of laws for the Danish Government, and, as Gothland was at that time a possession of Denmark, he may have thus distinguished the sea laws from another collection, namely, of land laws. Professor Schlyter, however, believes Gemen may have borrowed it from a MS. which is lost, or at all events is not known. There is some support to this view in the fact that in the archives of the guildhall of Lübeck there is preserved a MS. of 1533 which contains a Low German version of the same collection of sea laws, with a rubric prefixed to the first article announcing them to be "the water law or sea law, which is the oldest and highest law of Wisby," and there are good reasons for supposing that the scribe of this MS. copied his text from a MS. other than the Copenhagen MS. The same observation will apply to a second MS. of a similar character preserved in the library of the gymnasium of Lübeck, which purports to have been written in 1537. But as regards the Wisby sea laws little reliance can be placed on such rubrics or colophons as proofs of the facts recited in them, though they may be valuable as evidence of the reputed origin of the sea laws at the time when the scribe completed the MS. In illustration of this view it may be stated that in the same year in which the more recent of these two MSS. purports to have been completed—namely, 1537 —there was printed at Lübeck an enlarged edition of the sea laws consisting of seventy-two articles, being a Low German translation of a Dutch text, in which six additional Dutch laws had been inserted which are not found in the Copenhagen MS., nor have a place in Gemen's text, yet to this edition is prefixed the title, "This is the highest and oldest sea law, which the community of merchants and shipmasters have ordained and made at Wisby, that all persons who would be secure may regulate themselves by it." Further, it has an introductory clause to its thirty-seventh

article : "This is the ordinance which the community of skippers and merchants have resolved upon amongst themselves as ship law, which the men of Zealand, Holland, Flanders hold, and with the law of Wisby, which is the oldest ship law." At the end of the seventy-second article there follows the colophon: "Here ends the Gothland sea law, which the community of merchants and mariners have ordained and made at Wisby, that each may regulate himself by it. All honor be to God, MDXXXVII." Each article of this edition has prefixed to it after its particular number the word "belevinge" (judgment). It would thus appear that the Wisby sea laws have fared like the Oléron sea laws: they have gathered bulk with increasing years.

The question remains to be answered, How did this collection of sea laws acquire the title of the "Wisby sea laws" outside the Baltic? for under such title they were received in Scotland in the 16th century, as may be inferred from extracts from them cited in Sir James Balfour's *System of the more Ancient Laws of Scotland*, which, although not printed till 1754, was completed before his death in 1583. The text of the Wisby sea laws generally current in England is an English translation of a French text which Cleirac published in 1641 in his *Us et Coustumes de la Mer*, and is an abbreviated, and in many respects mutilated, version of the original sea laws. This inquiry, however, would open a new chapter on the subject of the northern sea laws, and the civilizing influence which the merchants of Wisby exercised in the 13th century through their factories at Novgorod, linking thereby the trade of the Baltic to that of the Black Sea.

See Pardessus, *Collection de Lois Maritimes antérieures au XVIII. Siècle* (6 vols., Paris, 1828–45); Schlyter, *Wisby Stadslag och Sjörätt*, being vol. viii. of the *Corpus Juris Sueco-Gotorum Antiqui* (Lund, 1853); and *The Black Book of the Admiralty*, ed. by Sir Travers Twiss (4 vols., London, 1871–76). (T. T.)

SEALING WAX. In mediæval times, when the principal use of sealing wax was for attaching the impression of seals to official documents, the composition used consisted of a mixture of Venice turpentine, beeswax, and coloring matter, usually vermilion. The preparation now employed contains no wax. Fine red stationery sealing wax is composed of about seven parts by weight of shellac, four of Venice turpentine, and three to four of vermilion. The resins are melted together in an earthenware pot over a moderate fire, and the coloring matter is added slowly with careful stirring. The mass when taken from the fire is poured into oiled tin moulds the form of the sticks required, and when hard the sticks are polished by passing them rapidly over a charcoal fire, or through a spirit flame, which melts the superficial film. For the brightest qualities of sealing wax bleached lac is employed, and a proportion of perfuming matter—storax or balsam of Peru—is added. In the commoner qualities considerable admixtures of chalk, carbonate of magnesia, baryta white, or other earthy matters are employed, and for the various colors appropriate mineral pigments. In the inferior waxes ordinary resin takes the place of lac, and the dragon gum of Australia (from *Xanthorrhœa hastilis*) and other resins are similarly substituted. Such waxes, used for bottling, parcelling, and other coarser applications, run thin when heated, and are comparatively brittle, whereas fine wax should soften slowly and is tenacious and adhesive.

SEALKOTE. See SIALKOT.

SEALS[1] (Gr. *σφραγίς*, Lat. *sigillum*). During the mediæval period the importance of seals was very great, as they were considered the main proofs of the authenticity of all sorts of documents, both public and private.[2] That is much less the case now, the written signature being thought a safer guarantee of genuineness. In order to make illicit use or imitation of a seal difficult, the seal itself was usually locked up and guarded with special care, and in the case of royal personages or corporate bodies was often made a very complicated work of art, which it would have been almost impossible to copy exactly. One very curious precaution that was adopted is still in use with the corporate seal of the monasteries of Mount Athos. The circular matrix[3] is divided into four quarters, each of which is kept by one of the four *epistatai* or ruling monks; the four pieces are joined by a key-handle, which remains in the custody of the secretary. Thus it is only when all five guardians of the various parts of the matrix meet together that the complete seal can be stamped on any document. The device on the Mount Athos seal is a half-length figure of the Madonna and Child, and the imprint is made by blackening the matrix in the flame of a lamp and then pressing it on the paper or vellum itself. Mediæval seals were applied in two different ways: in one the stamp was impressed in wax run on the surface of the document (Fr. *plaqué* or *en placard*); in the other the wax impression was suspended by cord or strips of parchment (Fr. *pendant*). The latter method was necessarily used with metal seals or *bullæ* (see below).

For the sake of greater security in the case of *plaqué* seals, it was a common practice from the 12th century onwards, or even earlier, to make a cross cut in the vellum of the document, the corners of which were then turned back, thus forming a square opening, over which the wax seal was stamped; the turned-up corners helped to hold the wax in its place, and the aperture allowed a second matrix to be applied at the back. This was usually a smaller private seal called a *secretum*. Thus, for example, an abbot would use on the front of a document the large corporate seal of his community, and on the back would stamp his personal seal as a *secretum*.

Till the 12th century pure white beeswax was generally used; after that wax colored green or red. The use of shellac or other harder materials, such as modern sealing wax, is of recent date. Thus it was usual to protect the soft wax seals by some sort of "fender," often a wreath of rushes or plaited strips of paper twisted round it; another method much employed in the 15th century was to cover the seal with leaves of oak, bay, or beech. *Pendant* seals were often encased in boxes of wood or *cuir bouilli*, which in some cases are very richly decorated. From the 13th to the 15th century original royal documents are usually on fine vellum and have green seals hung by many-colored silk and gold thread, while office copies are on coarser vellum and have white seals hung by parchment strips. In England an important official, called the clerk of the chafe-wax, an office which still exists, was entrusted with the duty of softening the wax for state seals over a chafing-brazier. Two different methods of sealing documents, either closed or open for inspection, are recorded in the legal terms "letters secret" and "letters patent."

Owing to the enormous number of mediæval seals which still exist, and their frequently great historical and artistic importance, it is necessary to adopt some method of classification, especially for large collections, such as that of the British Museum, which contains about 25,000 specimens, and the very important one of the Society of Antiquaries.[4] The chief classes are these: (1) *Ecclesiastical.*—(*a*) Seals belonging to offices, such as those of popes, bishops, abbots, deans, etc.; (*b*) common seals of corporate bodies, such as chapters, religious colleges, monasteries, and the like; (*c*) official seals without the name of the officer; (*d*) personal

[1] For antique seals, see GEMS, JEWELLERY, and RING.

[2] In some cases, in the presence of witnesses, a seal which did not belong to the signer of a document was used when the right matrix was not at hand. This has naturally caused many archæological puzzles.

[3] The word "seal" is often used to denote both the impression made and the object that makes the impress. More correctly the latter is called the "matrix," and only the impression is called the "seal."

[4] This valuable collection has been arranged and catalogued by Dr. C. S. Percival, the best modern authority on English seals.

seals, with or without name. (2) *Lay.*—(*a*) Royal seals, including those of queens and royal princes; (*b*) official seals in the name of the sovereign or a state official; (*c*) common seals of corporate bodies, such as towns, universities, guilds, schools, hospitals, etc.; (*d*) personal seals (not being royal) with effigies, heraldry, merchants' marks, or other devices, with or without a name, or with name only, or with legend only.

French Royal Seals.[1]—The earliest and most complete series of seals is that of the French kings. The Carlovingian and Merovingian monarchs mostly used antique gems or pastes,—portrait heads being selected and a legend added in the metal setting of the matrix. Charlemagne used a head of Jupiter Serapis,[2] Pippin the Short that of the Indian Dionysus. The British Museum possesses a seal of Odo or Eudes, king of France (888–898), impressed from a fine Greek gem of the 3d century B.C., with a portrait of Seleucus IV. The oldest existing matrix is that of Lothaire I. (*c.* 817), now preserved at Aix-la-Chapelle, attached to an altar-cross. It is an oval intaglio in rock crystal, with a laureated portrait and the legend + XPE . ADIVVA . HLOTHARIVM . REG.; it is not an antique, but is of contemporary Byzantino-Rhenish work. Till the time of Louis VI. (1108–1147) these seals were *plaqué*, but he introduced *pendant* seals about 1108; and counterseals at the back were first used by Louis VII. (1137–80). The grand series of round seals with an enthroned figure of the king begins with the Capet Henry I. (1031–60). The king holds a sceptre in one hand and a flower in the other. Those of the queens are frequently of a pointed oval form, with a standing portrait figure holding a flower in each hand. In the 13th and 14th centuries the French royal seals were elaborate works of art, with a finely draped figure of the king seated under a rich canopy on a throne, decorated with lions' or eagles' heads; the king holds a sceptre in each hand. The queens' seals, of a round or pointed oval form, are also very beautiful, with a graceful figure standing between two shields under a rich canopy. After the 15th century there was a rapid decadence in the royal seals, and in the 17th and 18th centuries they were of the most tasteless style, far worse than those used in England at the same date.

English Royal Seals.—This, which is on the whole the most beautiful of all royal series, begins with the seal of Edward the Confessor (see Fig. 1).[3] The great seal of William the Norman and his successors was not *plaqué*, like the earlier ones, but pendant; it has on one side an enthroned figure of a king copied from contemporary French seals, and on the reverse the king on horseback armed with spear and shield. These two ways of representing the sovereign have been used on all the royal seals of England down to the present day. By degrees greater elaboration of ornament was introduced into the throne and its canopy. In Edward III.'s time niches with minute statuettes of saints were added at the sides of the obverse. The climax of magnificence was reached in the reign of Henry V. On the obverse of his seal the king sits holding the orb and sceptre; the gorgeous canopy contains statuettes of the Virgin and two saints, and at each side are three rows of statuettes in minute canopied niches, each row two tiers high; about fifteen minute figures of saints and angels are introduced into the design. On the reverse is the king on horseback, bearing a sword and shield; the horse, going at full speed, is clothed with richly embroidered heraldic drapery, and on its head and on the king's is a lion crest. After Henry V. the seals began to decrease in magnificence, and in the reign of Henry VII. the new taste of the Renaissance began to supplant the pure Gothic of the earlier seals. In the time of Philip and Mary both sovereigns appear together, seated under canopies, or riding side by side.[4] The great seal of the Commonwealth is a marvel of ugliness. On the obverse is a perspective view of the interior of the House of Commons, and on the reverse a map of Great Britain and Ireland. Cromwell's seal has an equestrian portrait of himself, and its reverse the arms of the Commonwealth between a lion and a dragon as supporters. Little is noticeable about the seals of succeeding sovereigns; that of Victoria is minutely cut, but is very poor as a work of art.

FIG. 1.—Seal of Edward the Confessor.

Other English Seals.—Gilt bronze was the commonest material for large seals, but other metals were used, such as gold, silver, and lead, also jet and ivory, especially before the Norman Conquest. Rock crystal, carnelian, and sard were the favorites among the hard stones cut for matrices. Large seals were usually either round or of a pointed oval form (as in Figs. 2 and 3); the small *secreta* were sometimes square, triangular, or hexagonal, as well as round or oval.[5] The most elaborate and beautiful of all were those of religious corporations, such as the chapter seals of monasteries.[6] These are among the most exquisite works of art that the Middle Ages produced, especially during the 14th century, and exceed in delicacy of workmanship and elaboration of design the finest seals of all other classes, not excepting those of the sovereigns. Fig. 2 shows the common seal of Boxgrove priory (Sussex), the matrix of which is now in the British Museum. On one side is a figure of the Virgin enthroned, and on the reverse a representation of the west front of the priory church, with open tracery and niches containing minute statuettes. This elaborate matrix is made up of four distinct pieces of gilt bronze, and to form the perfect seal must have been a work requiring considerable skill and patience. The reverse was formed by two stamps used on two separate plaques of softened wax: one of these formed the background with the various statuettes, and the second was used to stamp the open tracery work of the front of the church; the latter when hard was fitted on to the impression of the background, and thus a sort of miniature model of the church was made, with its statues and the inner planes of the façade seen through the open

[1] See Wailly, *Éléments de Paléographie*, vol. ii., pl. A.; by various authors, *Trésor de Num. et de Glyptique*, vol. i., Paris, 1834 (which contains also plates of English royal seals); Douet-d'Arcq, *Coll. de Sceaux de l'Empire*, Paris, 1863–68; *Bulletin de la Société de Sphragistique*, Paris, v. y.; D'Anisy, *Recueil de Sceaux Normands*, Caen, 1835.

[2] The monks of Durham also used a gem with a head of Jupiter Serapis, round which was added the legend—CAPVT . SANCTI . OSWALDI.

[3] The English kings before the Conquest signed usually with a cross only, but a few, such as Offa, Ethelwulf, and Ethelred, occasionally used seals, especially on documents containing grants to St. Denis and other French abbeys, on which they followed the French custom of affixing *plaqué* seals.

[4] A variety of design is introduced on the reverse of one of Queen Elizabeth's seals; she is represented standing, holding the orb and sceptre, and wears a dress with enormous hoops. Her other seal has the usual equestrian portrait on the reverse.

[5] As a rule, from the 12th to the 15th century, ecclesiastical seals and those of females were of the pointed oval form, most others being circular; there are, however, many exceptions to this rule.

[6] A special English office for the blessing of seals is printed by Maskell, *Mon: Ritualia*, 1882, vol. iii.

tracery work,—the effect being extremely rich and delicate. When the finished obverse and reverse had been fitted together, the legend was added on their edges by means of the fourth piece of the matrix,—a strip of bronze with letters cut into it on both its edges; first one side and then the other of this strip was pressed against the rim of the wax seal, which thus received the impression of the complete legend all round its

FIG. 2.—Fourteenth-century seal of Boxgrove priory; reverse.

edge. The seal of Southwark priory, also of the 14th century, is even more elaborate, as both sides have open tracery separately applied, and thus the matrix consists of five distinct pieces. Many of the bishops' seals, though less complicated in design, are of equal beauty to those of the chapters. The common design

FIG. 3.—Seal of Richard de Bury, late 14th century.

has a standing figure under a richly decorated canopy. Fig. 3 shows a very beautiful example, the seal of Richard, bishop of Durham. The standing figure of the bishop in mass vestments is modelled with wonderfull skill and shows extreme taste in the treatment of the drapery: the legend is s[igillum] RICARDI . DEI . GRA . DVNELMENSIS . EPI. A great variety of sacred subjects occur on ecclesiastical seals in addition to single figures of patron saints; the most frequent were perhaps the crucifixion, the Annunciation, the Coronation of the Virgin, and the Virgin enthroned in Heaven; small figures of kneeling worshippers were often added.

FIG. 4.—Seal of King's College, Cambridge.

Fig. 4 shows one of the most magnificent of this class, with, in the centre, a figure of the Virgin in glory, between St. Nicholas and Henry VI., each under a very rich canopy; at the sides are shields charged with England and France, and France (modern) alone, held by two monks.[1] This very beautiful work of art dates about the year 1443. In the 15th century the ecclesiastical seals began to fall off in richness and beauty, and after the Reformation were of little artistic value. Very handsome seals were used by lay corporations, especially the municipalities of towns. These last frequently have a careful representation of the town

FIG. 5.—Corporate seal of Rochester.

itself, with its circuit of walls or that of its chief castle or cathedral, and thus often afford valuable evidence as to the form of its defences and principal buildings. Fig. 5 shows a fine example, 3 inches in diameter,—the corporate seal of Rochester, made in the 13th century; it has a minute representation of the keep of Rochester Castle, surrounded by an outer circuit wall and a moat. On one of the turrets of the gateway is a sentinel blowing a signal horn; legend,

[1] This class of seal is often a sort of miniature reproduction of some magnificent altar retable, as in Fig. 4.

SIGILLVM . CIVIVM . ROFENSIS. The reverse has the same legend repeated round the scene of the Crucifixion of St. Andrew. Other corporation seals are covered with small figures under elaborate canopy work, much like those of the ecclesiastical foundations.

Seals of hospitals are often designed in a similar way, with a representation of the hospital building very minutely treated. In the 15th century seals began to be designed in a rather pictorial style, which, though very graceful, is inferior to the earlier and more architectonic class. Very magnificent seals were used by state officials; those of the lord high admiral of England are especially fine, from the beautiful form of the ship on the obverse. Fig. 6 shows that of the

FIG. 6.—Seal of Lord High Admiral Huntingdon.

earl of Huntingdon, who was lord high admiral in the reign of Henry VIII. In design it resembles those of the admirals of the previous century. On the sails are embroidered the royal arms of England.

Among private seals those of powerful barons are often large and very beautifully cut. Fig. 7 shows a

FIG. 7.—Seal of Robert Fitzwalter, *c.* 1270.

silver matrix, now in the British Museum, which is remarkable for the great beauty of its workmanship. Its legend is SIGILLVM . ROBERTI . FILII . WALTERI. On it an armed knight, of the time of Henry III., is riding over a dragon, whose tail ends in a scroll of very beautiful conventional foliage, modelled with the greatest spirit and delicacy. A common and graceful form of private seal in the 13th and 14th centuries has simply a shield with the owner's arms on a diapered background, the whole enclosed within many-cusped tracery. Fig. 8 shows an example of a fine Græco-Roman gem,—a carnelian engraved with a female head, full face. The 14th-century owner of this has added a metal setting with the words CAPVT . MARIE . MAGDALENE, to give it a sacred meaning. The legends of private seals or *secreta* were often chosen in allusion to their use; common phrases are "clausa secreta tego," or "lecta lege, tecta tege." Many ingenious devices were practiced to enable the same matrix to give two or more different varieties of impression. In some cases the border with the legend was so contrived as to slide up the handle, so that the seal could be made either with or without an inscription. Others had the border made to revolve on a swivel, so as to supply two different legends; and the magnificent monastic seals (as that shown in Fig. 2) were arranged so as to give a perfect seal without the use of the elaborate open tracery. In the 15th and 16th centuries merchants and handicraftsmen frequently employed devices connected with their trade—either some tool or badge or an arbitrary sign used as a trade-mark; or a rebus of the owner's name was used, such as a bolt and a tun (cask) for the name Bolton. The use of seals by the humbler classes was more common in England than abroad; even bondsmen sometimes had seals, both before and after the Norman Conquest. Seals of other countries mostly followed the same fashions as those of England, though of course varying in design and workmanship with each country. On the whole, the English seals were superior during their best period (the 14th century) to those of any other country, though matrices of great beauty were produced in both Germany and France. In Italy less care and skill were usually spent on seals, partly owing to the greater use of metal bullæ for important charters.

FIG. 8.—Antique gem used as a private seal.

Metal Bullæ.—These are necessarily not *plaqué* but *pendant*, and are held usually by cords passed through a hole in the seal. Lead was the metal most commonly used, but some sovereigns had bullæ struck in silver or gold, either as a mark of their own dignity or to confer special honor on the recipient of a charter. An extant letter from Petrarch to Charles IV. thanks that emperor for a diploma of the rank of count, and especially for the honor shown to him by the attachment of gold bullæ to the document. Lead bullæ were also used by various ecclesiastical dignitaries, from patriarchs to bishops, but were rarely used by ecclesiastics of lower rank. In some cases, however, especially in Sicily and Byzantium, bullæ were used by laymen of very moderate rank. A large number of fine papal bullæ[1] exist dating from the 7th century onwards.[2] Since the time of Pope Paschal II. they have borne heads of St. Peter and St. Paul; previously they had such simple devices as crosses or stars, with the name of the pontiff. Another early series of bullæ begins in the 8th century with the bullæ of the patriarchs of Byzantium. Those of the doges of Venice exist in large numbers, bearing figures of St. Mark and the reigning doge kneeling before him. Existing bullæ of Charlemagne have a rude profile portrait crowned with a diadem, and on the reverse the monogram of KAROLVS arranged in the form of a cross.

Consult, in addition to the works named above, Thulemarius, *De Bulla Aurea*, Frankfort, 1724; Römar-Büchner, *Die Siegel der deutsch. Kaiser*, Frankfort, 1851; Vossberg, *Gesch. der preussischen Siegel*, Berlin, 1843; Melly, *Siegel-Kunde des Mittelalters*, Vienna, 1846; Heineccius, *De Sigillis*, Frankfort, 1709; Lepsius, *Sphragistische Aphorismen*, Halle, 1842–43; Caulfield, *Sigilla Ecclesiæ Hibernicæ*, London, 1853; and more especially various articles in the *Gaz. des Beaux-Arts*, *Archæologia*, *Archæological Journal*, and *Proceedings* of other antiquarian societies. (J. H. M.)

[1] The term "bull" for a papal charter comes from its lead *bulla*.
[2] See Ficoroni, *Piombi Antichi*, Rome, 1745.

LATE REAR-ADMIRAL W. T. SAMPSON, U. S. N.

SEAMANSHIP.

SEAMANSHIP is the art of sailing, manœuvring, and preserving a ship or a boat in all positions and under all reasonable circumstances, and thus involves a sound practical knowledge of all the forces by which she may be actuated and the means at command to assist or counteract them; it is a branch of applied mechanics acquired by experience and study. The former can only be obtained thoroughly in many years spent at sea, in personal connection with the work of the ship and her boats; that such training should commence at an early age is very desirable, if not even imperative. The practical knowledge so gained should be supplemented and improved by reading, conversation, and discussion, as the casualties which befall ships are so varied that a man may pass forty years in sea-going vessels without experiencing one-half of those which might occur. Many of the old maxims are still applicable to every class of vessel and must always remain so.

Steam and sailing ships.

The terms "ship" and "vessel" are here intended to embrace all classes, though "ship" is generally applied to the larger without reference to form or description unless such is specified. Though the use of sails has been greatly superseded by the introduction of steam-power both in the navies of all nations and in the mercantile marine, it is still generally admitted that seamanship is best acquired on board a vessel which is dependent upon her sails. The construction and equipment of sailing ships had reached a high point of perfection at the time steam came into general use. The power derived from the steam-engine does not change any of the former conditions, but simply adds another element, confined to propulsion directly ahead or astern (except with reversible wheels or twin screws), which when combined with sails renders a ship much more manageable and safe,—that is to say, assuming all the forces at command to be properly applied. Hence it is very desirable that all ocean-going steam vessels should have sufficient sail-power to turn them round (wear) or to enable them to sail with the wind abeam without steam, especially when fitted with single screws or with paddle wheels which do not work separately. Twin screws, of course, give a double chance as far as the engine is concerned; but even with that advantage the loss of the rudder would leave the ship in a helpless condition if she had not efficient head and after sails to balance her on the desired course.

At present the excessive desire to make quick passages has greatly augmented the danger unavoidably attending a sea voyage, the risk as well as the violence of a collision at high speed in thick weather being thereby much increased. Through the want of masts and sails there is a probability of total loss by drifting helplessly on a lee shore during a gale, or by foundering "in the trough of the sea." In spite of her monstrous size (22,000 tons), the "Great Eastern," in 1863 or 1864, with her six comparatively small masts and weak sails was, after the loss of her rudder, very roughly used by the waves striking her full on the side. She was in the position which is expressed by the common sea-phrase "wallowing in the trough of the sea," from which her crew had no power to extricate her. A smaller vessel deeply laden in such a position would most probably have foundered, leaving no one to tell the tale. Too much stress is laid upon the retardation caused by masts and rigging when steaming head to wind; it is the pitching and plunging motion of the ship into a succession of waves that principally retards her speed. If the waves are approaching at the rate of 10 miles an hour and the ship is steaming against them at a similar rate, they will strike the bows with a force equal to 20 miles an hour. When a ship is steaming through comparatively smooth water (sheltered by land) against a gale of wind, her speed is but little reduced by the force of the wind alone, when other circumstances admit of her working full power. Storm-sails only require short masts, but these and the canvas they support should be strong, which is not the case in the merchant service generally.

Duties of a seaman.

Every seaman is expected to be thoroughly acquainted with the rigging of the vessel in which he serves, and when in charge he should frequently examine every part, to see that it is efficiently performing the duty assigned to it, being neither too taut nor too slack, nor suffering from chafing, wet, or other injury. He should be capable of repairing or replacing any part with his own hand if necessary and of teaching others how to do so. He need not necessarily be a navigator, though a good navigator must be a seaman; nor is it necessary that a seaman should be a shipbuilder, a mast-maker, a rope-maker, or a sail-maker, but he should possess a general knowledge of each art, especially the last; every able seaman should be able to sew a seam and assist the ship's sail-maker in repairing sails. It is greatly to be regretted that various circumstances have brought about such a change in the system of rigging ships, in both the British navy and the mercantile marine, that those who sail in them seldom see it done. Young officers were in former times frequently entrusted with the charge of day watches, during which they would give the necessary orders for making, shortening, or trimming sails, perhaps even tacking and wearing. That practice gave confidence and quickened the desire to learn more; it was more frequently done in small than in large ships. The general adoption of the steam-engine in ships has not only diminished the value of sail-power but of seamanship also, and has produced such a change in the rig that instead of masts and yards we find only two or three poles. In the British navy so many new sciences have been introduced that seamanship takes but a low place among them at the examination of a midshipman, who has had but little boat duty and probably found the discussion of seamanship in his mess-place contrary to rule. The rapidity with which all sail and mast drill is executed, combined with the perfection of the "station bill," renders it worse than useless as a means of teaching, as it gives a false confidence which fails in the hour of necessity, when the accustomed routine is thrown out by a sail actually splitting to pieces or a spar snapping. The fact that the same men perpetually do the same thing must tend greatly to render each evolution quick so long as every one is in his accustomed place, but sickness or the absence of a party from duty will disorganize the ship for some time, as the general usefulness of the men has been cramped. Sail drill in harbor is open to grave objections: unless in a tide-way, the ship must be invariably head to wind; for reefing and furling the yards are laid square, consequently flat aback; both earings are hauled out at once, and as it is only for exercise they are only half secured. Even when reefing top-sails at sea either for exercise or of necessity in company with other ships, the yards are laid square to enable the men to get readily on the weather side; therefore, if on a wind, the sail must remain aback or the ship must be kept away till the wind is on the beam in order to shake the sail.

Knots, hitches, bends, etc.

The foundation of all teaching of seamanship must be a knowledge of the knots, bends, and splices, and their use in the various parts of the rigging and equipment of a ship.[1] Some knots, bends, and hitches are intended to afford security as long as desired, and

[1] A person wishing to make sailor's knots need not be deterred by the want of material, as nearly all that are here represented were made, for the purpose of sketching them, with the lashing of a packing case.

then to be easily disengaged. Other knots, splices, and seizings are of a more permanent character, generally continuing as long as the rope will last.

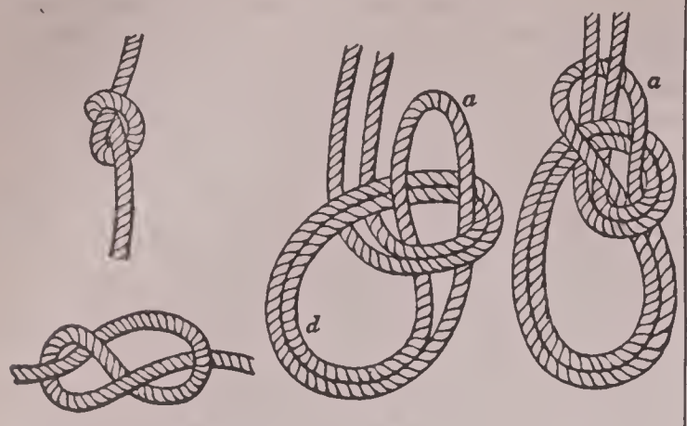


Fig. 1. Fig. 2. Fig. 3. Fig 4.

FIG. 1.—Overhand Knot.
FIG. 2.—Figure-of-Eight Knot.
FIG. 3. } Bowline on a Bight.
FIG. 4. }

Overhand Knot.—Used at the end of ropes to prevent their unreeving and as the commencement of other knots. Fig. 1 represents an overhand knot hauled tight; for an illustration of the same not hauled tight see KNOT, vol. xiv. p. 128, Fig. 7.

Figure-of-Eight Knot (Fig. 2).—Used only to prevent ropes from unreeving; it forms a large knob.

Reef Knot (see KNOT, *loc. cit.*, Figs. 8 and 9).—First form an overhand knot; then take the end *a* over the end *b* and through the bight.[1] This knot is so named from being used in tying the reef points of a sail, since it will not jam. If the end *a* were taken under the end *b*, a *granny's knot* would be formed.

Bowline Knot.—Lay the end of a rope *a* over the standing part *b*; form with *b* a bight *c* over *a*; take *a* round behind *b* and down through the bight *c*. This is a very useful knot, forming a loop which will not slip. *Running bowlines* are formed by making a bowline round its own standing part above *b*. It is the most common and convenient temporary running noose. See KNOT, *l.c.*, Figs. 11 and 12.

Bowline on a Bight (Figs. 3, 4).—The first part is made similar to the above with the double part of the rope; then the bight *a* is pulled through sufficiently to allow it to be bent over past *d* and come up in the position shown in Fig. 4. It makes a more comfortable sling for a man than a single bight.

Half-Hitch.—Pass the end *a* round the standing part *b* and through the bight. This hitch by itself round a large object would not hold and round a small one would jam excessively. See KNOT, *l.c.*, Fig. 13.

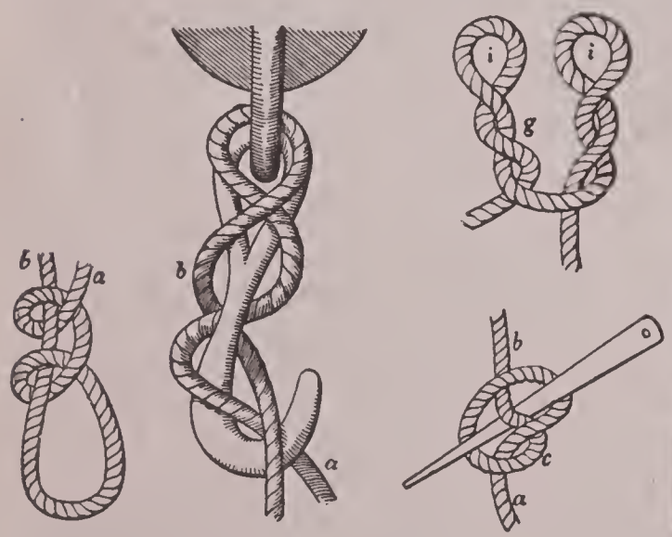


Fig. 5. Fig. 6. Fig. 7. Fig. 8.

FIG. 5.—Two Half-Hitches.
FIG. 6.—Double Blackwall Hitch.
FIG. 7.—Cat's-paw.
FIG. 8.—Marling-Spike Hitch.

Two Half-Hitches (Fig. 5).—The half-hitch repeated; this is commonly used, and is capable of resisting to the full strength of the rope. A stop from *a* to the standing part will prevent it jamming.

Clove Hitch.—Pass the end *a* round a spar or rope and cross it over *b*, its standing part; pass it round again and put the end *a* through the second bight. This hitch is generally used at right angles to the object and is improved by adding a half-hitch with the end *a* round *b*. When pulled in a line with the spar it becomes simply two half-hitches. An illustration is given in KNOT, *l.c.*, Fig. 15.

Double Blackwall Hitch (Fig. 6).—Pass the end *a* twice round the hook and under the standing part *b* at the last cross. The ordinary Blackwall hitch only extends to the first cross at *b*, and is quickly formed by passing the hook of a jigger through the bight of a rope so that the end may be jammed between it and the standing part, as from *b* to *a*. Used for setting up top-gallant rigging and similar light work when a slip is of little consequence.

Cat's-paw (Fig. 7).—Twist up two parts of a lanyard in opposite directions and hook the tackle in the eyes *i*, *i*. A piece of wood should be placed between the parts at *g*. A large lanyard should be clove-hitched round a large toggle and a strap passed round it below the toggle.

Marling-Spike Hitch (Fig. 8).—Lay the end *a* over *c*; fold the loop over on the standing part *b*; then pass the marling-spike through, over both parts of the bight and under the part *b*. Used for tightening each turn of a seizing.

Fisherman's Bend (Fig. 9).—Take two turns round a spar, then a half-hitch round the standing part and between the spar and the turns, lastly a half-hitch round the standing part.

Studding-Sail Halyard Bend (Fig. 10).—Similar to the above; except that the end is tucked under the first round turn; this is more snug. A *magnus hitch* has two round turns and one on the other side of the standing part with the end through the bight.

Timber Hitch (Fig. 11).—Take the end *a* of a rope round a spar, then round the standing part *b*, then several times round its own part *c*, against the lay of the rope.

Seizing (Fig. 12).—This consists of turns and crossings, the latter taken diagonally with a marling hitch each time. Used to keep woodings and seizings in place. The same term is applied to lines between the backstays to keep a broken part from falling.

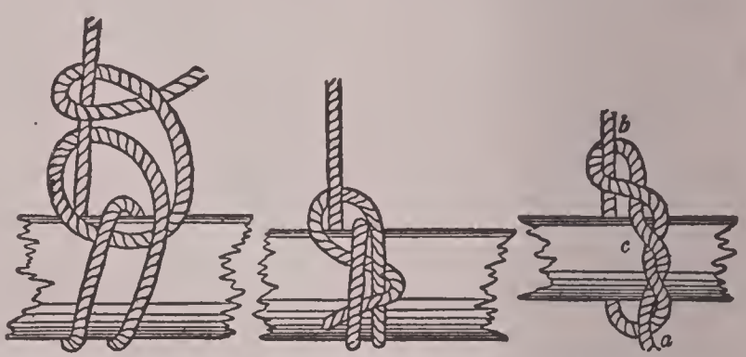


Fig. 9. Fig. 10. Fig. 11.

FIG. 9.—Fisherman's Bend.
FIG. 10.—Studding-Sail Halyard Bend.
FIG. 11.—Timber Hitch.

Carrick Bend (Fig. 13).—Lay the end of one hawser over its own part to form a bight as *e'*, *b*; pass the end of another hawser up through that bight near *b*, going out over the first end at *c*, crossing under the first long part and over its end at *d*, then under both long parts, forming the loops, and above the first short part at *b*, terminating at the end *e''*, in the opposite direction vertically and horizontally to the other end. The ends should be securely stopped to their respective standing parts, and also a stop put on the becket or extreme end to prevent it catching a pipe or chock; in that form this is the best quick means of uniting two large hawsers, since they cannot jam. When large hawsers have to work through small pipes, good security may be obtained either by passing ten or twelve taut racking turns with a suitable strand and securing each end to a standing part of the hawser, or by taking half as many round turns taut, crossing the ends between the hawsers over the seizing and reef-knotting the ends. This should be repeated in three places and the extreme ends well stopped. Connecting hawsers by bowline

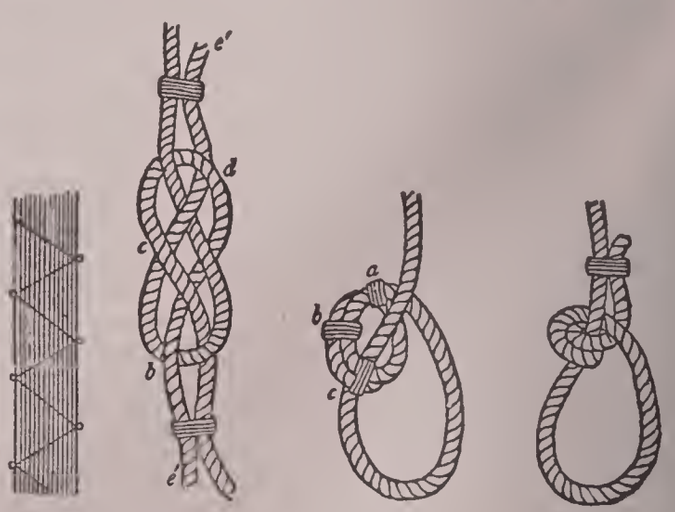


Fig. 12. Fig. 13. Fig. 14. Fig. 15.

FIG. 12.—Snaking.
FIG. 13.—Carrick Bend.
FIG. 14.—Inside Clinch.
FIG. 15.—Midshipman's Hitch.

[1] For an explanation of this and other technical terms, see the glossary on p. 630 below.

knots is very objectionable, as the bend is large and the knots jam.

Sheet Bend.—Pass the end of one rope through the bight of another, round both parts of the other, and under its own standing part. Used for bending small sheets to the clews of sails, which present bights ready for the hitch. An ordinary net is composed of a series of sheet bends. See KNOT, *l.c.*, Fig. 20. A *weaver's knot* is made like a sheet bend.

Single Wall Knot.—Unlay the end of a rope, and with the strand *a* form a bight; take the next strand *b* round the end of *a;* take the last strand *c* round the end of *b* and through the bight made by *a;* haul the ends taut. A *double wall* against the lay (not crowned) makes a good stopper. A *whale knot* is similar, but made with the lay. Fig. 21 of art. KNOT, *l.c.*, represents a single wall knot.

Single Wall Crowned.—Form a single wall, and lay one of the ends, *a*, over the knot; lay *b* over *a*, and *c* over *b* and through the bight of *a;* haul the ends taut. See KNOT, *l.c.*, Fig. 22.

Double Wall and Double Crown.—Form a single wall crowned; then let the ends follow their own parts round until all the parts appear double; put the ends down through the knot. A very excellent and generally used cable-stopper. See KNOT, *l.c.*, Fig. 23.

Matthew Walker.—Unlay the end of a rope. Take the first strand round the rope and through its own bight; the second strand round the rope, through the bight of the first, and through its own bight; the third through all three bights. Haul all taut. An easily made and useful knot. Illustrations are given in KNOT, *l.c.*, Figs. 24 and 25.

Inside Clinch (Fig. 14).—The end is bent close round the standing part till it forms a circle and a half, when it is securely seized at *a*, *b*, and *c*, thus making a running eye; when taut round anything it jams the end. It is used for securing hemp cables to anchors, the standing parts of topsail sheets, and for many other purposes. If the eye were formed outside the bight an *outside clinch* would be made, depending entirely on the seizings, but more ready for slipping.

Midshipman's Hitch (Fig. 15).—Take two round turns inside the bight, the same as a half-hitch repeated; stop up the end; or let another half-hitch be taken or held by hand. Used for hooking a tackle for a temporary purpose.

Fig. 16.

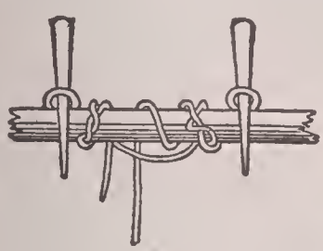


Fig. 17.

Fig. 18.

FIG. 16.—Turk's Head. FIG. 17.—Spanish Windlass. FIG. 18.—Slings.

Turk's Head (Fig. 16).—With fine line (very dry) make a clove hitch round the rope; cross the bights twice, passing an end the reverse way (up or down) each time; then keeping the whole spread flat, let each end follow its own part round and round till it is too tight to receive any more. Used as an ornament variously on side-ropes and foot-ropes of jibbooms. It may also be made with three ends, two formed by the same piece of line secured through the rope and one single piece. Form with them a diamond knot; then each end crossed over its neighbor follows its own part as above.

Spanish Windlass (Fig. 17).—An iron bar and two marling-spikes are taken; two parts of a seizing are twisted like a cat's paw (Fig. 7), passed round the bar, and hove round till sufficiently taut. In heaving shrouds together to form an eye two round turns are taken with a strand and the two ends hove upon. When a lever is placed between the parts of a long lashing or frapping and hove round, we have what is also called a Spanish windlass.

Slings (Fig. 18).—This is simply the bight of a rope turned up over its own part; it is frequently made of chain, when a shackle (bow up) takes the place of the bight at *s* and another at *y*, connecting the two ends with the part which goes round the mast-head. Used to sling lower yards. For boat's yards it should be a grummet with a thimble seized in at *y*. As the tendency of all yards is to cant forward with the weight of the sail, the part marked by an arrow should be the fore-side,—easily illustrated by a round ruler and a piece of twine.

Sprit-Sail Sheet Knot (Fig. 19).—This knot consists of a double wall and double crown made by the two ends, consequently with six strands—with the ends turned down. Used formerly in the clews of sails, now as an excellent stopper, a lashing or shackle being placed at *s*, and a lanyard round the head at *l*.

Turning in a Dead-Eye Cutter-Stay fashion (Fig. 20).—A bend is made in the stay or shroud round its own part and hove together with a bar and strand; two or three seizings diminishing in size (one round and one or two either round or flat) are hove on taut and snug, the end being at the side of the fellow part. The dead-eye is put in and the eye driven down with a commander.

Turning in a Dead-Eye end up (Fig. 21).—The shroud is measured round the dead-eye and marked where a throat-seizing is hove on; the dead-eye is then forced into its place, or it may be put in first. The end beyond *a* is taken up taut and secured with a round seizing; higher still the end is secured by another seizing. As it is important that the lay should always be kept in the rope as much as possible, these eyes should be formed conformably, either right-handed or left-handed. It is easily seen which way a rope would naturally kink by putting a little extra twist into it. A shroud whose dead-eye is turned in end up will bear a fairer strain, but is more dependent on the seizings; the under turns of the throat are the first to break and the others the first to slip. With the cutter-stay fashion the standing part of the shrouds gives way under the nip of the eye. A rope will afford the greatest resistance to strain when secured round large thimbles with a straight end and a sufficient number of flat or racking seizings. To splice shrouds round dead-eyes is objectionable on account of opening the strands and admitting water, thus hastening decay. In small vessels, especially yachts, it is admissible on the score of neatness; in that case a round seizing is placed between the dead-eye and the splice. The dead-eyes should be in diameter 1½ times the circumference of a hemp shroud and thrice that of wire; the lanyard should be half the nominal size of hemp and the same size as wire; thus, hemp-shroud 12 inches, wire 6 inches, dead-eye 18, lanyard 6 inches.

Fig. 19.

Fig. 20.

Fig. 21.

FIG. 19.—Sprit-Sail Sheet Knot.
FIG. 20.—Turning in a Dead-Eye Cutter-Stay fashion.
FIG. 21.—Turning in a Dead-Eye end up.

Short Splice.—The most common description of splice is when a rope is lengthened by another of the same size, or nearly so. Fig. 22 represents a splice of this kind; the strands have been unlaid, married, and passed through with the assistance of a marling-spike, over one strand and under the next, twice each way. The ends are then cut off close. To render the splice neater the strands should have been halved before turning them in a second time, the upper half of each strand only being turned in; then all are cut off smooth. *Eye-Splice.*—Unlay the strands and place them upon the same rope spread at such a distance as to give the size of the eye; enter the centre strand (unlaid) under a strand of the rope (as above) and the other two in a similar manner on their respective sides of the first; taper each end and pass them through again. If neatness is desired, reduce the ends and pass them through once more; cut off smooth and serve the part disturbed tightly with suitable hard line. Uses too numerous to mention. *Cut Splice.*—Made in a similar manner to an eye-splice, but of two pieces of rope, therefore with two splices. Used for masthead pendants, jib-guys, breast backstays, and even odd shrouds, to keep the eyes of the rigging lower by one part. It is not so strong as two separate eyes. *Horse-Shoe Splice.*—Made similar to the above, but one part much shorter than the other, or another piece of rope is spliced across an eye, forming a horse-shoe with two long legs. Used for back-ropes on dolphin striker, backstays (one on each side), and cutter's runner pendants. *Long Splice.*—The strands must be unlaid about three times as much as for a short splice and married,—care being taken to preserve the lay or shape of each. Unlay one of the strands still further and follow up the vacant space with the corresponding strand of the other part, fitting it firmly into the rope till only a few inches remain. Treat the other side in a similar manner. There will then appear two long strands in the centre and a long and a short one on each side. The splice is practically divided into three distinct parts; at each the strands are divided and the corresponding halves knotted (as shown on the top of Fig. 24) and turned in twice. The half strand may, if desired, be still further reduced before the halves are turned in for the second time. This and all other splices should be well stretched and hammered into shape before the ends are cut off. The long splice alone is adapted to running ropes.

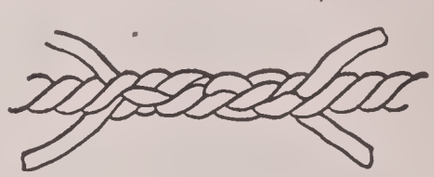


FIG. 22.—Short Splice.

Shroud Knot (Fig. 23).—Pass a stop at such distance from each end of the broken shroud as to afford sufficient length of strands,

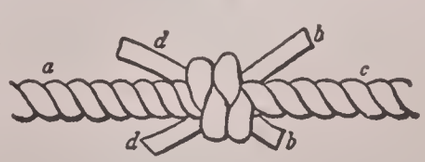


FIG. 23.—Shroud Knot.

when it is unlaid, to form a single wall knot on each side after the parts have been married; it will then appear as represented in the figure, the strands having been well tarred and hove taut

separately. The part *a* provides the knot on the opposite side and the ends *b*, *b*; the part *c* provides the knot and the ends *d*, *d*. After the knot has been well stretched the ends are tapered, laid smoothly between the strands of the shroud, and firmly served over. This knot is used when shrouds or stays are broken.

French Shroud Knot.—Marry the parts with a similar amount of end as before; stop one set of strands taut up on the shroud (to keep the parts together); and turn the ends back on their own part, forming bights. Make a single wall knot with the other three strands round the said bights and shroud; haul the knot taut first and stretch the whole; then heave down the bights close: it will look like the ordinary shroud knot. It is very liable to slip. If the ends by which the wall knot are made after being hove were passed through the bights, it would make the knot stronger. The ends would be tapered and served.

Flemish Eye (Fig. 24).—Secure a spar or toggle twice the circumference of the rope intended to be rove through the eye; unlay the rope which is to form the eye about three times its circumference, at which part place a strong whipping. Point the rope vertically under the eye, and bind it taut up by the core if it is four-stranded rope, otherwise by a few yarns. While doing so, arrange six or twelve pieces of spun-yarn at equal distances on the wood and exactly halve the number of yarns that have been unlaid. If it is a small rope, select two or three yarns from each side near the centre; cross them over the top at *a*; and half knot them tightly. So continue till all are expended and drawn down tightly on the opposite side to that from which they came, being thoroughly intermixed. Tie the pieces of spun-yarn which were placed under the eye tightly round various parts to keep the eye in shape when taken off the spar, till they are replaced by turns of marline hove on as taut as possible, the hitches forming a central line outside the eye. Heave on a good seizing of spun-yarn close below the spar and another between six and twelve inches below the first; it may then be parcelled and served; the eye is served over twice, and well tarred each time. As large ropes are composed of so many yarns, a greater number must be knotted over the toggle each time; a 4-inch rope has 132 yarns, which would require 22 knottings of six each time; a 10-inch rope has 834 yarns, therefore, if ten are taken from each side every time, about twice that number of hitches will be required; sometimes only half the yarns are hitched, the others being merely passed over. The chief use of these eyes has been to form the collars or stays, the whole stay in each case having to be rove through it,—a very inconvenient device. It is almost superseded for that purpose by a leg spliced in the stay and lashing eyes abaft the mast, for which it is commonly used at present. This eye is not always called by the same name, but the weight of evidence is in favor of calling it a Flemish eye. *Ropemaker's Eye*, which also has alternative names, is formed by taking out of a rope one strand longer by 6 inches or a foot than the required eye, then placing the ends of the two strands a similar distance below the disturbance of the one strand, that is, at the size of the eye; the single strand is led back through the vacant space it left till it arrives at the neck of the eye, with a similar length of spare end to the other two strands. They are all seized together, scraped, tapered, marled, and served. The principal merit is neatness.

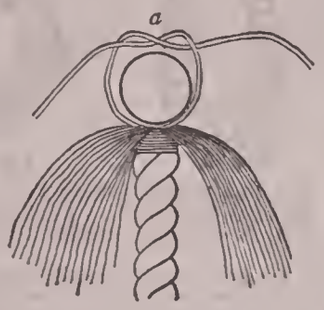


FIG. 24.—Flemish Eye.

Mouse on a Stay.—Formed by turns of coarse spun-yarn hove taut round the stay, over parcelling at the requisite distance from the eye to form the collar; assistance is given by a padding of short yarns distributed equally round the rope, which, after being firmly secured, especially at what is to be the under part, are turned back over the first layer and seized down again, thus making a shoulder; sometimes it is formed with parcelling only. In either case it is finished by marling, followed by serving or grafting. The use is to prevent the Flemish eye in the end of the stay from slipping up any farther.

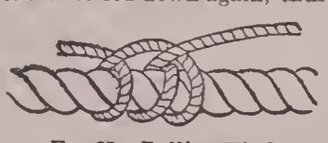


FIG. 25.—Rolling Hitch.

Rolling Hitch (Fig. 25).—Two round turns are taken round a spar or large rope in the direction in which it is to be hauled and one half-hitch on the other side of the hauling part. This is very useful, as it can be put on and off quickly.

Round Seizing (Fig. 26).—So named when the rope it secures does not cross another and there are three sets of turns. The size of the seizing line is about one-sixth (nominal) that of the ropes to be secured, but varies according to the number of turns to be taken. An eye is spliced in the line and the end rove through it, embracing both parts. If either part is to be spread open, commence farthest from that part; place tarred canvas under the seizing; pass the line round as many times (with much slack) as it is intended to have under-turns; and pass the end back through them all and through the eye. Secure the eye from rendering round by the ends of its splice; heave the turns on with a marling-spike (see Fig. 8), perhaps seven or nine; haul the end through taut; and commence again the riding turns in the hollows of the first. If the end is not taken back through the eye but pushed up between the last two turns (as is sometimes recommended), the riders must be passed the opposite way in order to follow the direction of the under-turns, which are always one more in number than the riders. When the riders are complete, the end is forced between the last lower turns and two cross turns are taken, the end coming up where it went down, when a wall knot is made with the strands and the ends cut close; or the end may be taken once round the shroud. *Throat Seizing.*—Two ropes or parts of ropes are laid on each other parallel and receive a seizing similar to that shown in Fig. 21,—that is, with upper and riding, but no cross turns. As the two parts of rope are intended to turn up at right angles to the direction in which they were secured, the seizing should be of stouter line and short, not exceeding seven lower and six riding turns. The end is better secured with a turn round the standing part. Used for turning in dead-eyes and variously. *Flat Seizing.*—Commenced similarly to the above, but it has neither riding nor cross turns.

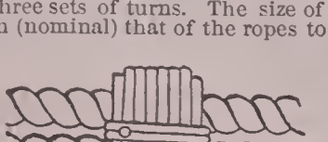


FIG. 26.—Round Seizing.

Racking Seizing (Fig. 27).—A running eye having been spliced round one part of the rope, the line is passed entirely round the other part, crossed back round the first part, and so on for ten to twenty turns according to the expected strain, every turn being hove as tight as possible, after which round turns are passed to fill the spaces at the back of each rope, by taking the end *a* over both parts into the hollow at *b*, returning at *c*, and going over to *d*.

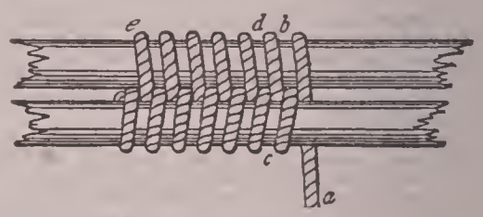
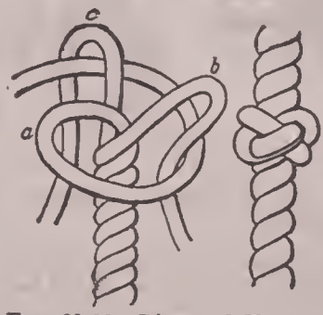


FIG. 27.—Racking Seizing.

When it reaches *e* a turn may be taken round that rope only, the end rove under it, and a half-hitch taken, which will form a clove-hitch; knot the end and cut it close. When the shrouds are wire (which is half the size of hemp) and the end turned up round a dead-eye of any kind, wire-seizings are preferable. It appears very undesirable to have wire rigging combined with plates or screws for setting it up, as in case of accident—such as that of the mast going over the side, a shot or collision breaking the ironwork—the seamen are powerless.

Diamond Knot (Figs. 28, 29).—The rope must be unlaid as far as the centre if the knot is required there, and the strands handled with great care to keep the lay in them. Three bights are turned up as in Fig. 28, and the end of *a* is taken over *b* and up the bight *c*. The end of *b* is taken over *c* and up through *a*. The end *c* is taken over *a* and through *b*. When hauled taut and the strands are laid up again it will appear as in Fig. 29. Any number of knots may be made on the same rope. They were used on man-ropes, the foot-ropes on the jibboom, and similar places, where it was necessary to give a good hold for the hands or feet. Turk's heads are now generally used. *Double Diamond.*—Made by the ends of a single diamond following their own part till the knot is repeated. Used at the upper end of a side rope as an ornamental stopper-knot.



FIGS. 28, 29.—Diamond Knot.

Stropping-Blocks.—There are various modes of securing blocks to ropes; the most simple is to splice an eye at the end of the rope a little longer than the block and pass a round seizing to keep it in place; such is the case with jib-pendants. As a general rule, the parts of a strop combined should possess greater strength than the parts of the fall which act against it. The shell of an ordinary block should be about three times the circumference of the rope which is to reeve through it, as a 9-inch block for a 3-inch rope; but small ropes require larger blocks in proportion, as a 4-inch block for a 1-inch rope. When the work to be done is very important the blocks are much larger; brace-blocks are more than five times the nominal size of the brace. Leading-blocks and sheaves in racks are generally smaller than the blocks through which the ropes pass farther away, which appears to be a mistake, as more power is lost by friction. A clump-block should be double the nominal size of the rope. A single strop

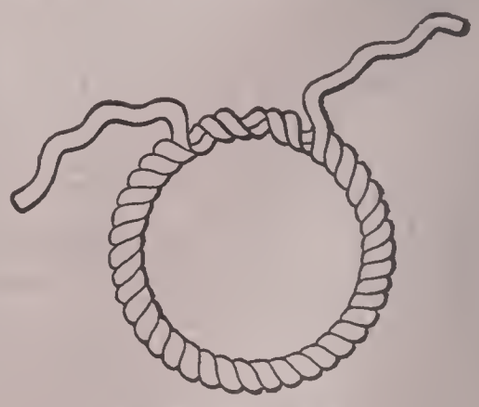


FIG. 30.—Grummet-Strop.

may be made by joining the ends of a rope of sufficient length to go round the block and thimble by a common short splice, which rests on the crown of the block (the opposite end to the thimble) and is stretched into place by a jigger; a strand is then passed twice round the space between the block and the thimble and hove taut by a Spanish windlass to cramp the parts together ready for the reception of a small round seizing. The cramping or pinching into shape is sometimes done by machinery invented by a rigger in Portsmouth dockyard. The strop may be made the required length by a long splice, but it would not possess any advantage.

Grummet-Strop (Fig. 30).—Made by unlaying a piece of rope of the desired size about a foot more than three times the length required for the strop. Place the centre of the rope round the block and thimble; mark with chalk where the parts cross; take one strand out of the rope; bring the two chalk marks together; and cross the strand in the lay on both sides, continuing round and round till the two ends meet the third time; they are then halved, and the upper halves half-knotted and passed over and under the next strands, exactly as one part of a long splice. A piece of worn or well-stretched rope will better retain its shape, upon which success entirely depends. The object is neatness, and if three or multiples of three strops are to be made it is economical.

Double Strop (Fig. 31).—Made with one piece of rope, the splice being brought as usual to the crown of the block, *t*, the bights fitting into scores some inches apart, converging to the upper part, above which the thimble receives the bights *a*, *a*; and the four parts of the strap are secured at *s*, *s* by a round seizing doubly crossed. If the block be not then on the right slew (the shell horizontal or vertical) a union thimble is used with another strop, which produces the desired effect; thus the fore and main brace-blocks, being very large and thin, are required (for appearance) to lie horizontally; a single strop round the yard vertically has a union thimble between it and the double strop round the block. The double strop is used for large blocks; it gives more support to the shell than the single strop and admits of smaller rope being used. Wire rope is much used for block-strops; the fitting is similar. Metal blocks are also used in fixed positions; durability is their chief recommendation. Great care should be taken that they do not chafe the ropes which pass by them as well as those which reeve through.

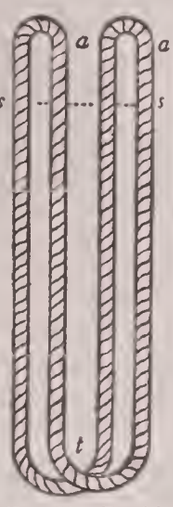


FIG. 31.—Double Strop.

Selvagee Strop.—Twine, rope-yarn, or rope is warped round two or more pegs placed at the desired distance apart, till it assumes the requisite size and strength; the two ends are then knotted or spliced. Temporary firm seizings are applied in several places to bind the parts together before the rope or twine is removed from the pegs, after which it is marled with suitable material. A large strop should be warped round four or six pegs in order to give it the shape in which it is to be used. This description of strop is much stronger and more supple than rope of similar size. Twine strops (covered with duck) are used for boats' blocks and in similar places requiring neatness. Rope-yarn and spun-yarn strops are used for attaching luff-tackles to shrouds and for many similar purposes. To bring to a shroud or hawser the centre of the strop is passed round the rope and each part crossed three or four times before hooking the "luff;" a spun-yarn stop above the centre will prevent slipping and is very necessary with wire rope. As an instance of a large selvagee block-strop being used,—when the "Melville" was hove down at Chusan (China), the main-purchase-block was double stropped with a selvagee containing 28 parts of 3-inch rope; that would produce 112 parts in the neck, equal to a breaking strain of 280 tons, which is more than four parts of a 19-inch cable. The estimated strain it bore was 80 tons.

Stoppers for ordinary running ropes are made by splicing a piece of rope to a bolt or to a hook and thimble, unlaying 3 or 4 feet, tapering it by cutting away some of the yarns, and marling it down securely, with a good whipping also on the end. It is used by taking a half-hitch round the rope which is to be hauled upon, dogging the end up in the lay, and holding it by hand. The rope can come through it when hauled, but cannot go back.

Whipping and Pointing.—The end of every working rope should at least be whipped to prevent it fagging out; in ships of war and yachts they are invariably pointed. Whipping is done by placing the end of a piece of twine or knittle-stuff on a rope about an inch from the end, taking three or four turns taut over it (working towards the end); the twine is then laid on the rope again lengthways contrary to the first, leaving a slack bight of twine; and taut turns are repeatedly passed round the rope over the first end and over the bight, till there are in all six to ten turns; then haul the bight taught through between the turns and cut it close. To point a rope, place a good whipping a few inches from the end according to size; open out the end entirely; select all the outer yarns and twist them into knittles either singly or two or three together; scrape down; and taper the central part, marling it firmly. Turn every alternate knittle and secure the remainder down by a turn of twine or a smooth yarn hitched close up, which acts as the weft in weaving. The knittles are then reversed and another turn of the weft taken, and this is continued till far enough to look well. At the last turn the ends of the knittles which are laid back are led forward over and under the weft and hauled through tightly, making it present a circle of small bights, level with which the core is cut off smoothly. Hawser and large ropes have a becket formed in their ends during the process of pointing. A piece of 1 to 1¼-inch rope about 1½ to 2 feet long is spliced into the core by each end while it is open: from four to seven yarns (equal to a strand) are taken at a time and twisted up; open the ends of the becket only sufficient to marry them close in; turn in the twisted yarns between the strands (as splicing) three times; and stop it above and below. Both ends are treated alike; when the pointing is completed a loop a few inches in length will protrude from the end of the

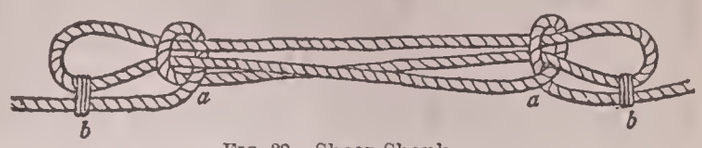


FIG. 32.—Sheep-Shank.

rope, which is very useful for reeving it. A hauling line or reeving line should only be rove through the becket as a fair lead. *Grafting* is very similar to pointing and frequently done the whole length of a rope, as a side-rope. Pieces of white line more than double the length of the rope, sufficient in number to encircle it, are made up in hanks called foxes; the centre of each is made fast by twine and the weaving process continued as in pointing. Block-strops are sometimes so covered; but, as it causes decay, a small wove mat which can be taken off occasionally is preferable.

Sheep-Shank (Fig. 32).—Formed by making a long bight in a top-gallant-back-stay, or any rope which it is desirable to shorten, and taking a half-hitch near each bend, as at *a*, *a*. Rope-yarn stops at *b*, *b* are desirable to keep it in place till the strain is brought on it. Wire rope cannot be so treated, and it is injurious to hemp rope that is large and stiff.

Knotting Yarns (Fig. 33).—This operation becomes necessary when a comparatively short piece of junk is to be made into

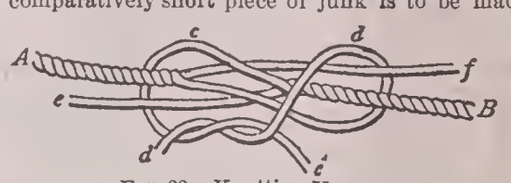


FIG. 33.—Knotting Yarns.

spun-yarn, or large rope into small, which is called twice laid. The end of each yarn is divided, rubbed smooth, and married (as for splicing). Two of the divided parts, as *c*, *c* and *d*, *d* are passed in opposite directions round all the other parts and knotted. The ends *e* and *f* remain passive. The figure is drawn open, but the forks of A and B should be pressed close together, the knot hauled taut, and the ends cut off.

Butt Slings (Fig. 34).—Made of 4-inch rope, each pair being 26 feet in length, with an eye spliced in one end, through which the other is rove before being placed over one end of the cask; the rope is then passed round the opposite side of the cask and two half-hitches made with the end, forming another running eye, both of which are beaten down taut as the tackle receives the weight. Slings for smaller casks requiring care should be of this description, though of smaller rope, as the cask cannot possibly slip out. *Bale Slings* are made by splicing the ends of about 3 fathoms of 3-inch rope together, which then looks like a long strop, similar to the double strop represented in Fig. 31.—the bights *t* being placed under the cask or bale and one of the bights *a*, *a* rove through the other and attached to the whip or tackle.

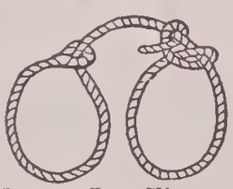


FIG. 34.—Butt Slings.

The marks on the lead-line are leather at 2, 3, and 10 fathoms, white at 5 and 15, red at 7 and 17, and blue at 13. The length of the lead is not usually included. The deep-sea line commences with 2 knots at 20, another knot being added for every 10 fathoms, and a single knot at each intermediate 5. Log-lines should have ample stray line (distance between the log-ship and the first mark). The distance of 47 feet and a 28-second glass were adopted to assimilate the sea furlong to the shore furlong, which was absurd. Fifty feet to half a minute would be more correct and more convenient.

Since space will not allow of a full description of masting and rigging, only a few of the more important points will be noticed. The masts must be stepped before they are rigged; accordingly we will first describe the manner in which they are put on board in cases where the assistance of shears on hulk or jetty is not available; at an out-port a seaman is still left to his own resources, just as he was in former times. Fixing the masts in a large frigate, such as that shown in Fig. 35 below, is a serious consideration, as the mainmast weighs about twenty tons.

Masting.

Two suitable spars must be procured about three-fourths the length of the main-mast and about two-thirds its diameter,—the greater the housing the higher the shears. They are towed alongside or under the stern with the thicker ends forward, and parbuckled over the side or hoisted in through the stern-ports by means of a derrick, whichever is most convenient. The smaller ends are rested upon a spar across the gunnel or the break of the poop, crossed, and lashed with strong well-stretched rope (about 4½ or 5 inches) passed figure-of-eight fashion, commencing at the centre, returning with riding turns as a racking seizing, and crossed again; the turns at the extreme ends should not be so taut as the others. Care must be taken to place the seizing equidistant from each heel after they have been trimmed to fit flat upon shoes of strong oak planking; they will remain within their full spread by

about 2 feet each side till after the head seizing has been secured. Lash a threefold purchase-block to the horns above the lashings, to hang down clear under the cross, so as to correspond with a twofold block to be lashed to the mast. If such blocks cannot be procured two top-blocks may be substituted for the upper block and one on the mast, reserving the fourth top-block as a lead secured to one of the shear legs or near it.[1] Two purchases may be on each side if two are used, and as high up as the shears will allow, the limit being from heel to lashing 6 or 8 feet less than from the lower side of the purchase-block to the deck. Old spars having been hung over the side for the mast to rub against and the purchase fall taken round the capstan, the mast is hove up till the head comes above the gunnel; then two single blocks with long-tailed strops are secured round it with the gird-lines of about 4 inches and

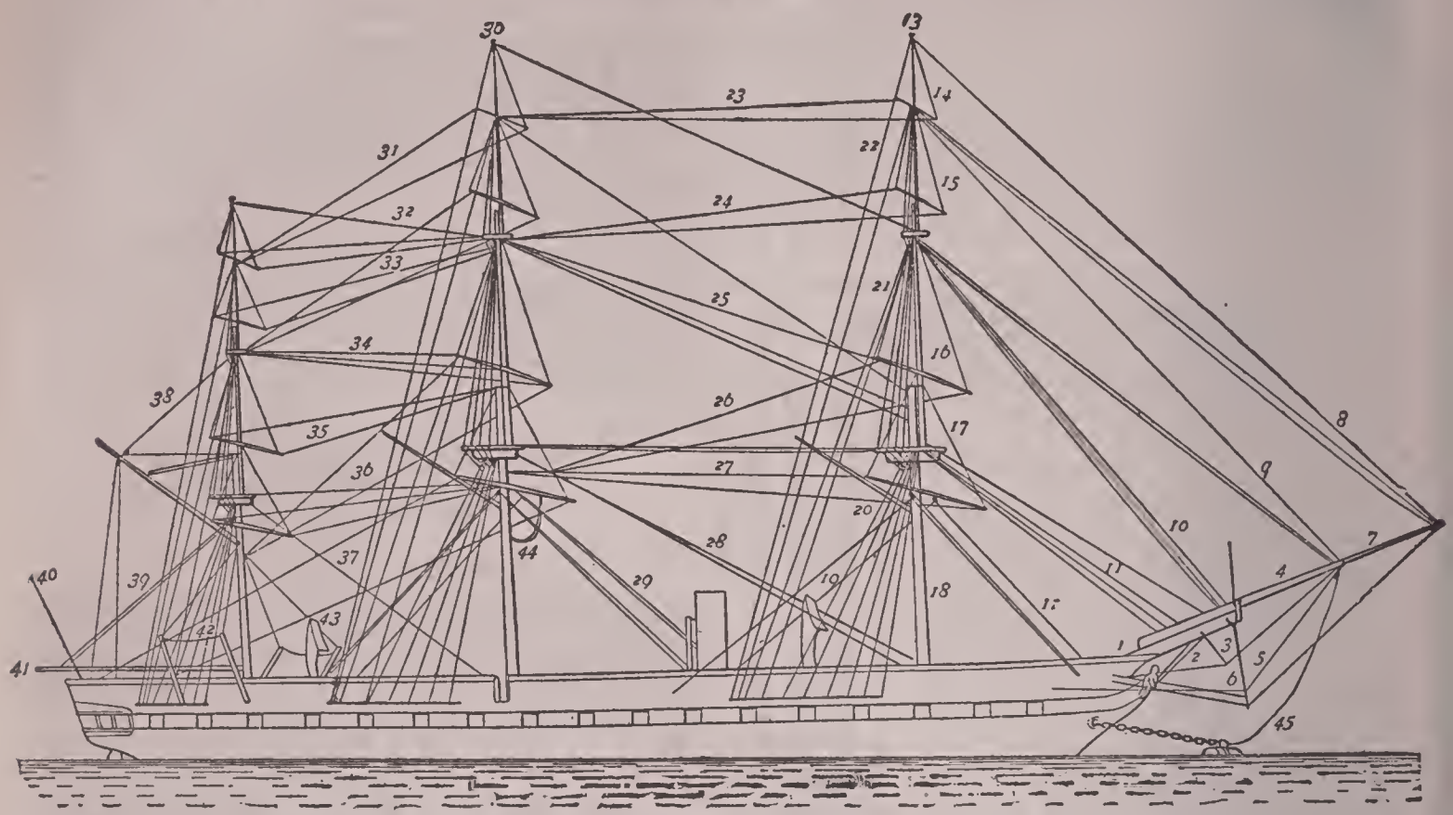


FIG. 35.—The spars and rigging of a frigate.[2] 1, the bowsprit; 2, bobstays, three pairs; 3, sprit-sail-gaffs, projecting on each side of the bowsprit,—the ropes at the extremities are jib-guys and flying-jib-guys; 4, jibboom; 5, martingale-stay, and below it the flying-jib-martingale; 6, back-ropes; 7, flying-jibboom; 8, fore-royal-stay, flying-jib-stay, and halyards; 9, fore-top-gallant-stay, jib-stay, and halyards; 10, two fore-top-mast-stays and fore-top-mast stay-sail halyards; 11, the fore-top-bowlines, stopped into the top and two fore-stays; 12, two fore-tacks; 13, fore-truck; 14, fore-royal-mast, yard, and lift; 15, top-gallant-mast, yard, and lift; 16, fore-top-mast, top-sail-yard, lift, and reef-tackle; 17, fore-top, fore-lift, and top-sail-sheet; 18, fore-mast and fore-shrouds, nine pairs; 19, fore-sheets; 20, fore-gaff; 21, fore-top-mast back-stays and top-sail-tye; 22, royal and top-gallant back-stays; 23, fore-royal-braces and main-royal-stay; 24, fore-top-gallant-braces and main-top-gallant-stay; 25, standing parts or fore-top-sail-braces and main-top-mast-stays; 26, hauling parts of fore-top-sail-braces and main-top-bowlines; 27, four parts of fore-braces; 28, main-stays; 29, main-tacks; 30, main-truck; 31, main-royal-braces; 32, mizzen-royal-stay and mizzen-royal-braces; 33, main-top-gallant-braces and mizzen-top-gallant-braces; 34, standing parts of main-top-sail-braces and mizzen-top-mast-stay; 35, mizzen-top-sail-braces; 36, hauling parts of main-top-sail-braces, mizzen-top-bowlines, and cross-jack-braces; 37, main-braces and mizzen-stay; 38, standing part of peak halyards; 39, vangs, similar on each gaff; 40, ensign staff; 41, spanker-boom; 42, quarter-boat's davits; 43, one of the davit topping-lifts and wind-sail; 44, main-yard-tackle; 45, a bull-rope.

used at the same time with advantage, one block hanging on the fore, the other on the after side. A gird-line is also placed on the highest part of the horns to assist in canting the mast, and another for the purpose of hoisting up a man should anything require alteration. The lashing at the shear-head must be well protected with old canvas and all the decks must be shored up in the vicinity of the places where the shear-legs stand for each mast. The legs must be lashed together at the desired spread and heel tackles led forward and aft from each. To form the four head-guys the central parts of two hawsers are clove-hitched above the lashing and spread as far as is convenient in four directions and set up by tackles. When all is ready and the purchase rove, the lower block should be secured forward as high as can be; and, while the purchase is being hove upon, a light derrick or small shears lifting the shear-head will greatly assist; of course the after heel tackles must be well secured. After the shears are erect and the heels cleated and lashed to the shoes they can be scuffed about by the heel tackles and guys to any desired position, —the hole for the mizzen-mast is first plumbed.

The mizzen-mast should be brought alongside with its head aft, and a sufficiently strong selvagee strop lashed on the fore side if it is to be lifted by one purchase, and one twice the length of the mast ready rove. The tressel-trees are now usually bolted on in the mast-house. The gird-line from the shear-head must be bent to the head of the mast at a suitable height to act as a topping-lift. As the mast is hove up by the capstan a stout rope from out-board must be timber-hitched round the heel so as to ease it in as it clears the gunnel, and to haul it towards the part-

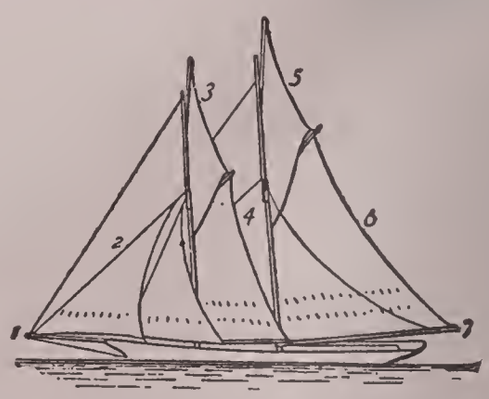


FIG. 36.—Schooner yacht. 1, bowsprit, with martingale to the stem; 2, fore-top-mast-stay, jib, and stay-fore-sail; 3, fore-gaff-top-sail; 4, fore-sail and main-stays 5, main-gaff-top-sail; 6, main-sail; 7, end of boom.

ners (mast-hole); when it has been lowered to within 2 feet of the step, a slew rope is passed three times round the mast and a "cat's-paw" formed on each side, through the eyes of which a capstan bar is passed ready to heave either way as required; in the meantime both the heel of

[1] Top-blocks in large ships are 26 inches, carrying 9½-inch rope, the breaking strain of which is 25 tons; by taking the standing part down to the mast there are three parts lifting, equal to 75 tons,—a sufficient margin over 20 tons. Twenty-two-inch blocks and an 8-inch rope would break at 54 tons. Large ships have one 26-inch rope and one 24-inch double block for jeers, which would reeve an 8-inch rope. The size of a block implies the length of the shell, of a rope its circumference, and of a chain cable the diameter of the iron.

[2] References are not repeated for each mast where the names and functions are identical.

the mast and the step should be well coated with white lead or coal-tar. Lower and slew according to directions from below; when the mast is stepped and brought to the desired position, place four temporary wedges, rig a triangle, trice it up by the gird-lines, unlash the purchase or strops, overhaul down, unrig the triangle, and haul the gird-lines taut on each side.

The shears can be transported forward in nearly an upright position by first pulling the heel-tackles and then the guys, shifting the guys forward one at a time as necessary. The main-mast and the fore-mast are taken in in the same way as the mizzen-mast, described above,—all three abaft the shears; but, being much longer, they require greater hoist and greater care generally.

Bowsprit.

To take in the bowsprit the shears are again moved forward, all the heel-tackles being led forward and extra lashings placed on the heels. A purchase nearly as strong as that to be used in lifting the bowsprit should be secured between the fore-mast-head and the shear head, or two parts of a stout hawser may be used, the middle being clove-hitched over the horns and the ends taken round beams well aft on either side, ready for veering as the shears are drooped (to an angle of about 45°), then to act as the principal support; the fore-guys are also taken aft to assist. The fore-mast must be wedged on both decks and one or more tackles used to keep the head aft. The bowsprit cap is invariably bolted on in the mast house; the bowsprit is then brought under the bows with the cap end forward and slung for the main purchase a little outside the housing, which is generally about two-fifths of the whole length. The main purchase should plumb nearly the length of the housing outside the bows, and the higher the shear-head the greater

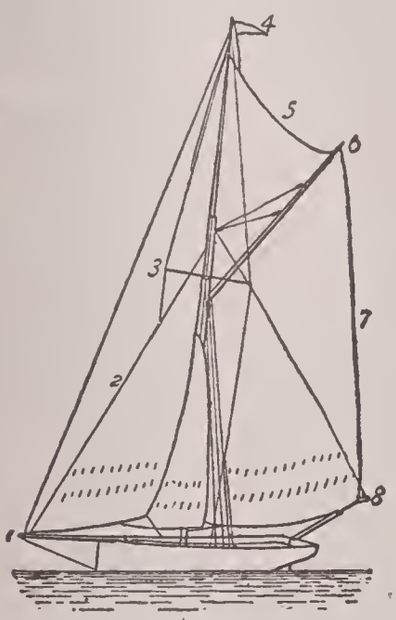


Fig. 37.—Cutter yacht. 1, bowsprit and martingale; 2, jib,—behind it is the fore-sail; 3, cross-trees and top-mast-shroud; 4, pennant designating the club to which she belongs; 5, gaff-top-sail; 6, peak of gaff, hoisted by peak and throat halyards; 7, main-sail; 8, end of boom and topping-lift.

the freedom of motion. The outer purchase attached to a strop through the hole in the cap and the guys from the cap to each cat-head alike tend to force in the bowsprit when it is high enough; besides this, a heel rope is put round it before it leaves the water, and a strop with a tackle to the bitts is used to bowse it into the hole and mortise. It is hoisted to about an angle of 45° before the heel is entered. A rough sketch made to scale will greatly facilitate such operations and ensure success. When a bowsprit is put in by shears on a hulk or jetty, it is hoisted up ahead of the ship nearly horizontal, or at the angle (steeve) which is intended to assume, and the ship is moved ahead towards it, till the bowsprit enters in the desired position.

The directions for masting a large ship are more than sufficient for masting a small one, which is so much easier.

Rigging bowsprit.

Gammoning the bowsprit is the most important point in rigging a ship, as the stays of the fore-mast and main-top-mast depend for security on the bowsprit. In large ships there are two distinct lashings (of either new stretched rope or chain) to keep the bowsprit down; they are passed in a similar manner over a long saddle-shaped piece of wood called a gammoning fish and through the holes in the head knees, the outer one first. One end is clinched or shackled round the bowsprit over the fore-part of the hole; the other, being rove through the after-part of the hole, comes up on the aft side of the first turn on the bowsprit and down inside that part and before the turns in the hole, thus forming a double cross with the first turns outside. Every turn is set up as passed by means of a pendant through the hawse-pipe or bow-port, and a block is secured to the hole for the bobstays, which are attached to the gammoning by a selvagee or toggle, and held while the next turn is being passed by a racking seizing if rope and by nails driven through the links into the fish if chain. When the hole is full of turns—eight or ten—the whole is frapped together as tightly as possible, commencing at the lower part.

The clothing of a bowsprit of a large ship consists of nine strops for its own security and the fore-stays. A bobstay collar is hove on at one-third the distance between the night-heads and the outer extremity, and close outside it two bowsprit-shroud collars and a fore-stay collar, then the second bobstay collar, two bowsprit shroud collars, another fore-stay collar, and the third bobstay collar; in addition to these there is a cap bobstay, which sets up to a bolt close inside the bowsprit cap. The bobstay and bowsprit-shroud collars are hove on at right angles to the spar and usually cleated in that position. But this cleating is a mistake; as the strain comes upon each of them very obliquely, it is necessary that they should yield in that direction before the cleats are nailed, or they will give way and slacken the rope when it is most required to be taut. Bobstays are cut to the required length, wormed and parcelled from the centre towards the ends, and served; they are rove through their respective holes in the cutwater before being spliced, which splice is tapered, parcelled, and served over, and rests on the head of the heart when it is seized in. The bobstays and bowsprit shrouds are set up by lanyards half the nominal size if rope and the same size of wire; the standing parts are secured by running eyes around the necks of the collars confining the hearts, and are set up by two luffs, one acting upon the other.

Getting up tops.

The cross-trees are swayed up one at a time by the two gird-lines, whose united action and a guy on deck conduct them to their places, where they drop into recesses and are bolted to the trestle-trees. When a whole top is to be got up it is placed abaft the mast (except the mizzen) with the lower side forward and the fore part uppermost; the gird-lines are passed under it, that is, before it, each being rove up through the second hole from aft for the futtock-plates and hitched tightly to its own part as it passes the lubber's hole, which part is also stopped to the hole at the fore part of the top. If it be a large top each gird-line may be taken down the fore (under) side (as before), rove up through the after-hole for the futtock-plate, down through the lubber's hole, taut up through the foremost hole, and hitched to the hoisting part, which is stopped firmly to the fore part, where a gird-line leading from the mast abaft is also stopped after the end has been made fast to the centre hole for the top-rail; that gird-line is to keep the top clear of the trestle-trees as it goes up and to assist in placing it. There are several slightly different ways of slinging a whole top; but in all cases the gird-line blocks (after the stop is cut) hoist the fore part higher than themselves, till it falls over them and hangs as nearly horizontal as could be judged in slinging it. The final adjustment of it in its place is done by hand, and then it is bolted to the cross-trees. The mizzen-top is put over either in a similar manner with a guy to the taffrail or sent up before the mast with the after part uppermost, a gird-line from the main-mast-head keeping it clear of the trestle-trees, which project much farther on the fore side. Tops are taken off by the reverse process; but it is more difficult to get the hole back over the mast-head.

Tops are now very seldom made in one part, but in two halves, which is more convenient and equally serviceable. Each half is sent up in a similar manner to the whole top; the gird-lines are bent on precisely the same way, but one half at a time, which falls square at the side of the mast when the stop is cut instead of going over the top of the mast. After the top is bolted, it is advisable to hoist up the lower cap into the top while the whole space of the lubber's hole is still free, but not to put it on till after the lower rigging is fixed. The cap being placed near the mast with the bolts downwards and the hole for the top-mast forward, both gird-lines are brought down through the lubber's hole on the same side; that which crossed before the mast is bent on to the fore part of the cap, and that which belongs to the side on which the cap is lying is made to sling the after part fairly and is then stopped to the fore part, so that this last is hoisted up by both gird-lines end on till in the top, when, the stop at the fore end being cut,

the cap hangs in front of the mast and the round hole can be placed exactly over the space between the trestle-trees where the top-mast will come up. A soft piece of wood called a "bolster" is made to fit into the angle formed by the trestle-tree and the mast on each side, and is bolted in place so as to present a smooth rounded surface along the whole distance required for the rigging to rest upon, and is covered by a padding of tarred canvas five or six parts thick, secured by a row of flat-headed nails along the upper side. Each mast is similarly provided.

Lower rigging.

Preparatory to sending up the lower rigging on the masts it is necessary to rearrange the gird-lines, as it is obviously inconvenient to hoist the eye of a shroud over the mast and allow it to fall down over both parts of a heavy rope which would require to be hauled up from the deck or rerove every time; therefore they are lashed to the leads in the trestle-trees for the truss falls, and a small gird-line is lashed high up abaft the mast to be worked in the top for both sets of rigging. The starboard tackle-pendant is put over first, then the port pair, next the starboard foremost pair of shrouds followed by the port pair, and so on alternately till all the shrouds are in place, ending with an odd one called a swifter on each side. Large ships have four pairs of shrouds and a swifter on each side. They are all seut up in a similar manner: the large gird-line from the trestle-tree is secured to the pendant at the extremity and to the shrouds more than the length of the mast-head below the seizing by means of a strop with a slip-rope, toggle, and down-haul; the eye is opened to the shape of the mast-head and the after-port is stopped to the gird-liue, which sways it up to the lubber's hole, when the men in the top bend the eye in the direction it is to go over the mast and make fast their small gird-line a fathom or two below the seizing, with a stop ou the after part of the eye, which is cut when the pendaut or shroud is fair for going over the mast-head. When the shroud is over, each eye is hardened dowu by a large mallet called a "commander." Ropes should be rove through the thimbles of the pendants and hauled taut when they are being driven down; then the "up-and-down" tackles should be hooked to the short legs (which are forward), while the long legs are being lashed abaft the mast and the runner-blocks lashed to them for stayiug the mast by the runners. As each pair of shrouds are put over, they should be temporarily set up by the dead-eyes and lanyards, or by a luff-tackle on each, to prevent their springing up before another pair presses upon them. It is of very great importance to keep each eye taut before others press on it both for preservation and appearance; many an eye has been stripped of its service and parcelling through slippiug out from under the weight. A piece of rounding made fast to a bolt in the hounds of the mast with au eye in the other end is very useful for keeping the back of the eye dowu while it is being made taut, by reeving the short eye end up through the eye of the shroud and hooking a burton from the deck to it, which is pulled upon at the same time that the shroud is set up on the other side of the ship; when fiuished, that piece of rope will be jammed. The lower stays, after they have been completely fitted and the hearts have been turned in, are stopped together one over the other at the fork of the collar, at the sides, and at the eyes. The gird-lines, having been put back to the mast-head, are sent down through the lubber's hole, oue crossing the fore side of the mast, and are bent to both stays below the fork of collars and stopped to the eyes; they are thus swayed up near their places, the respective eyes being lashed together by rose-lashings low down over the eyes of all the shrouds. The hearts are then carried forward, the fore to the hearts in collars round the bowsprit and the maiu to hearts provided for the purpose near the fore-partners, while the collars of the stays are suspended from the fore-part of the top, the collars being eased down as required to preserve a straight line between the lashing-eyes and the point where the stay is set up.

Setting up stays.

The following is the method employed to set up the rigging on the masts. It is first drawn forward by the runners and tackles (lashed to the long legs of mast-head pendants, which are lashed together abaft the mast) till brought before the position it is intended to stand in, as the strain of the shrouds will draw it aft. Many seamen recommend, with reason, that a strain should be brought on the after-swifters while it is being stayed, to keep it more firm. The propriety of wedging the mast before the rigging is set up may be considered an open question; it was considered lubberly forty years ago, but is now the common practice. The lanyards of the stays are iu proportion smaller than those of the shrouds, since many more turns can be passed through hearts than through dead-eyes. The standing parts are made fast round the collar or strop of the lower heart by a running eye; the end is rove up through the heart in the stay and down through the lower one twice and the slack hauled through by the sail-tackle, which must be previously secured for that purpose round the lower mast-head and hung over the fore-part of the top; or the two top-burtons may be used, one for each stay. When the slack of the lanyard is through and racked, the double block of a luff-tackle is attached by turning the bight back over a toggle or glut, as slings are represented iu Fig. 18. Then a selvagee strop is passed twice round both parts below the bight *s* (when the figure is turned up), brought up on the side of the arrow, and hooked to the luff. A cat's-paw, as shown in Fig. 7, may be used with a glut placed at *g* to keep the parts open, otherwise a large rope would be injured. The single block of the luff is secured to the stay as high up as it will reach by a long double-tailed selvagee, which is dogged softly at first, but terminates with close-taut turns aud a spunyard seizing. Care must be taken to prevent kinking the rope, especially if it is wire; if hemp, it should be parcelled to protect the outer yarns. The fall of the luff is connected with the sail-tackle (by one of the means described) aud the sail-tackle fall led in the direction of the stay; it is pulled up steadily, the nips of the lanyards having been well tarred to make them slip through the hearts, while they are also shaken up by levers. When taut euough the lanyard is securely seized to the next part, another turn rove, set up, and seized, till the scores in the hearts are full; then riding turns are taken. Whilst the first riding turn still bears the strain, all the seizings on the lanyards should be cut off, and others put on when each part has taken over an equal strain. After the riding turns are completed, the end of the lanyard is secured by a clove-hitch and a seizing. When there is not a sail-tackle a long luff may be used in a similar manner, the double block being secured above the single block of the other luff. It is desirable that both stays on the masts should be set up at the same time, but it is not imperative; care should be taken that they are equally taut.

Lanyards.

A lanyard for rigging with dead-eyes is half the nominal size of rope shrouds and the same size as wire rigging. The knot is inside under the end of the shroud, or is first spliced to a bolt in the chains and then rove through that hole; it is rove full before commenciug to set up. The mast having been stayed, luffs are placed on the shrouds with the double block down and brought to the lanyard as above described; the up-and-down tackle from the mast-head pendant is secured to the fall of the luff by a cat's-paw and strop and pulled up till taut enough, the foremost shroud ou the starboard side first, theu that ou the port side, and so on alternately till they are all nearly taut alike (the after-swifters not quite so taut as the others), which is best ascertained by an experienced man shaking them; if the dead-eyes are not square (even) when finished, it is far better to turn them in afresh than to have an unequal strain on the shrouds. If a pair of shrouds were set up at the same time it would be better for the eye aud the seizing. Tar should be used freely on the lanyards as they enter the dead-eyes, whether they are of iron or wood; it causes them to slip quite as well as grease aud preserves the rope, while grease causes it to decay. The lanyards are seized to the next part till a clove-hitch is taken above the dead-eye and the end seized down; the parts of the lanyard should then be made to bear an equal straiu, and afterwards seized together lest any part should be injured. The runners should be kept taut till everything is secured, then eased up gently, to avoid straining the mast. Lower masts geuerally have an inclination to belly,—*i.e.*, bend aft. Space will not admit of details being given as to the various parts of the rigging; the main principles follow the lines of that which has been already rather fully described above. The top-mast stays and rigging are set up by means of top-burtons aud jiggers, the top-gallant-rigging and that of all small vessels by jiggers and light appliances.

Lower cap and top-mast.

The lower caps were supposed to have been swayed up by the gird-lines and placed in position to receive the top-masts before the lower rigging was put over. To fix one of them in its place, let a top-block be hoisted up, lashed to the mast-head close below the square on which the cap is to rest, on the side suitable to the sheave in the top-mast; through the block reeve a suitable hawser (9 inches for a large ship); send the fore end down through the square hole between the trestle-trees; lay it along the top-mast (the spare one if allowed two); reeve it through the live sheave in the heel, and hitch it round the head of the top-mast and hawser, leaving considerable end; also place a good lashiug round the mast-head and the hoisting-part of the hawser and seize the two parts of the hawser together about half-way up, strong enough to bear the weight of the mast. If the

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top-mast be much longer than the space between the deck and the trestle-tree, the lashing must be placed low enough from the head of the mast to allow it, while suspended, to project above the top outside, while the heel is guided down the main hatchway or fore-scuttle. The capstan is used to heave the mast up; when it is pointed between the trestle-trees, remove the lashing round the head, and if landed—*i.e.*, resting its weight on the deck—make the end of the hawser fast round the mast-head, the hitch being on the side opposite to the block, and cast off the racking lashing, leaving the mast ready to be hove up by the two parts of the hawser. If not landed, heave up 3 or 4 feet before securing the end of the hawser, so that, when that has been done and well seized, the capstan may be moved back till both parts bear an equal strain; the racking can then be taken off without fear of a jerk. After the head of the top-mast has been hove 3 or 4 feet through the hole in the cap, it is securely lashed, commencing with a clove-hitch round the mast, the ends being passed through the bolts under the cap on one side and repeated on the other, so that it will be sure to hang horizontally. Heave round the capstan till the cap is above the lower mast-head; then steer it by means of a handspike or capstan bar in the fid-hole, while men in the top direct the head of the top-mast by handspikes, till the hole in the cap is exactly over the square of the mast, when by moving back the capstan and beating the cap down with a commander it will fit firmly in its place.

If the heel of the top-mast rests on the deck before the head is free from the trestle-trees, it is as well to lower it down to that position; but, if it is too short to rest there, the up-and-down tackles must be used to suspend it by strops through the fid-hole, while the top-block is being unlashed and hooked to the after-bolt fixed for that purpose in the cap and the end of the hawser secured to the foremost bolt on the opposite side. In large ships a shore is placed under the fore-part of the cap to support the weight and resist a possible blow from the top-sail-yard. The top-mast may now (unless it is blowing hard) be swayed right up and fidded to prove that it will fit when required (an allowance being made for the wood swelling with wet), and sent on deck in exchange for the other mast, which, when swayed above the lower cap, will have a gird-line lashed round the head and then be raised 15 or 20 feet more. One part of the gird-line should be sent down abaft all and bent on to the fore-part of the top-mast cross-trees; by this, assisted by a guy, they can be swayed up till above the lower cap, upon which the after-part will rest, securely lashed to the bolts to prevent it slipping, while the fore-part will lean against the top-mast at such a distance as to ensure it falling in the right position when the top-mast is lowered and to receive the head of the mast between the trestle-trees as it is swayed up again to a convenient position for receiving the rigging. The rigging is swayed up by gird-lines on the cross-trees, and put over in a similar manner to the lower rigging, the top-burton pendants first, then the shrouds and back-stays in succession, and the stays are lashed.

There is usually a chain necklace round each top-mast-head, sunk in the bolsters; one leg of each is for the top-sail-tye hanging-block to shackle to, and forward there are two other legs for the jib-halyards and fore-top-mast stay-sail-halyards. After the rigging has been placed over the top-mast-head, the cap is sent up by two gird-lines lashed as high as possible and bent to the foremost part of the cap, with stops to the after-bolts, by which means it goes up before all, with the under-side towards the mast; when it is high enough the after-stops are cut and it slides up on the top of the mast, assisted by men at the mast-head, who get it over the square and beat it down. Directly the top-mast is in position to receive the rigging the top-rope pendants are rove and the tackles secured, first one to relieve the hawser of the weight and then the other in its place. Copper funnels are sometimes used to receive the top-mast rigging, similar to those for top-gallant masts.

Top-gallant and royal rigging.

Top-gallant and royal rigging is sometimes stripped of the service and covered with canvas, which is afterwards painted, for the sake of neatness; but the durability of the rope is thereby greatly lessened. Another bad practice is that of taking off one of the top-gallant-backstays, thereby directly diminishing the support. But worse still is the trick of forming the eyes of rigging and backstays by two seizings, the ends of each rope going to different sides of the ship; this gives two eyes over the mast instead of four, and makes everything depend on the strength of the seizings. It is now a very common practice to cross the top-gallant rigging and set it up on opposite sides of the top, instead of reeving it through the necklace on the top-mast and setting it up on the same side. This is done entirely for the sake of saving seconds in shifting the spars, either the top-gallant-mast or the top-mast. Shrouds so treated give no support to the mast whatever; probably they act in the reverse way, as may be easily shown by drawing a straight line to represent the masts when standing upright and lines in rough proportion at right angles for the top and cross-trees. Draw the top-gallant rigging on one side from mast to cross-tree and thence to the opposite side of the top. The top-mast, having a little play in the cap and at the heel, is bound to go over some inches at the head, taking the cross-tree with it; it will then be seen that the weather-side of the cross-tree has approached the lee side of the top, slackening the weather and tightening the lee top-gallant rigging.

Lower yards.

Getting a lower yard on board requires great care to avoid injury to the hammock netting and other things. Spars should be slung over the side for it to rub against and slip-ropes through the ports to ease it over the gunnel. If it is to be hoisted in on the port-side, the starboard yard-arm is towed foremost. A hawser may be rove through the port top-block down through the lubber's hole and bent round the centre of the yard. The hatch of the lubber's hole must be open and a strong mat provided. Instead of the hawser the jeers may be partially rove, the standing part being secured to the yard, and also the sail-tackle from the top-mast-head to the lower yard-arm and the starboard up-and-down tackle to the starboard yard-arm, also a burton from the fore-mast to the main-yard, or from the bowsprit if it is a fore-yard. The capstan and jeers will heave up the bulk of the weight, while the other tackles cant it and ease it across the gunnel. A derrick is sometimes used to keep it off the ship's side. When a ship is alongside a jetty, a guy from a strong-hold on shore removes all difficulty, and a list towards the side at which the yard is coming in is desirable. Lower yards are usually rigged while resting across the gunnel; they are swayed up by the jeers, and slung with strong chains—the part round the yard being connected with that round the lower mast-head by a tongue and slip. The yards must be prevented from canting forward with the weight and drag of the sail; accordingly the slings, either chain or rope, should be put on with the bight coming up the fore side (see Fig. 18, where the arrow indicates the fore side and the direction the sail pulls); they are generally put on the wrong way. Merchant ships are invariably fitted with iron trusses, which are fixtures on the mast, holding the yard at the requisite distance and acting as a universal joint. They are of great advantage where there is not a large crew.

Trim and stowage.

While the rigging is progressing the disposition of all heavy weights is worthy of serious attention; for not only ought the vessel to be brought to the draught and trim designed by the builder, or that which has by experience been found the best, but there must not be too much strain at any one part, especially the extremities. In ships intended for sailing or steaming rapidly this is of vital importance; the bows and sterns of cutter or schooner yachts should be empty. Placing the weights in the wings of the hold will steady the rolling motion and make the intervals longer; but this may be carried too far for stability,—especially if the vessel has a low free-board. Weights low down close to the keel will increase stability at the expense of a quick uneasy jerking motion. A yacht which carries much ballast low down will be very stiff under canvas and may sail well in the Solent, but would be unfit to go outside the Isle of Wight. When heavy weights are carried in merchant ships as part cargo, they should never be placed as a solid mass; railway bars, for instance, may be stowed gridiron fashion a foot apart, by which means they will occupy as much space and act upon the ship in the same way as an equal weight of provision casks.

Bending sails.

Before bending sails all the ropes are rove ready for use. A yacht's sails if new should be scrubbed, to take the stiffness out of them. In all cases they should be set when bent and the yards braced each way (unless it is blowing too hard), or there is a risk of something going wrong when they are required for use. In setting them care should be taken that no part is stretched or girt unduly.

Cable.

The inner end of a chain cable is usually secured by a tongue-slip and by a short piece of cable which passes round the mast or is shackled to the keelson; it still retains the name of "clinch." The tongue should not have scope enough to reach the compressor, as it has been known to strip back the ring and slip the cable. It is a good thing to trice up the slip before the cable is stowed, so that it will be accessible at all times, either for slipping, shackling another cable, or bending a hawser. It may be thought that a chain cable would run into the locker and stow itself, but that is a mistake; if care is not

taken to spread it evenly, it will form a pyramid with turns round the base, upon which the upper part will fall as soon as the ship leans over; it will then be necessary to haul up several small bights before the cable will run clear.

Single anchor.

A ship should never lie long at single anchor at a tide-way or during variable winds, for fear of fouling her anchor and thereby destroying its holding power. Frequently space is wanted, as ship and cable range over a large circle, with liability to foul other ships or their anchors. A long scope of cable will only keep a ship clear of her anchor during very light winds, unless assisted by close attention and correct judgment on the part of the seaman. The direction of the two streams of tide should be considered in connection with the wind in order to keep the ship to leeward of her anchor each time she passes it. A strong wind blowing across the direction of the tide and acting on the hull of the ship will secure that effect; but, when the directions of wind and tide are the same, or nearly so, precaution is necessary at each turn of the tide; it is then that a buoy watching over the anchor is of great service. When the wind and tide are in the same direction the helm should be kept over to that side which will cause the ship's head to point in the direction on which she has previously passed the anchor, as the bight of the cable will be dragging that way. The force of the tide alone will cause her to shoot over considerably; but when she is assisted by the fore-top-mast stay-sail (or stay-fore-sail in a small vessel) the sheer will be much greater. The sheet in either case is better to windward and the fore-top-sail braced sharp abox if the wind is light; but, when the tide commences to change, the sails should be allowed to fill, or it should be taken in and the helm placed in midships. If sufficient effect has not been produced by helm and head-sails before the tide ends, the mizzen-top-sail should be set as soon as the ship falls head to wind, first braced abox to turn her stern in the desired direction and then flat aback so as to drag the cable straight. Cutters and schooners have not that advantage; they must depend on the helm and head-sails. At the end of a weather tide the helm and stay-sail will guide the vessel past the anchor. If a ship should break her sheer (pass the wrong way), or during calms and variable winds should approach her anchor, the cable should be hove in, and if there is reason to suspect the clearness of the anchor it should be sighted, since it will be of no use as an anchor if a turn of cable is round the fluke. When anchoring, the state of the tide must be considered in connection with the depth of water; a vessel was once left high-and-dry by the ebb-tide near Dungeness, and a large iron ship drove her own anchor through her bottom in the Solent, off Lymington. The avoidance of the anchors in shallow water is another reason for mooring.

When a ship is in an exposed position, where it may become necessary to let go two or three anchors through stress of weather, in any part of the northern hemisphere, the bower on the port side should be used first, next the foremost one on the starboard side, and as a third the after one on the starboard side, since the ordinary wind veers with the sun, and at the end of the gale the cables will be clear of each other. In the southern hemisphere the reverse order holds good.

Mooring.

When a ship is likely to remain many days at an anchorage where there is a tide or variable winds it is better to moor at once on arrival, with a scope of cable each way six or eight times greater than the depth of water, and an open hawse towards the worst wind. The two cables combined should always be much in excess of the distance between the anchors, otherwise they will possess but little strength to resist a rectangular strain,—an error frequently committed. The amount of support which cables will render under such circumstances will be in proportion to the sine of the angle contained between the anchor and the ship's bow and a line from one anchor to the other. Suppose, for example, a ship moored with anchors east and west of each other, 100 fathoms apart and having 55 fathoms on each cable, in 10 fathoms of water. With chain cables the hawse pipes would not be more than 53 fathoms from each anchor, consequently with a south wind the support given to the ship by each cable will only be 33 per cent. of the strain on the cable,—that is, say, 66 tons combined when the cables are strained up to 100 tons each. The support increases rapidly as the cable is veered; an addition of 5 fathoms each way will (under the above circumstances) give 101 tons, and a scope of 80 fathoms each way will give 153 tons. In practice the cables by dragging over the ground, especially soft mud, assume a direction more ahead, particularly when each cable has a long scope. The anchors should be placed sufficiently far apart to prevent fouling with the slack chain, but not farther, unless the water is too shallow to allow the ship to pass over her anchor at low tide. Such an anchorage is not suitable for very long ships unless special moorings are provided, for which purpose Parks's mooring-blocks are very suitable and inexpensive; they are commonly used in Portsmouth harbor. These blocks are recommended as moorings for the use of yachts and small craft, as being trustworthy and less likely to be stolen than anchors of any kind. Should a ship that is moored with a good scope on each cable have the misfortune to part one of them, her position will be preferable to what it would be if parted from a single anchor, as the bight of cable dragging over the ground will retard her progress, giving more time for another anchor to be let go. In all cases of veering cable either it should be done so freely that the ship will fall off broadside to the wind, when it may be secured while drifting, or it should be done very slowly, a few fathoms or even a few feet at a time, the ship not being allowed to get any stern way. Veering during a squall should be avoided if possible; it should be done in time, before the violence of the squall is felt; but, if it is intended to pay out freely till broadside on, the head-yards should be braced abox to assist and another anchor should be ready. A cable should never be secured entirely by the bitts or windlass, but the compressor and deck stoppers should participate in the strain. When unmooring, the riding cable should be veered freely to allow the ship to get directly over the lee anchor; if it is embedded, stopper the cable while vertical and heave on the other, which must break it out.

Clearing hawse.

The laborious operation of clearing hawse was mitigated or avoided by the introduction of chain cables and the invention of the mooring swivel. As the cables unshackle at every 12½ or 15 fathoms, the end to be dipped round the other cable need not be long. There are two general methods of holding the weight of the lee cable while the turns are taken out. The simplest is to have a light tongue slip to take the flat link, but only about one-tenth the strength of the cable; in a large ship it should have a roller at the top, so that the end of a hawser may be rove and form a standing part. The slip being fixed on the lee cable close above the turns and the hawser taut, the nearest shackle inboard is taken out, and the short end thus formed is hauled out of the bawse-pipe by the fore-bowline, or else by a rope from the bees of the bowsprit, a hook-rope being also attached for hauling it inboard again. A boat should be in attendance from which to detach the hook-rope from the end of the cable, pass it round the riding-cable, and make it fast again to the end of the cable (hanging by the bowline) for hauling it back through the hawse-pipe; thus an elbow is formed taut round the riding-cable in the reverse direction to the elbows and turns below the slip. That operation must be repeated till the same number of turns is formed above as below the slip,—observing that a cross cannot be removed, but the lee cable can be brought under the other. When the cable is taut in and shackled, the slip is knocked off, which allows the turns to drop clear. The cables will then be as they were when moored, with the addition of one or two fathoms on the lee cable. If the short end of the cable is lowered into a boat and lifted by the bowline only for each turn, the operation can be performed much quicker. The second method is to lash the two cables together above the turns with a piece of old rope, which acts as the slip and is cut when done with. In rough weather when a boat cannot lie under the bows the lashing must be passed by a man on the cable (if it is not high enough, heave it up), after which both cables are hove into the same hawse-pipe, whence they are easily cleared inboard; if there are many turns a small lashing will suffice in moderately deep water.

One of the objections made to slack mooring is that turns are formed below water where they are not visible. To meet this objection a piece of paper representing a ship stuck to the glass cover of a compass, with two differently-colored threads attached to paper anchors or inserted into cuts at the edge of the card, in the directions the anchors actually bear from each other, will represent all the turns which the ship makes with the cables.

Mooring-swivel.

There are various ways of putting on a mooring-swivel, but doing it inboard appears to be the safest and easiest. First place it in the riding-cable by shackling the two short legs of the swivel; leave the two linked ends for the second cable, the end of which being hauled out of the hawse by the bowline is hauled into the other pipe by a hook-rope and shackled to the outer long leg; the stopper just inside the hawse (which had been holding the weight outboard of the lee cable) is then slipped and that hawse-pipe is left clear for hauling out the inner end of the lee cable, which is hauled in the other side and shackled to the inner (upper) long leg of the swivel; it then becomes a bridle. There are thus three parts of cable in that hawse-pipe; the last, having no

weight, should be stopped here and there to the others so as to be carried out as the swivel is vecred towards the water's edge and the bridle hove up square. Ships constructed as rams take in both bridles on the same side. A mooring-swivel should always be taken off by first heaving it inboard. If moored very slack, turns may form below the swivel during a calm with still water, but they will disappear with a cross strain; and if the ship is about to get under way the swivel and turns may be hove in together. If it becomes desirable to put on a mooring-swivel when turns are in the cables, let it be put on over them; they will soon shake out. One of the bridles is sometimes taken off the swivel for the sake of clearing that side of the deck; the error is obvious on considering that the strength of the remaining part is not eqnal to the strain which may come npon the span, and the nip in the hawse-pipe is always the part most severely tried. The importance of frequently white-leading and greasing all cable shackles and swivels is obvious, but, being tronblesome, it is much neglected. The bow of a cable shackle should always be forward; if the reverse is the case, the shoulder may strike the side of the hawse-pipe or get jammed nnder the compressor. The shape of a shackle bolt shonld be such as to prevent it entering the wrong way; they often go half way in and jam.

Anchors.

It is desirable that every vessel should carry anchors as large as she can stow and work conveniently, and cables to correspond. A wooden-stocked anchor is lighter when under water than an iron-stocked one of similar holding power, and the wooden stock is less liable to foul when let go; but the durability of iron has nearly rendered the wooden stock obsolete. The old-fashioned anchor with long shank, fluke, and stock had greater holding power and certainty of grip than the more compact dnmpy anchor now in common use. Backing large anchors by smaller ones is now seldom practiced, except when vessels are on shore and the anchor is laid out on a sandy bottom; it is generally better that each anchor should have its own cable and proportionate strain. Floating anchors were formerly used to keep ships' bows np in a gale; they were made of iron crossbars and three or four thicknesses of strong canvas, or a spar with a heavily-weighted sail, spanned with a stont hawser; such a contrivance might frequently be improvised and used to prevent a boat or small vessel from foundering.

Lost anchors.

Shonld an anchor be lost in sand or soft mud after having borne a heavy strain, it may be bnried entirely, when it can only be recovered by grappling the chain, if that is of sufficient length. This is best done by a small anchor with a bar of iron to assist the stock and dragged by a long scope of chain. If the anchor is on ordinary ground and only sunk as far as the shank or a little more, as shown in Fig. 38, it is easily re-

Fig. 38.

covered whether there is any cable on it or not. The full length of a hawser strong enough to weigh the anchor should be used as a sweep, with a boat at each end pulling very slowly or dropping with the tide, in the reverse direction to the strain when it parted, so as to catch the fluke as a hook. Towing a hawser against the tide is generally waste of time, and a chain forms too narrow a bight, unless the anchor is buoyed. When the anchor is felt both boats should close together and their crews pnll with all their strength for a minute or two. Then, while one boat remains stationary, keeping her part of the hawser steady, the other shonld cross her bows with a slack hawser, which thus passes under the tauter part; this second boat, by continuing in a circle ronnd the anchor and returning to the side of the stationary one, will cause a turn to be formed round the fluke, as represented in the fignre. Both crews should again pull hard to tighten the turn ronnd the fluke, after which, both parts being held in one boat and made equally tant, an anchor shackle (buoyed) is placed round them and shaken down by a veer-and-haul pull on both parts by the crew of one boat, while the other tows ahead to keep a strain on the hawser till it is nearly vertical, when the anchor is secured. The ship can then take in the two parts of the hawser and weigh it.

In getting a ship under way there are a few precantions which should necessarily be observed. If the ship is moored, the first anchor to be weighed is that which it would be least convenient to sail from. At the time of unmooring the direction of the tide is very important in the case of sailing ships, and should not be disregarded by steamers. The hanling part of the cat-fall is always throngh the foremost sheave, to prevent the tackle from fouling owing to the ship's motion through the water. The cable on the second anchor should always be hove short before making sail. Should there be plenty of room and the wind moderate, there is no cantion necessary beyond placing leadsmen in the chains with newly marked lines, and putting the helm hard over each way to ensure its being clear. The after-yards shonld be braced up on one tack and the head-yards on the other, to pay her head off; in cutters and schooners the stay-fore-sail is used for that purpose. If another vessel is at anchor too close astern to ensnre gathering way while ahead of her, it should not be attempted; but, by squaring the after-yards as soon as the anchor is tripped, the ship's head will pay off till it becomes safe to fill all the sails and pass under the stern of the other vessel. The anchor should have been *catted* and perhaps *fished* also during the interval; much way shonld never be on the ship till the anchor is seenred, for fear of it slipping or of a man falling overboard. Should rocks or shallow water be inconveniently close astern different means must be adopted. If the wind blows directly on shore, offering no choice of direction, and a current runs parallel to the shore, the ship's head should be cast against the stream. The yards shonld be braced abox sharp up, with as mnch sail set over them as the force of the wind will allow, every means being taken to heave the anchor np quickly; and, in a well-manned ship, as soon as it is ont of the ground, haul on board the main-tack and aft with the sheet, set jib and spanker. The helm being alee, keep it so as long as is reqnired, and brace round the head-yards quickly; the ship will soon spring ahead. Then, by keeping close to the wind, the rate of movement will be retarded till the anchor is secured; then set the fore-sail.

Getting nnder way.

The above is applicable in moderate weather when all or nearly all plain sail could be set. But, should there be a strong wind and a rough sea, it might not be possible to weigh the anchor or to prevent it staving the bows if it were hove up; in that case it mnst be sacrificed for the safety of the ship by passing the strongest hawser from the after-port (padded with mats) to the cable, making it fast by a rolling-hitch, and hauling it taut; an axe and block should be in readiness, also guys, to prevent the spring of the hawser breaking men's legs. The courses shonld be reefed and all ready for setting; the top-sails (double or treble reefed) thould be set or sheeted home ready for setting; and all the yards shonld be braced up on the tack it is intended to go off on. The first opportunity shonld be taken when the ship is commencing a yaw in the desired direction to slip the cable, set the forc-stay-sail and fore-top-mast stay-sail; as soon as the top-sails fill, cut the spring, set the recfed courses, and the main- and mizzen-try-sails. To veer the cable previous to slipping would be more likely to break the hawser. The expedient of losing an anchor should only be resorted to when there is too much wind and sea to admit of weighing it and not too much to prevent the ship, of whatever description, from gaining something to windward nnder a press of sail. Otherwise her condition is made worse by the loss of the anchor; it would be better to decide upon riding the gale out, letting go other anchors, veering all the cable available, striking the top-masts, and bracing the yards nearly fore-and-aft. The cutting away of the lower-masts, when necessary, must always be done with great care to avoid killing people or bilging the ship with the wreckage. The lanyards of the lower rigging on one side should be cnt as the ship rolls in that direction, and a few notches made in the mast on both sides 3 or 4 feet above the deck, the men rnnning aft out of the way when it is likely to fall, for which operations they would have from eight to fourteen seconds. As soon as the mast has fallen the lanyards of the stays shonld be cnt and the most strenuons efforts made to cnt and clear every rope which wonld still hold the mast to the ship.

Slipping cable.

When weighing in rough weather with sufficient room to drift, it is better to have the anchor fully secured before making any sail; or, if it is intended to run before the wind, the ship can be kept on her course by the jib only till the anchor is stowed. Steaming up to an anchor against strong wind or tide is objectionable, as it requires great attention and jndgment to avoid jerks; the same applies to steaming in a gale to ease the strain on the cable; a constant watch should be kept to prevent the cable ever becoming slack. Forc-and-aft rigged vessels have mnch less difficulty in getting nnder way when close to a lee shore, as their main-sails can be fully set without holding wind, and directly she pays off all the sails draw.

If the anchors drag and the ship strikes the bottom, especially on rocks, and it is apprehended that she may go to pieces or founder in comparatively deep water, it would be right to select the best place on shore (if there be a choice), and endeavor to thrust her into it by slipping or breaking all the cables and making sail, if there is still the means of doing so, with the view of driving her up as high as possible and so saving life; let it also be at the top of high water, if that can be waited for. When there is a heavy strain on a chain cable it is easily broken by scratching a notch with a common saw on a link that rests firmly on the bitts and then striking it with a maul or sledge-hammer. Running on shore.

The usual way of testing whether the anchors are holding or not is by dropping the lead over the side and leaving the line slack; but the ship is liable to swing over it, causing it to be disturbed. A grapnel over the bow or from the bowsprit is preferable. Also by sitting on a cable before the bitts a tremulous motion is felt if the anchor is dragging.

If instead of a dead lee shore we have the wind oblique with the line of coast, and the ship from some cause too close to admit of a stern-board towards it, the head-yards should be braced abox to cast her head inshore, while the after-yards are kept square; this will cause the ship to make a long stern-board from the shore, which will not terminate till the wind is well abaft the beam. The helm up to that time may be kept in midships, as there is no reason to diminish the curve. As the stern-way is lost the helm should be put hard up, the head-yards squared, and the mizzen-top-sail kept shivering till braced up on the desired tack. The main-top-sail should be kept full. If it is necessary to get the ship round as quickly and as shortly as possible, the fore-yard, instead of being squared when about to shake, may be braced entirely round quickly so as to continue paying her bow off till the wind comes aft, then squared to allow her to come to. The jib or the fore-top-mast stay-sail (according to the weather) may be hoisted when the anchor is tripped or not, until the wind is before the beam on the desired tack; if at the former time the sheets should be hauled to windward and kept so till the ship is before the wind, then eased off till the wind comes before the beam. The spanker or mizzen-try-sail should be set as soon as it will draw the right way.

What has been said about trimming the sails as the ship is turned round after casting with her head inshore is equally applicable to a case of ordinary wearing when it is desirable to turn the ship with as little loss of ground as possible. As a general guide to the position in which the yards should be placed, it may be remembered that the pressure on the sails always acts at right angles to the yards. This may be exemplified by bracing the yards sharp up when the wind is two or three points abaft the beam. As it will then blow directly into the sails they will certainly receive greater strain, but the speed of the ship will be less than when the yards were square; and it may be observed that considerable leeway will be caused by the lateral pressure. In wearing ship all the fore-and-aft sails should be taken in except the head-sails, and when the helm is put up the main-sail should be taken in and the mizzen-top-sail shivered,—the latter continued till it is sharp up for the new tack. A fashion has been adopted of leaving the mizzen-top-sail square till after the head-yards have been squared; hence everything depends for a time upon the action of the rudder, and the ship sails a considerable distance before the wind and loses so much ground. The operation of wearing a cutter requires much more care than with a square-rigged vessel on account of the heavy boom. A schooner is treated similarly, but the spars and sails are lighter in proportion to the size of the vessel. Before putting the helm up, the tack of the main-sail is triced up (the top-sail clewed up), and the peak dropped till it is nearly in a line with the boom topping-lifts, which is called scandalizing the main-sail. Both peak and boom are secured firmly in midships by means of the down-haul and sheets. Not only is the diminution of after-sail necessary to allow the vessel to pay off quickly, but the change of wind from one quarter to the other will only cause a gybe which is perfectly under control. The jib and stay-fore-sail are gybed by hauling the sheets flat just before the wind is aft so as to diminish the jerk as much as possible. The peak of the main-sail is easily rehoisted while the tack is up and the vessel luffed up to the wind. The runners and weather-boom topping-lift should be pulled up while the ship is before the wind and the top-sail-sheet hauled out as soon as the peak is up,—the tack-tackle being shifted to windward and pulled down. In wearing during fine weather, especially in yachts when racing, some risk may be preferable to the loss of time and the main-sail may be kept set. As the main-sheet is usually rove through a treble block on the boom, a double block to move along the horse, and a single block on each quarter, a strong crew can man each part at the same time and haul the boom in midships quickly, belaying the part which was at the lee side and is about to become the weather side directly the boom is over the leading block, while the other part is kept in hand till the gybe has been effected to lessen the jerk. Wearing ship.

The sails of all vessels are most effective when set as nearly flat as practicable, and also each sail, as well as each part of a sail, should be spread at the same angle from the keel. If under that condition too much or too little weather-helm is required, the balance should be established by changing the quantity of canvas at either end or by altering the trim, not by permanently easing off a sheet, for that is as detrimental as dragging the rudder at a large angle. By altering the stand of the mast materially the angle and consequent set of all gaff-sails are thrown out. Set of sails.

To tack a fore-and-aft-rigged vessel is very simple; by easing off the jib and fore-sheets at the time the helm is eased down and hauling over the main-sheet, the vessel will soon run up to the wind; then if the fore-sheet is hauled flat over as for the former tack it will assist to pay her bow off the right way. The jib-sheet would be hauled aft while shaking, but not too soon to cause it to take the wrong way. The fore-sheet is shifted over as the other sails are about to fill, according to the speed with which the vessel is paying off. In a smart vessel, such as a cutter-yacht in smooth water and with a good breeze, there will be no occasion to retain the fore-sheet, but allow it to shake itself over similarly to the jib. Returning to the idea of tacking with difficulty,—the helm should be put hard over as the speed decreases and reversed directly sternway commences; this remark applies to vessels of all shapes and sizes, as will also the advice not to put the helm over to a large angle while the vessel is going at great speed. At an angle of 10 degrees, more than 98 per cent. of the force on the rudder is applied to turning the vessel and 17½ per cent. to retard her; while at 30 degrees one-half the force would retard and 86½ per cent. tend to turn. Hence we see the reasons for recommending close fitting, broad, tapering rudders. Tacking.

While the vessel is in stays the weather-boom topping-lift should be pulled to take the weight of the boom, the runner-and-tackle on the weather side set up, and the lee one slacked as soon as she is round; also shift the main tack-tackle over to windward and set it up; get a pull of the gaff-top-sail tack if necessary.

The jib of a cutter, yawl, or schooner with a running bowsprit is a difficult sail to handle when the vessel is under way. If there is sea-room it is better to keep the yacht away before the wind and let go the outhaul, when the traveller will run in, or pull at the same time on the inhaul, which should be fitted with a span to keep it square. Haul the stay-fore-sail sheet over to make room to haul in the jib to leeward of it. Gather in the slack canvas smartly to keep it from getting overboard; get hold of the luff of the sail by the stay-rope, while some hands pull on the downhaul. When the sail is perfectly under control let go the halyards and continue hauling on the stay-rope and downhaul. When there is not room to run before the wind, it is best to heave to with the fore-sheet to windward while taking in or shifting a jib; by letting go the outhaul the traveller will run in and the sail can be handled as before, a good hold being always kept of the weather side, that is, the luff of the sail. If another jib is to be bent it should be laid along the weather side of the deck in readiness, with the tack forward and the head aft. The sheets are then untoggled from the former sail, hauled across outside (to windward) of the fore-stay, and toggled to the second jib; also take the tack to the traveller, hook it, and run it out. Hook the halyards and hoist the jib up by them; then tauten the luff by the purchase while the sheet is flowing.

A jib-headed gaff-top-sail is preferable for use on a wind and commanding breeze, though for light winds a long yard spreads a fine sheet of canvas. Such a yard should be slung at one-third from the fore-end (as a boat's dipping lug), the clew-line block secured at the length of the leech from the upper end, and the standing part of the clew-line made fast to the lower end, this last to keep it clear of the cross-tree when being hauled down, which must always be done on the side it has been set, a tack being made if necessary to bring it to windward. On the approach of a squall the fore-sail should be hauled down by means of the downhaul and the vessel luffed up; it is dangerous to attempt bearing up at such a time until the main-sail has been scandalized; the effect of the water on the rudder aids greatly in tripping a vessel over. Gaff-top-sail.

As bad weather comes on the main-sail must be reefed (a smaller jib having been already set) by topping up the boom, easing down the peak and throat, and hauling down the reef cringle to the boom by the reef-tackle; lash the tack and tie the points without rolling the slack canvas. The second and third reefs are taken in as the wind increases and the fore-sail reefed again or stowed, during which time the jib-sheet should be hauled flat, the main-tack triced up, and the vessel kept close to the wind to avoid plunging the sea over the bow. To reef the bowsprit,—house the top-mast, let the jib run in, slack the bobstays and bowsprit shrouds, take out the fid, and let the bowsprit run in one or two reefs; then refid it, set taut the gear, and set a small jib. It is at all times much more difficult to steer a short vessel than a long one, but especially in a heavy sea, when the mode of treatment must be entirely different. A small vessel should be luffed up to meet every large wave in order to bow it as much as possible. She will have but little way on at the time of meeting it and will drop into it easily; the bow will then fall off, the sails fill, and a run be made parallel to the waves till she is luffed up again. A four-oared gig has been taken through a heavy sea under oars by pulling up to meet every dangerous crest which could not be dodged, and just before it broke over the bow backing away from it. The smallest amount of sail which can be shown by a main-sail is when it is balance-reefed; this is accomplished by close-reefing it and lowering the jaws of the gaff close down to the boom, while the peak stretches up that part of the leech above the close-reef cringle. The plan is more frequently adopted by fishing smacks than by yachts or other well-found vessels; they have a try-sail which, being laced on a smaller gaff, is hoisted by the same peak and throat halyards as the larger sail, and has its sheet secured to a bolt near the stern, while the boom is crutched and secured with the main-sail and the large gaff lashed to it. The try-sail admits of being reefed; it is a safe sail either on or off the wind in rough weather. The greatest care is necessary when running before the wind to keep the vessel on her course and to avoid gybing. A vessel should never get under way without a small boat, and a cutter should never be without her legs for fear of taking the ground unexpectedly. In racing to windward, if the wind is variable, keep nearly dead to leeward of the mark vessel, as every change in the direction of the wind will then be an advantage; unless there is a tidal preference for one direction over the other, that will of course decide it.

Reefing sails.

If taken aback by a change of wind, and wishing to remain on the same tack, put the helm up and haul over the fore-sheet. In a ship haul over the head-sheets and brace the head-yards abox. The way to tack a ship under favorable circumstances may here be assumed as well known, and only a few hints relative to doubtful cases given. A few minutes prior to the attempt set all suitable sail, keep steadily "rap-full" with a small helm, so as to get as much way as possible. If the crew is large enough to list the ship, send them over to leeward, ease down the helm slowly, haul the boom in amidships, haul down the head-sails, ease off the fore-sheet, let go the head-bowlines, and check the head-braces. Directly the wind is out of the fore-top-sail, brace the head-yards sharp up again and haul the bowlines. When the wind is entirely out of the main-top-sail, let go the top-gallant bowlines (if those sails are set) and raise tacks and sheets, except the fore-tack, which should be raised after the main-yard has been swung. As soon as the vessel loses her way, shift the helm hard over, and send the men to their stations. If she brings the wind across her bow, hoist the head-sails with the sheets on the same side as before; if the wind takes them well and the ship is still going round, give the order "main-sail haul," haul down the main-tack, aft the sheet, shift over the head-sails, haul the after-bowlines. As the main-top-sail fills, or before, according to the rapidity with which she pays off, swing the head-yards to the order of "haul off all."

Tacking.

If when near head to wind it is found that the bow is falling back and stern-way commencing, it is evident that she has "missed stays." The helm in that case should not be shifted, as with stern-way it will help her to pay her bow off in the direction it was before. The head-sails should be hoisted, the main-sail and spanker taken in, the fore-sheet hauled aft, the after-yards squared. As the wind comes abaft the beam the mizzen-top-sail should be kept shivering and the main-top-sail just full; shift the helm as she gathers head-way. When before the wind square the head-yards, shift over the head-sheets, and keep them flowing. Set the spanker when it will take the right way; complete wearing as before described. This is similar to "box-hauling"; it is not necessary to brace the head-yards abox if she will fall off without. The manœuvre of putting the helm down and letting the ship shoot up in the wind before wearing is sometimes adopted for the sake of diminishing the run to leeward. Hauling all the yards at once is very objectionable; the sails are longer aback and have to be hauled round by main strength against the pressure of the wind.

Missed stays.

"Club-hauling" may occasionally save a ship even in these days of steam, as a paddle-steamer will not turn with her head against a strong gale and a heavy sea, nor will a sailing-ship with an auxiliary screw-propeller. It may be done when the ship is found edging down on a lee shore, too close to wear, and having a depth of water not exceeding 20 fathoms. It will take two or three minutes to open the hawse-pipe, get the cable clear, and procure hammer and punches for unshackling, and mauls for breaking the cable if necessary. Put the helm down and act as in ordinary tacking till she ceases to turn nearer to the wind; then let go the anchor, whether she has entirely lost her way or not, as passing the anchor a little will give a greater swing back when the strain comes and allow more time for slipping the cable, which should be done directly the wind has crossed the bow; at the same time swing the after-yards. If the cable has been slipped successfully, the head-yards may be hauled as soon as the after-yards have been braced up, as she will soon be broadside on. It has been proposed to run a spring from the after-lee-port to the anchor, but that would take too much time.

Club-hauling.

"Backing and filling" is practiced in a tidal channel which is too narrow to allow a ship to gather way for tacking. One top-sail, with the jib and spanker occasionally, is generally sufficient to give slight head or stern way, to avoid either bank or another vessel, while the tide carries her broadside against the wind; the less sail exposed the less the lee-way. Fore-and-aft vessels having less power to get stern-way should have a boat in attendance with a line and a small anchor.

Backing and filling.

"Kedging" was a frequent performance before steam-tugs were introduced; it consisted of a series of movements from one small anchor to another, previously laid out by boats. For a similar purpose harbors that were much frequented were formerly furnished with a succession of warping buoys. The large ropes used for transporting ships are called hawsers, and by a strange anomaly were formerly cable-laid nine-stranded. Such rope is hard and stiff to handle; it absorbs more wet and retains it longer, therefore is less durable; when new the strength is far inferior to hawser-laid rope of similar size. Manila and coir hawsers float on the water and are therefore very useful.

Kedging.

Dropping through a narrow tidal channel by means of an anchor just touching the bottom is called "dredging" or clubbing; it can be practiced in a passage which is too narrow for backing and filling, such as the upper part of the Thames, where it is done every day. The vessel swings to her anchor and points her stern up (or down) the stream; by heaving in the cable (for which the steam capstans and windlasses afford great facility) the tide takes the ship on as fast as it is running so long as the course remains clear. When it is desirable to approach either side, a few fathoms of cable paid out will cause it to hold; the helm and the action of the tide will then sheer the ship as desired, and by heaving in cable she will go on again, so that a sailing-ship should go up at half the rate of the tide at least. With a screw-steamer it is far easier, as the screw will straighten her as well as the tide, and when fairly pointed through an open space she can make a stern-board at five knots an hour while perfectly under control.

Dredging.

A few words may be said about making and shortening sail in bad weather. One point holds good in all cases: the sails should never be allowed to flap, as that exposes them to the danger of splitting. The tack or luff is invariably secured first, while the sheet bears a steady strain enough to keep the sail from shaking. Before hoisting fore-and-aft sails the sheets are steadied aft; and, should a sheet carry away, the sail is hauled down or brailed up instantly. Spankers and try-sails should be taken in entirely by the lee-brails, the stack only of the weather-brails being at first taken down. A practice has become general in the British navy of securing the top-sail clew-line blocks to the lower cap instead of round the yard, for the sake of saving time when shifting top-sail-yards; the use of the clew-lines for hauling the yard down and steadying it is thus lost; this is one of many objectionable practices.

Making and shortening sail.

There has been a difference of opinion as to the mode of setting and taking in top-sails and courses; but the same

rule should apply to all square sails alike; that which is safest for one will be safest for the others. Experience and the balance of opinion favor the hauling home of the weather top-gallant-sheet, top-sail-sheet, and tack of the fore-sail or main-sail first, with a good strain on the clew-lines, clew-garnets, and bunt-lines, to avoid flapping. The lee sheet may then be hauled and eased down by clew-line and bunt-line. Each bowline should also be steadied taut in succession to prevent the leech from flapping. There appears to be no advantage in first hauling the lee-sheet partially down. The taking in of these sails has been equally a matter of dispute, and many advocate taking in a top-sail in a different manner from that which they would adopt in taking in a course. Falconer's rule was often quoted and followed in former times. It runs thus:

Top-sails and courses.

> "And he who strives the tempest to disarm,
> Will never first embrail the lee yard-arm."

It must be remembered that the decision there supported by the sea-poet was then a novelty, and opposed to the opinion of the practical seaman. A main-sail had been split by "letting fly" the sheet; but that proves nothing, as all sails will split if the clew flies loose in a gale. The lee clew of an eighty-gun ship's main-top-sail was blown over the yard-arm in consequence of the weather-sheet having carried away; that clew was hauled up first. It might not have happened had the bunt-lines been well manned and had there been a small strain on the lee bowline. Either plan will answer if the bunt-lines are well manned and the sheets eased steadily; but that the weather clew should be set first and taken in last is preferable.

In taking in top-gallant-sails before the wind both sheets should be kept fast till the yard is down. When a top-sail is to be reefed the yard should be pointed to the wind; and for the first reef the top-gallant-sheets, bunt-line, and bowlines should be hauled taut, for the second reef the top-gallant-sail should be clewed up, to keep the sheets from knocking the men at the yard-arms. In rough weather a preventer parrel and rolling-tackle should be put on before the men go on the yards. For a fourth reef the top-sail should be clewed up during the operation; it will then be performed with less difficulty. The long reef-points in top-sails and courses have generally given place to the lighter and more expeditious method of having reef-lines on the sails, with beckets and toggles on the jackstay. The whole strain of the sail is thus thrown on the jackstay and small eyebolts, instead of the points being firmly tied round the yard itself. Also the slab of each reef is usually allowed to hang down and chafe at the fold; but this can be prevented by fastening three or four small slab-lines on each side of each reef. Cunningham's invention for reefing top-sails is very valuable in all weakly manned ships, but it requires to be kept square upon the yard while rolling up. If it becomes necessary to shift a top-sail during a gale, it should be made up on deck in the shape it would assume if furled on the yard, and stopped with spun-yarn, with the reef-earings and bowline bridles showing near the ends and the clews and bunt-line toggles near the centre, where it would be slung by a slip strop. When the two earings are taken into the centre it will form four parts, and the weather top-mast studding-sail halyards being bent round it will cause it to look like a large bale. In that state it is hoisted into the top by the sail tackle, at the same time being steadied by the studding-sail halyards; there all the ropes are bent, clew-lines and bunt-lines hauled up, reef-tackles hauled out, and the sail bent to the yard before the stops are slipped or cut; then it is reefed as desired before the weather sheet is hauled home. A fore-sail or main-sail is bent in a similar manner, except that the various ropes employed on a course are bent on deck, by which ropes and the burtons it is swayed up. Studding-sails are very useful in long voyages; their disuse on the main-mast is to be regretted, especially in long ships. A top-mast or top-gallant studding-sail is shifted "before all," by a man on the yard gathering in the sail as it is lowered to him and holding the outer leech till it cants the right way.

Coasting.

During a coasting voyage the vessel must be within a moderate distance of the shore, therefore the person in charge should constantly be ready to run for shelter when necessary, and have the moral courage to do it in time. In yachting voyages, however distant, there is a natural desire to see the land and all that is worth seeing, and, being well provided with charts, such vessels can enter any harbor, when perhaps a pilot is not able to get out. A ship starting on a foreign voyage should seek "blue water" as soon as possible, and keep a safe distance from all land which is liable to become a lee shore, and not be tempted to edge in because a certain tack is much nearer to the desired course than the other. For the choice of track and for trade winds, see NAVIGATION.

Heaving to.

To heave to for the purpose of stopping is done in a cutter by easing off the jib-sheet, hauling over the weather fore-sheet, and tricing up the tack of the main-sail. A schooner is treated similarly; the top-sail (if she has one) is backed and the gaff-fore-sail is taken in. A ship has her courses hauled up, head-sheets eased off, and either the main or fore yard squared. Upon the latter point opinions differ. If two ships are close together, the one to windward had better back the main-top-sail and the ship to leeward the fore-top-sail; they should always preserve a little headway. Boats invariably board ships on the lee side; small vessels, when drifting fast, on the weather side. A ship at anchor in a tide-way will always present a lee side during some period; but a "weather tide" causes a dangerous sea for boats. A boat's oars should never be tossed up or forward when there is danger of their fouling, for fear of staving the boat or injuring some one in the after part.

When in the vicinity of a lee beach and landing by means of a boat is determined on, the oars should be manned to the utmost and the waves watched (as they always vary), and the boat forced in on top of the third large wave, care being taken to keep her exactly end on to the sea. At the instant of touching the ground every man should jump out and begin to haul up the boat, if she is of reasonable weight; the next wave will probably put them all out of danger. By holding on to the boat they give and receive mutual support, and avoid being sucked back by the receding water or crushed by the boat.

The term "hove to" as applied to a vessel in a gale of wind is derived from the desire to turn her bow up towards the wind and sea; this under all circumstances of sail should be the point aimed at, since then the seas strike the side obliquely and also the bow, which is the strongest part. The best sails to keep on a ship during a violent gale are the close-reefed main-top-sail, main- and mizzen-try-sails, and fore-stay-sail. The fore-try-sail also may do good, and is far preferable to a main-stay-sail. The pressure of the main-top-sail tends greatly to mitigate the violent motion; also by heeling the ship she presents a higher side to keep the sea out and a sloping deck to aid the water in running off. The helm should be about one turn "a-lee," never hard down. When north of the equator ships should heave to on the starboard tack, and the reverse in southern latitudes. More sail should be made as soon as the gale moderates, to steady the ship. The violent rolling motion may sometimes be diminished by altering course, so that the period between the waves reaching the vessel may be made to disagree with her own period of oscillation, or when running before the wind by bracing the yards up in opposite directions. Steamers at a reduced speed can scarcely be considered as hove to; their masts and sails are too weak to be of any use in a gale and too small in moderate winds; they make the rudder do all the work. The best sail to scud under is close-reefed main-top-sail, reefed fore-sail, and fore-top-mast stay-sail.

Three contingencies should always be anticipated by the captain and officer of the watch, and in some degree by every man in the crew, so that the alarm should lose half its dread and be met by prompt action,—a man falling overboard, fire, and collision. A boat's crew should be appointed in each watch, who on going on deck should see the boat ready and the plug in. If the ship be on a wind and capable of tacking, on the cry "A man overboard!" the helm should be put down and the ship steered round on the other tack, with either the fore or main yards left square and the courses up; she will then drift down towards the man, while the boat, which was at first on the weather side, is being lowered to pick him up. If the ship is running free the case is worse; she must be brought to the wind instantly with the head-yards square. Various plans have been devised for lowering boats, many of them very good when executed by trustworthy men; the same may be said of the old system with plain blocks and tackle; practice and coolness will render either successful.

Man overboard.

With regard to fire, prevention is better than cure: lights in the hold should never be without a protecting lantern, and passengers' sleeping-cabins should be lighted by lamps fixed in the bulkhead, inaccessible from the inside. Pumps and engines for extinguishing fire should be on the upper deck, for fear of being cut off by the first outbreak. Fire stations and exercise should be frequent even with the smallest crew. On the first alarm all ports and ventilators should be closed, wind-sails hauled up, hatchways closed as much as practicable, awnings and all lower sails taken in, and the ship kept before the wind, unless the fire is in the after-part, in which case the boats should be lowered at once. Many

Fire.

other things will present themselves to a cool head; perhaps the first order should be "Silence!"

Collision. Collisions may be reckoned among those dangers against which no man can guard himself, be he ever so wise and experienced; it avails not that one ship should do what is right, unless they both do so. The laws upon the subject appear to be all that can be desired (see "Rules of the Road," under NAVIGATION, vol. xvii. p. 285); but the mode of enforcing obedience is very lax and lenient. A pure nautical tribunal is greatly needed, and every unjustifiable deviation should be severely punished, whether followed by an accident or not. It is admitted that in most cases of collision the evidence is so conflicting that a judge must be puzzled where to find the truth. The great increase of speed diminishes the time of approach; the increased length of vessels demands a larger circle to turn in; the want of sail at the extremities diminishes the power of turning, throwing all the work on the rudder, which is proportionately much smaller than it was. The perpendicular stem gives a deadly blow at the flat side instead of first cutting down the upper works by the sloping cut-water, and probably coming to a state of rest before reaching the water's edge. Sufficient care is not taken to keep all lights from the upper deck and all places where they may disable the eyes of the officer in charge or the look-out men. Even holes have been made at the back of the bow-light box to enable the officer of the watch to see them burning; of course his eyes are thereby rendered unserviceable for seeing distant objects. Officers in the merchant service are invariably in two watches, which does not allow them sufficient time to sleep, especially in windy weather. If immediate action is not taken the instant a sail or a light is reported, the officer in charge should take bearings by the compass, by which he will soon know if the other vessel is inclined to pass ahead or astern. If it remains stationary by the compass, they must both be converging on the same spot.

Leaks. If a ship should spring a leak at sea which may be attributable to straining and is sufficiently serious, she should be run before the wind and sea under small sail. If the pumps then clear out the water, she may run for a port or resume her voyage when the gale ceases. If the leak does not abate, though the motion of the ship is easy, it will be evident that a butt (the end of a plank) has started if it is a wooden ship, or that a plate has given way if an iron ship. In that case, two stout hauling-lines should be placed under the bowsprit and head-gear, and the end of one secured to the head-earing, the other to the clew of a spare top-sail or course, also two similar ropes to the other side, each of the four ropes being marked at 10 and 15 fathoms from the sail. Half a hundredweight of iron (shot or furnace bars) should be attached to each clew, the ship's progress completely stopped, the sail thrown overboard and drawn square across the bows; the hauling-lines on the clews being carried aft and kept square by the marks, while the ropes on the head of the sail are veered, the sail is placed like a large patch over the place desired. Should the position of the leak not be discovered, it might be well to place the sail under the main-mast; if this has no effect, place another sail under the fore-mast and the fore-foot. This simple device is no doubt very ancient and was probably the process called in the book of Acts "undergirding the ship." Sails have usually been thrummed; but that requires much time, and the utility is questionable. If a large hole has been made by collision a spread sail would be burst by the pressure; but such a hole being usually at the side and partially visible, a large sail nearly in the form in which it was stowed, having the stops cut, should be thrown over before the hole end downwards, and when sunk below the supposed depth of the fissure, brought towards it till the bight of the sail enters the vortex, when it will be sucked in violently and either disappear within the ship or block the hole; if the latter, smaller sails can be spread slack over the hole to be sucked in. The use of sails for the above purposes has been strangely neglected during late years, though much more frequently needed.

A leak can be stopped from inboard when accessible by placing over it pads of oiled or tarred canvas, tarred coal-sacks, bags of white lead, tallow, paint, clay, or any material which fits close when pressed by boards and shored down firmly,—that or something similar could be done when a ship is on shore. If a ship is on shore with a large hole in one part of her bottom, she might be recovered, especially if ebb-tide recedes many feet, by building a double partition with a space of about 2 feet between on each side of the injured part, filling the space with clay, and shoring it well,—in other words, by improvising two water-tight bulkheads; the water having been pumped out of the sound parts the rising tide would float her. When a ship is on shore with numerous cracks in her bottom, but not a clear hole, she may be floated by constant pumping, even though at first the expedient should fail to prevent the tide from ebbing and flowing in the hold. By maintaining as much as possible an inward flow the small fissures will gradually choke with weed and sand, till the inflow is so reduced as to be within the power of the pumps; hay, oakum, or dirt of any kind should be thrown over where it can be sucked into the leak. The ordinary pumps of a ship may be supplemented by nailing together four common deal boards and fitting two square valves weighted with lead, hinged and lined with leather, to rest on seats 2 feet from one end, which must be weighted on the outside as the bottom. A large hole near the top should be provided with a leather lip to shoot the water over the combings. When slung in the bights of two ropes four men jerk it up and down; the force with which it descends through the water will send a stream up the tube with less labor than bailing entails.

Ship on shore. Ships on shore should be secured from driving into a worse position before being freed from any weight. Hard substances such as guns and shot should not be thrown on the lee side or where the ship in hauling off might strike on them. Keep sufficient fresh water for immediate use. An anchor is usually carried out between two boats, the flukes being hung to a spar across the boats chocked up from the thwarts, while the stock is suspended across the sterns of the boats. The boats should be hauled out to a kedge anchor, while other boats support short bights of hemp cable. Good axes should be used for letting go the anchor.

Rudders. A wooden rudder when immersed is very little heavier than water and can be shipped and unshipped by seamen with ordinary appliances; but iron ships have metal rudders sometimes weighing as much as 20 tons. The following remarks apply to wooden rudders only. To unhang a rudder remove the woodlock,—a chock recessed and nailed to the stern-post close above the upper pintle,—the use of which is to prevent it being unhung by accident. From a beam or chock above the rudder-head suspend two luff-tackles, single blocks, and two leads up, and the double blocks down to strops through the tiller hole. A few men on each luff-fall will easily lift the rudder the length of the pintles; and as they are drawn from the gudgeons it will swing free and may be lowered between two boats provided with spars across their gunnels; the bight of a rope will bring the heel up to a position similar to that of the head,—nearly horizontal. It can then be taken under the main yard and hoisted in, or be carried for repair to a wharf or suitable beach at high water. Before a rudder is taken off to be hung, two long guys are rove through holes for the purpose at the fore-part of the heel, one end of each being hitched to the band for the rudder-chains, while the other is in readiness to hand into the ship halfway forward and low down. On the rudder-head being suspended by the luff-tackles a little higher than its position when shipped, the guys will haul it to the exact line with the stern-post; it is then lowered into the gudgeons, the guys unrove by means of the short ends, and the woodlock replaced. Smooth water is desirable for that operation; a little tide in a line with the keel will assist. The tiller should be firmly wedged or secured in the rudder-head so as to prevent any jerking motion; for the same reason, the wheel ropes should be kept moderately taut; they should also be rove in two parts, lashed together on top of the wheel, for convenience in shifting them one part at a time. The rudder-chains are shackled to a band, which embraces the rudder a little above the water, and are attached to a stout rope, usually stopped up round the counter ready to receive tackles, by which the ship may be steered imperfectly after the rudder-head is disabled.

The construction of a temporary rudder has always been considered an interesting and highly useful piece of seamanship. One easy plan is to pass the end of a large hemp cable out of the rudder-hole or central port, haul it up to the ship's side, lash to it one or more large spars, sling the whole bundle about the centre of the spars with stout hawsers as guys, throw it overboard, and heave in a part of the cable, leaving the part with the spars lashed to the side of it far enough away not to be lifted out of the water with the pitch of the ship. The guys when rove through blocks on the spare top-sail yard-arms, which are lashed across the gunnel for the purpose, are taken to the capstan; by this means the ship may be steered with the assistance of her sails. If there be not a hemp cable on board, the largest hawser must be used with a spare top-mast or the largest spar available.

Early in the 19th century Captain Edward Pakenham contrived an efficient rudder with the material in his ship. Part of a top-mast heel up formed the rudder-head and main-piece, the fid-hole becoming the tiller-hole. The main-piece passed through the round hole of the lower cap,

which was made of elm and lined with leather, and which, being secured by a collar near the lower part, acted for pintles and gudgeons, and was drawn into place by two hawsers *h*, *h*, till it embraced the stern-post by the square intended for the mast-head (Fig. 39). There should be ropes to the bolts *b*, *b*, to keep it horizontal. Another top-mast was cut, which, with the remainder of the first, made four parts in all, flattened and fitted together, woolded and bolted, and so forming the required width. Three pigs of ballast were let into the lower part and the whole planked over and secured with spike nails. Fine weather was necessary for shipping it and a collar was built above the rudder-hole to confine the motion and to support the weight. The materials carried in modern ships may differ, but a fertile mind will generally find substitutes. The "Pique" frigate, commanded by the Hon. H. J. Rous, steered across the Atlantic during sixteen days of almost continuous gales, a distance of 1500 miles, by means of a cable over the stern and a Pakenham rudder during part of the time. She had been on shore in the Gulf of St. Lawrence; during the voyage she was making 20 inches of water an hour and she had also two masts sprung; she reached St. Helens in the Isle of Wight on the 13th of October, 1835.

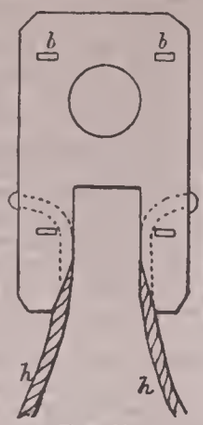


FIG. 39.

It is a difficult thing to get a lower yard from the deck into its place without letting go either stays or rigging, and this the following instance will illustrate. The "Thunderer," an eighty-four gun ship, broke her main-yard, which was 112 feet long, completely in two, 5 feet to leeward of the slings. The broken parts were sent down, and a main-top-sail-yard crossed instead, while a reefed top-sail did duty as a course and a mizzen-top-sail over it as a main-top-sail. The parts of the main-yard were placed together on deck; the two halves of a spare anchor stock were let in on the fore and aft sides and an oak mast fish on top, with some studding-sail-booms to round it off. All parts were bolted, hooped, and woolded together, making it as strong as ever it was, entirely from the material carried in the ship. The sketch

Raising mainyard.

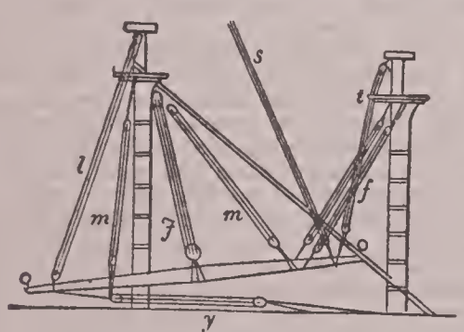


FIG. 40.

(Fig. 40) represents the time of dipping the port yard-arm under the main-stay: *y* represents the jeers, which bear the principal weight (total, 5¼ tons); *f* the two fore-tackles lashed to the mast-head pendants; *t* a top-burton; *s* a sail-tackle to the top-mast-head; *m*, *m* main-tackles from the mast-head pendants; *l* the main-lift; *y* a yard-tackle secured to an upper-deck beam. The main-yard was entirely rigged before being crossed: the blocks are not shown. In a long ship the operation would be easier. When a fore-yard has to be got across from the deck, time and trouble can be saved by letting go, half at a time, all the fore-rigging and back-stays which are on that side.

When feeling the way into harbor during a thick fog, let a boat pretend to tow the ship with the deep-sea lead-line; by this means a margin of 100 fathoms of safety will be secured. Care should be taken that every running rope in the ship be slacked previous to rain or heavy dew.

For further information and variety of opinions see Captain Francis Liardet, R.N., *Points of Seamanship and Discipline;* Robert Kipping, *Masting, Mast-making, and Rigging Ships;* Vanderdecken, *The Yacht Sailor;* R. H. Dana, *Seaman's Manual* (10th ed., 1867); Captain Alston, *Seamanship;* Charles Bushell, *Rigger's Guide;* Captain Sir George S. Nares, *Seamanship* (6th ed.).

GLOSSARY.[1]

A.B., "able-bodied," signifies a trained seaman. *Abaft* (prep. and adv.), relatively nearer the stern. *Abeam*, in a direction abreast the ship. *About ship*, to tack or turn head to wind. *Accommodation-ladder*, a flight of steps over the side, suitable for ladies. *Adrift*, severed from all security. *Aft*, towards the stern. *Arming the lead*, placing tallow in the cavity at the end to bring up specimens from the bottom. *Astern*, behind; to pass astern is to go behind. *Athwart*, across; as across the bows. *Avast* (as in the expressions, "Avast there," "Avast heaving"), stop.

Back and fill, a mode of drifting safely with the tide, against the wind. *Back a sail*, to let the wind press it the reverse way. *Backstay*, a support at the side and abaft an upper mast. *Bale-slings*, a long strap of rope for hoisting packages. *Ballast*, anything carried for the sake of its weight. *Banyan-day*, formerly a fast-day on which oatmeal was issued in lieu of meat. *Bare poles*, at sea without any sail set. *Barrica*, a small cask for water in boats. *Batten down*, to cover the hatchways with canvas secured with battens, in order to exclude the sea. *Beam*, the extreme width. *Beam-ends*, a ship is on her beam-ends when inclining over at a right angle. *Bear a hand*, make haste. *Bear away* and *bear up*, steer farther from the wind. *Bearing*, direction; *down to her bearings*, a point in the inclination of a good ship at which she resists going further. *Becket*, a rope eye to receive a knot or toggle. *Bees*, strong projections bolted on each side the bowsprit. *Belay*, to secure a rope by turns round a belaying pin or cleat. *Bells*, one sound is made for each half-hour from setting the watch (see "watch"). *Belly*, in a mast, a curve with the convex side aft. *Belly-band*, a broad strip of canvas across the middle of a sail, to strengthen it. *Belly-stay*, a rope from the centre of the mast led forward. *Bend*, sails are said to be bent to the yards; a kink formed in a hemp cable when stowing it: to make fast anything; to bend on. *Bentick shrouds*, formerly used to assist the futtock shrouds and set up on deck. *Berth*, the situation of a ship or other thing. *Between wind and water*, at the water's edge. *Bight*, a loop formed by a rope. *Bilge*, a gutter nearly the length of the bottom of the ship; hence bilge-water. *Binnacle*, a box for the compass. *Bite*, the anchor bites when it hooks the ground. *Bitts*, a rack with sheaves and pins; cross timbers or iron to secure the cable. *Block*, a shell of wood or metal containing one or more sheaves. *Blue water*, clear of the English Channel; at a distance from shore. *Bluff*, broad, as applied to the bows. *Boarding-netting*, a rope net to exclude an enemy. *Bobstays*, strong ropes or chains to keep the bowsprit down. *Bold shore*, that which has deep water close to it. *Bolsters* soft wood and canvas under the eyes of the rigging. *Bolt-rope*, a superior description, made of fine yarn, used for roping sails. *Bonnet*, an addition to a try-sail (or other sail), attached by a row of beckets rove through each other. *Boom-irons*, supports for studding-sail-booms. *Booms*, spare spars (indefinitely). *Both sheets aft*, running before the wind. *Bower anchors*, the two principal anchors for use. *Bowline*, a rope to bow the leech of the sail forward; *bowline-bridle*, a span for the same; *to sail on a bowline*, to sail close to the wind. *Bowse*, a violent pull. *Box*, or braced *abox*, the head-yards crossed the reverse way of the after-yards; *box her off*, to force her bow from the wind. *Box-hauling*, letting the ship come to the wind, hauling round all the yards, making a stern-board, and wearing. *Brace to* or *by*, to bring the yards back a little, to make them shake or nearly so. *Brace up*, to place the yards as far forward as they will go. *Brail up*, to take in a sail by means of brails. *Break bulk*, to commence discharging cargo. *Break her sheer*, to pass the wrong side of her anchor. *Breast-fast*, a security at right angles to the side. *Bridle*, two parts of cable from the hawse to mooring. *Bring by the lee*, to fall off till the wind, after crossing the stern, backs the sails. *Bring to*, either to anchor or to stop by backing a sail; to connect the cable with the capstan, or a tackle to a rope. *Broaching to*, coming to the wind against the helm. *Broadside*, the whole side; the discharge of every gun on one side. *Broadside on*, the flat side against anything. *Broken-backed*, a state caused by weakness or strain, when the centre sinks unduly (see "hogged"). *Bucklers*, shutters and bars to secure the hawse-holes at sea. *Bulk*, the cargo is stowed in bulk when without sacks or packages. *Bull-rope*, a rope from the jibboom to keep a buoy or boat from the bows. *Bull's-eye*, a wooden fair lead or a round thick piece of glass. *Bumpkin*, a short spar projecting from each bow, to which the fore-tack is hauled down; it is supported by *bumpkin shrouds*. *Bunt*, the centre part of a square sail when furled. *Bunt-lines*, ropes from the foot of a sail by which to haul it up. *Buoy-rope*, the rope between the crown of the anchor and the buoy. *Burton*, a long purchase with a double and a single block. *Bush of a sheave*, the brass lining upon which the pin rests. *Butt*, the end of a plank. *Butt-slings*, strong slings for casks. *By*, brace the yards by, nearly in the direction of the wind, but not so as to shake. *By the board*, overboard entirely, as a mast going over the side. *By the head* or *stern*, drawing more water forward or aft.

Cable-laid, the designation of nine-stranded rope. *Caboose*, a cook-house on deck. *Cant*, to turn over. *Cap*, a large piece of elm fitted on the top of a mast by a square hole, with a round hole for an upper mast to slide through; with iron masts the cap is of iron. *Capshore*, a support to the fore-part of a lower cap. *Capstan*, a drum on a vertical spindle for heaving heavy weights. *Careen*, to heel over bottom out of water for repairs. *Cast off*, to let go. *Cat-block* and *cat-fall*, used in hoisting the anchor. *Catharpin legs*, short ropes connecting the lower parts of the futtock shrouds. *Cat-head*, timber-head projecting from the bow on which to hang the anchor. *Cat's-paw*, a slight puff of wind; a means of hooking a rope. *Caval*, a large cleat for securing ropes. *Chafing-mats*, mats to protect the rigging. *Chain-plate*, an iron plate securing a dead-eye. *Chain-pump*, the largest hand-pump, which by an endless chain and valves produces a continuous flow. *Channels* or *chains*, projections from the ship's side to spread the rigging. *Chock-a-block* or *block and block*, when the blocks of a tackle meet together. *Choke-a-luff*, to pass turns of spun-yarn round both parts of the fall to prevent their moving when let go. *Cleat*, a piece of beech with two horns for belaying ropes; a piece of wood nailed to secure a thing from slipping. *Clew-garnet*, for hauling up the clew of a course. *Clew-line*, the rope which hauls up the clew. *Clew of a sail*, the corner to which the sheet is attached. *Clews*, an arrangement of small lines called knittles for hanging cots and hammocks. *Clinch*, the inner end of a cable; also a mode of fastening a hemp cable to an anchor, and for other purposes. *Clubbing*, *dredging*, or *driving*, each word implies dropping with the tide, while the ship is governed by the helm and an anchor scraping

[1] See also the explanation to Fig. 35 at p. 620.

the bottom. *Club-haul*, to tack by means of letting go and losing an anchor. *Coamings*, the raised frame of a hatchway. *Cockbill*, when the anchor hangs loose from the cat-head. *Collars*, the upper parts of the stays and large straps round the bowsprit. *Come up*, to render slack or let go. *Coming up*, when the change of wind allows a nearer approach to the course. *Commander*, a large mallet for hammering rope. *Companion*, a high covering over a hatchway. *Compressor*, a curved bar to squeeze the chain cable against a beam as a stopper. *Conning*, directing the helmsman. *Counter*, the angle of the stern on either side. *Courses*, fore-sail and main-sail of a square-rigged vessel. *Crank*, unstable, easily turned over. *Cringle*, an iron ring to confine a sail to a stay; an eye formed by a strand on the leech of a sail. *Crossing the bows*, passing close ahead. *Cross-trees*, spreaders under the tops and at the top-mast heads to support the top-gallant rigging. *Crow's-foot*, several spans of small rope brought to a common centre. *Crow's-nest*, a seat for a lookout man at the top gallant mast-head. *Cruppper*, a chain to keep down the heel of the jibboom. *Crutch*, an iron rest for a boom; a metal swivel for an oar to work in. *Cut and run*, to cut the cable and go in haste.

Davit, a derrick of wood or iron to lift a weight. *Deaden her way*, to retard progress. *Dead eye*, a clump of wood with three holes, without sheaves; an iron frame for setting up rigging. *Derrick*, a single spar held by guys to lift a weight. *Dog*, to pass the tails of a stopper or other ropes zigzag. *Dog's-ear*, the leech of the sail between the reefs when allowed to stick up. *Dog-vane*, made of feathers for the use of the quartermaster. *Dog-watch*, 4 to 6 and 6 to 8 P.M.; figuratively, a short time. *Dowse*, to lower a sail; put out a light. *Drag*, applied to an anchor not holding. *Draught*, the depth of water required to float the ship. *Draw*, when a sail takes the wind properly. *Dredging*, see "clubbing." *Drift*, floating without guidance. *Driving*, dragging the anchor unavoidably in a gale; dropping intentionally with the tide and very little cable. *Drop astern*, to fall behind. *Drop of a sail*, the distance the foot is from the yard. *Dunnage*, firewood or valueless things placed under the cargo.

Earings, the upper corners of a square sail; the ropes by which they are secured to the yard. *Ease her*, in steamers, go slow. *Ease off*, to slacken a rope. *Ease the helm*, move it back towards midships. *Edge away*, to steer farther from the wind, or obliquely from a ship. *Edge in with*, to steer obliquely towards something. *Elbow*, an angle formed by two cables or ropes. *Embrail*, to hrail up (obsolete). *End for end*, changing a half-worn rope, substituting a strong part for a weak. *End on*, in a direct line with the length of the ship. *Estivador* or *stevedore*, a man who stows holds but does not go to sea. *Even keel*, when a ship draws as much water forward as aft.

Fag-end, the end of a rope unlaid; refuse. *Fair-way*, the free passage to a harbor. *Fair wind*, a wind which allows a ship to steer direct for her destination. *Fake*, one circle of a coil of rope. *Fake down*, to arrange a rope to and fro clear for running. *Fall*, of a tackle, the part which is hauled upon. *Falling off*, when the change of wind obliges the ship to deviate farther from her course. *False keel*, an addition to the main keel, not vital to the strength of the ship. *Fetch way*, to move through being insecure. *Fid*, a piece of wood or iron to key up a mast or keep out a cutter's bowsprit; a wooden cone used by riggers. *Fill*, to place the sails to the wind so as to propel the ship forward. *Fish*, a piece of wood or iron secured to a weak mast or yard to strengthen it. *Fish-davit*, a derrick for hoisting the flukes of an anchor; hence *fish-block*, *fish-hook*, *fish-fall*. *Flat aft*, when the sheet of a sail is as taut as it can be; *flatten in* is the order to produce that effect. *Flaw of wind*, wind sudden and unstable in force and direction. *Fleet*, to rearrange a purchase for another pull. *Flemish horse*, a foot-rope at the yard-arm for men to stand on. *Flotilla*, a fleet of small vessels. *Flowing sheet*, the sheet eased off to a fair wind. *Flush*, level. *Flush-decked*, having neither poop nor forecastle. *Foot-ropes*, ropes on the yards, the jibboom, and the flying jibboom for men to stand upon. *Fore and aft*, from one end to the other lengthways of the ship. *Fore-and-aft sails*, those not set on yards, therefore capable of being placed in a line with the keel. *Forecastle*, the front part of the upper deck, but more correctly the deck built over that part; *top-gallant forecastle*, a short piece of deck open beneath. *Fore peak*, under the front part of the deck; the forward extremity. *Fore reach*, to sail faster through the water than another when on a wind, though not gaining to windward. *Forge ahead*, the ship moving ahead slightly when hove to, or in a calm, or over a shoal. *Foul*, entangled (of a rope); contrary (of a wind); weedy (of the bottom). *Foul hawse*, when the cables are twisted. *Frapping*, an irregular lashing to bind things together. *Freeboard*, that part which is above water. *Freshen the nip*, to veer a little cable, or any rope, in order to relieve the parts strained. *Full and by*, to steer close to the wind, keeping the sails full. *Funnel*, a copper sheath at the top-mast or top-gallant-mast head. *Furl*, to roll up square sails; other sails are *stowed*. *Futtock-shrouds*, short ropes below each top.

Gammoning, a strong lashing of rope or chain to secure the bowsprit down to the head knee. *Gangboard*, a plank with battens for people to walk upon. *Gangway*, the narrow deck between the quarter-deck and forecastle; the entrance to a ship; any passage kept clear. *Gaskets*, bands of plaited rope-yarns to secure the sails when furled. *Gird-lines*, ropes which are on a mast when it is hoisted in and by which the shrouds are triced up. *Girt*, when the mooring cables are so stretched as to prevent the ship swinging freely. *Glut*, a piece of wood which keeps a knot or hitch from closing. *Goose-neck*, a crooked iron to support a studding-sail-boom. *Goose-wings*, the parts of a course which are exposed to the wind when confined by clew-garnets and buntlines only. *Graft*, to cover a rope with fine line in an ornamental manner. *Griping*, coming up to the wind against the helm. *Ground-tackle*, anchors, cables, and all connected with them. *Grow*, a term applied to the direction of the cable when it is being hove in. *Grummet*, a rope ring made by a strand. *Gudgeon*, that part of the hanging of a rudder which is bolted to the stern-post. *Guess-warp*, a rope stretched taut to haul something to and fro upon. *Gunnel* or *gunwale*, the highest part of the bulwark. *Guys*, ropes to keep a spar or other thing in the desired position. *Gybe*, to let a fore-and-aft sail shift from one side to the other when nearly before the wind.

Halyards, ropes exclusively for hoisting sails. *Hand over hand*, to pull with one hand after the other; figuratively, done quickly. *Handsomely*, an injunction signifying slow motion; with care. *Handy billy*, a small axe kept on deck. *Hard down* and *Hard-a-lee*, position of the helm, the reverse of *hard-a-weather* and *hard up*. *Haul on board*, the usual order for hauling down the main-tack. *Haul up*, altering the course more towards the wind. *Hawse-holes*, the openings in the bows through which the cables pass,—the iron lining is the *hawse-pipe;* a large piece of wood which stops the hole at sea is the *hawse-plug; open hawse*, when the cables are clear of each other; *a cross*, when the ship has swung half round; *an elbow*, when once round; *a round turn*, when twice round; *in the hawse*, in the space close ahead. *Hawser*, a large rope for moving a ship, now frequently of steel wire. *Head-sails*, the flying-jib, jib, and fore-top-mast stay-sail. *Head sea*, when the waves run contrary to the course though the wind may not be so. *Headway*, motion in the direction of the vessel's head. *Heart*, a block of hard wood, which takes a large rope round it and many turns of a lanyard through it. *Heave down*, to careen for repairs. *Heave in stays*, to come up in the wind for tacking. *Heave short*, to heave in the cable to a short scope. *Heave the lead*, to cast the lead to ascertain the depth. *Heave the log*, to throw the log over to test the speed. *Heel*, the lower part of a mast, spar, rudder, or stern-post. *Heel chain*, from the bowsprit cap to keep the jib-boom out. *Helm's a-lee*, a word of command implying that the helm is down. *Hog*, to scrub or scrape the bottom. *Hogged*, applied to a vessel when through weakness the bow and stern droop, so that the profile is that of a hog's back (see "broken-backed"). *Home*, when sheets are close down to the yard they are home; when an anchor is hove upon and draws through the ground it is said to come home. *Hoops*, broad wooden bands used with gaff-sails and wind-sails. *Horse*, a bar upon which the fore or main sheet blocks of small vessels run. *Hounds*, large cheeks on a mast to support the trestle-trees. *Housing*, of a mast, the part below the upper-deck. *Hove to*, an abbreviation of *hove to the wind*, to bow the sea; to stop. *Hulk*, an old vessel without masts. *Hull*, the body of the vessel exclusive of masts and riggiug. *Hull-down*, so far distant that the hull is below the horizon.

Inboard, any place within the ship. *In irons*, when the sails are so badly arranged that the vessel will not obey the helm. *In the wind*, too close, the sails flapping.

Jack-stay, a tight rope to which others are made fast. *Jacob's ladder*, a rope ladder with wooden steps. *Jaw-rope*, to confine the jaws of a gaff to the mast. *Jeers*, a heavy purchase for swaying up the fore and main yards. *Jewel-block*, at the extremity of a yard for the studding-sail halyards. *Jew's harp*, a shackle at the head of an anchor. *Jigger*, a small handy tackle with a double and a single block. *Junk*, old cable or large rope, used for making swabs, mats, spun-yarn, etc. *Jury-mast*, *jury-yard*, *jury-rudder*, temporary substitutes for mast, etc.

Keckle, to pass old rope round a hemp cable to protect it from chafing. *Kedging*, to move by means of warps and kedge anchors. *Keelson*, a timber inside on top of the keel. *Keep away*, steer farther from the wind. *Keep her full*, the helmsman to keep the sails full of wind. *Keep your luff* and *keep to the wind*, synonymous expressions. *Kink*, a knotty twist in rope; a bend in wire-rope which is difficult to straighten. *Knees*, angular supports of iron or wood. *Knittle-stuff*, small line made by hardening two or three rope-yarns and twisting them together. *Knot*, a geographical mile (see art. Log).

Lacings, small lines securing sails and other things. *Landfall*, finding the land as expected. *Landlocked*, protected by land in every direction. *Lanyard*, a rope for tightening larger ropes; a line to fasten knives, marling-spikes, etc. *Larboard*, the old name for the left side, now called *port*. *Lash*, to secure two or more things together by ropes. *Lay to*, to wait; to heave to. *Lazy-guy*, a rope or tackle on a spanker-boom or main-boom to keep it steady. *Lead*, the weight for ascertaining the depth of water. *Lead*, the lead of a rope is its proper direction through the blocks. *Leech*, either side of a square sail and the lee-side of all others (see "luff"). *Leech-lines*, on courses only, to haul the leech of the sail close up to the fore-side of the yard. *Lee lurch*, a deep roll to leeward. *Lee shore*, a shore upon which the wind blows directly and which is unsheltered. *Lee side*, the side farthest from the wind, either inside or outside the ship. *Under the lee*, a ship is so spoken of in relation to the land by which it is protected; similarly a boat may be said to be "under the lee" of a ship. *Leeway*, the distance a ship drifts out of her course, indicated by the angle formed by the wake. *Legs*, spars carried by cutters to keep them upright when on the ground. *Life-lines*, small ropes to steady the men when standing on the yards, to hold by when being lowered in boats, and for similar purposes. *Lift*, a rope near the extremity of each yard to top it up, *i.e.*, lift it. *Limbers*, boards or plates to keep the hilge clear. *List*, to lean over continuously. *Lizard*, a lanyard with a thimble to confine another rope or to slip at pleasure. *Loose sails*, letting them fall free to dry or for use. *Lubber*, a man not skilled in seamanship. *Lubber's hole*, an open space in the top near the eyes of the rigging, through which a man can crawl instead of going outside. *Luff*, an order to steer closer to the wind; of a sail, the fore-part of a stay-sail, try-sail, or jib, and the weather-side for the time being of any square sail. *Luff-tackle*, is formed of 3-inch or 4-inch rope, a double and a single block, and is used for various temporary purposes.

Make sail, to set sail. *Make water*, to leak. *Manger*, a tight enclosure to catch the water from the hawse-pipes. *Man-rope*, placed over the side at the gangway for people to climb up by, and at other places. *Man yards*, men to stand in a row on each, as a salute. *Marl*, to secure things together by a succession of half-hitches. *Marling*, soft-laid white line for securing sails to the bolt-rope. *Marling-spike*, an iron or copper spike used by sailmakers and riggers. *Marry*, to fit the strands together ready for splicing. *Martingale*, a tackle to keep down a spar. *Maul*, a large double-headed hammer used by riggers. *Messenger*, an endless rope or chain from the capstan to bring in the cable. *Midships*, the centre, or, when applied to the helm, the neutral point. *Miss stays*, to try to tack and fail. *Mooring-swivel*, a swivel with four short legs to meet two cables from the anchors and two bridles

from the hawse. *Mouse*, a swelling or obstruction raised on a stay; also a seizing across the point of a hook.

Neaped, of a ship, to be in a dock or on shore requiring more water to float than neap-tides afford. *Near*, a caution to the helmsman that the ship is too close to the wind. *Necklace*, a chain or band round a lower mast for the futtock rigging to be set up to, or round the top-mast for the top-gallant rigging to reeve through. *Nip*, the part of the rope which bears the chief strain; to freshen the nip is to veer out and change the place. *Nipper*, a selvagee, rope, or chain for binding the messenger to the cable. *Norman*, a block of wood placed in one of the holes of a capstan for veering a rope by. *Nun-buoy*, a buoy of any material in the form of a double cone.

Offing, a distance from the land. *Off the wind*, not so close as she might be if sailing *on a wind*. *Open*, an anchorage is open when exposed to the sea; the hawse when the cables are clear of each other; an object when visible, not obscured. *Orlop-deck*, the lowest in large ships. *Out of trim*, when the weights are wrongly placed. *Overhaul*, to slacken every part of a tackle; to overtake; to examine.

Painter, the rope by which boats are made fast. *Parbuckle*, to hoist by rolling a thing with two ropes. *Parcelling*, covering a rope with strips of tarred canvas. *Parrels*, stout ropes covered with leather, used to confine an upper yard to the mast. *Parting*, breaking, as parting the cable. *Pay a seam*, filling it with pitch. *Pay away* and *pay out*, applied to slacking hawsers or cables. *Pay down*, lowering things, as the cable to be coiled or stowed. *Pay off*, from the wind, as by hoisting head-sail or putting the helm up; to pay and dismiss the crew. *Peak*, the outer part of a gaff and of a gaff-sail. *Pendant*, a large rope with a tackle attached. *Pennant*, a narrow signal flag; a long strip flown by ships of war. *Pig*, one part of iron ballast; the largest is 3 cwt. *Pintle*, a large pin bolted to the rudder, by which it is hinged. *Pitching and sending* signifies plunging the bow into one wave and the stern into another. *Plain sail*, all except studding-sails and stay-sails between the masts. *Point*, a platting or line to tie up a reef; to secure the end of a rope with knittles. *Pooped*, a vessel is said to be pooped when a wave breaks over the stern. *Port*, the modern word for left. *Press of sail*, very much sail. *Preventer-brace*, an additional rope to support the yard during a gale. *Prize*, to move by a lever or a spar; a lawful capture. *Purchase*, a tackle or lever.

Quarter, the part of the side near the stern, hence quarter-boat; also the part of a yard between the centre and the yard-arm.

Rack, a frame with sheaves and belaying pins. *Rake*, to fire through a ship from end to end; the inclination of the masts aft. *Range of cable*, it was formerly customary to haul up cable equal to the depth of water. *Rap-full*, the wind acting fully on every sail. *Ratlins* or *Ratlings*, small lines as steps up the rigging. *Razee*, a ship reduced in height by one or more decks. *Reach*, the open straight part of a river between two bends. *Ready about, ready o' ready*, words of warning preparatory to tacking. *Reef-tackles* and *reef-pendants*, for hauling up the leeches of top-sails and courses ready for reefing; the latter also on a boom for reefing a sail. *Reeving-line*, a small rope rove through blocks to drag a larger one after it. *Refit*, general repair. *Relieving-tackles*, placed on a tiller to assist the wheel-ropes during a gale. *Rendering*, slipping, not holding as a knot or fastening should. *Ribs and trucks*, flat boards and rollers alternating; used for jaw-ropes and parrels. *Riding between wind and tide*, when balanced between the two. *Riding cable*, the cable bearing the strain. *Rigging stoppers*, for securing the standing rigging when broken. *Right a vessel*, to recover the upright position. *Right the helm*, to relinquish the position the helm is in at any moment and place it in midships. *Ring-ropes*, cable stoppers which pass through the ring-bolts. *Robands*, small tyers to fasten a top-sail or course to a jack-stay. *Rogue's yarn*, a thread of worsted spun in the rope to mark it; each British royal dockyard formerly used a different color. *Rolling tackle*, stretched from the lee quarter of a yard to the mast, to relieve the parrel or truss from the jerking strain of the lee roll. *Roping*, the bordering of every sail. *Round down*, to overhaul, to slack by hand. *Rounding*, old 3-inch or 4-inch rope for hack purposes. *Round in the weather-braces*, the wind becoming more favorable, to bring the yards nearer to square. *Roundly*, to lower or veer quickly, *Round to*, to come to the wind and heave to. *Round turn*, a double twist in a cable; to veer a rope round a bit-head or cleat. *Round up*, to shorten up a tackle; to pull up a slack rope through a block. *Rouse it in*, as hauling a hawser by hand without a purchase. *Rowlock*, an opening in the gunwale of a boat for an oar. *Rudder chains* and *pendants* are shackled to a band on the rudder ready to steer the ship if the rudder-head gives way. *Rudder coat*, canvas or leather round the aperture and rudder-head to exclude the sea. *Runner and tackle*, a long pendant and tackle for staying lower masts; the chief support aft to a cutter's mast. *Running rigging*, that which is rove through blocks, or is otherwise hauled upon.

Saddle, a wooden rest for the heel of the jibboom and the end of the spanker boom. *Sag to leeward*, to make more leeway than headway. *Sail close to the wind*, to sail with the sails barely full. *Sail large* or *free*, to sail off the wind, as "with a flowing sheet." *Sail tackle*, from the top-mast-head to sway up top-sails and top-sail-yards. *Samson-post*, a strong piece of elm to fit against a beam above it and in a step on the deck. *Scandalize a boom main-sail*, to trice up the tack and drop the peak. *Scope of cable*, the length veered out of the hawse. *Scotchman*, an iron plate to protect a part of the rigging from chafing. *Scudding*, running before a gale either with or without sail; the latter is described as "under bare poles." *Scull*, a small oar. *Sculling*, propelling a boat by moving the flat of the oar over the stern to and fro while changing the angle. *Scupper*, a passage for water to run off a deck. *Scuttle*, a hole in the side to admit light and air; a hole made in the side or deck to let water flow in. *Sea*, a wave; a *long sea* or a *short sea* has reference to the distance between the waves. *Sea-boat*, a vessel is said to be a good or bad sea-boat according as she behaves in a gale. *Sea-room*, free from land or shoals. *Seizing*, a small lashing. *Selvagee*, a strap made of yarns or small rope wound as a skein and marled together. *Sending*, see "pitching." *Sennit*, a platting of three or more rope-yarns. *Serving*, covering a rope closely with spun-yarn, hove on by a *serving mallet*. *Set up*, applied to standing rigging to make it tight. *Setting-fid*, a large cone of wood used in fitting rigging. *Sewed*, to be lifted out of the water, as by running on a ledge, or being left by the tide. *Shackle*, a curved bar, with two eyes and a bolt, for joining chains. *Shank-painter*, a stopper which holds up the fluke of an anchor at the bows. *Shape a course*, to steer in the desired direction, the wind favoring. *Shear-hulk*, a vessel fitted permanently with shears. *Shears*, two large spars with their heads lashed and heels spread, for masting ships and lifting heavy weights. *Sheave*, a wheel of brass or lignum vitæ for ropes to travel on; all the flakes of a coil of rope to complete a layer. *Sheer*, to swerve from the course, the curve formed by the bow and stern being higher than the centre. *Sheer-ballon*, a bar of iron to keep the dead-eyes square. *Sheer off*, to edge away. *Sheet*, the rope which holds the lee lower corner of a sail. *Sheet-anchor*, one of the largest, and the third for use. *Sheet home*, to haul the sheets of square sails to their positions. *Shift the helm*, put it over the other way. *Shipped*, taken on board; anything fixed in its place for use. *Shipshape*, in a proper and seamanlike manner. *Shiver a sail*, to make it shake and render it neutral. *Shoot*, to go ahead after the propulsion has ceased. *Shorten sail*, to take in some portion. *Skid*, a spar for something to rest or slide upon. *Skin of a sail*, the part exposed when it is furled. *Skipper*, the old name for the master of a small vessel. *Slab of a sail*, the slack part which hangs down after the leech-lines are hauled up. *Sleepers*, timbers in the hold and strengthening pieces in the tops. *Slew*, to turn or cant over. *Slips*, ropes with toggles, shackles, and tongues, and various contrivances for letting go quickly. *Small helm*, when the sails are well balanced and the rudder but little used. *Small sail*, and *snug sail*, low and reduced, ready for bad weather. *Sound*, to ascertain the depth of the sea, or of water in the pump-well. *Span*, two parts of a rope spread to divide the strain, or for making a point secure in an intermediate place. *Spanish windlass*, a bar of iron and two marling-spikes to heave seizings taut; tightening ropes by twisting them together by a lever. *Spell*, a turn or relief. *Spider*, a small iron outrigger, to keep the main-brace block clear of the counter. *Spilling-lines*, ropes passed round a part of a sail which is flapping, to confine it. *Spitfire-jib*, a small storm-sail used in cutters. *Splice*, to join two ropes by entwining the strands. *Splice the main-brace*, to give a glass of grog to every man after some unusual fatigue, or on some occasion of rejoicing. *Splicing-tails*, a short piece of chain with three tapering tails, for splicing to a hemp cable. *Spring*, a hawser from the after-part to cant the ship. *Spring a leak*, to cause a leak by straining. *Sprit-sail*, formerly set on the sprit-sail-yard; an efficient four-sided sail for boats and barges, the peak of which is held up by a spar called a *sprit*. *Sprung*, cracked, fractured. *Spun-yarn*, rope-yarns, laid up together softly. *Square-rigged*, having yards and square sails, as ships and brigs have. *Square sails*, those set upon such yards as have lifts and braces, regardless of their proportions. *Square yards*, to adjust them by means of their lifts and braces. *Stand by a rope*, to be in readiness to let it go. *Standing, off and on*, sailing to and fro, as off a port. *Standing part*, the fixed end of a running rope. *Standing rigging*, such as shrouds and stays. *Stand on*, to continue the same progress and course. *Starboard*, the right-hand side. *Starboard* and *port tack* express the direction of the wind, on the right hand and on the left respectively. *Stay-sails*, any sails set on a stay, except the jib, flying-jib, and fore-sails of cutters and schooners. *Steady*, to the helm; to keep the same course. *Steadying-lines*, passed from eye-bolts in the gunnel of a boat to the slings to keep it upright. *Steere*, the angle which the bowsprit forms with the horizon. *Stem on*, striking head foremost at right angles, the reverse of *stern on*. *Stern-board*, having considerable stern-way. *Stevedore*, see "estivador." *Stiffness*, stability under canvas. *Stirrup*, a short rope from a yard to support a foot-rope. *Stop*, a light temporary seizing. *Storm-sails*, stay-sails and try-sails of the strongest canvas. *Stranded*, when one strand is broken; wrecked on a beach. *Stream-anchor*, about one-third to one-fourth the weight of a bower anchor. *Stream the buoy*, to throw over the buoy which is to watch over the anchor. *Strike*, to send down from aloft. *Strike colors*, a token of submission. *Strike soundings*, to succeed in reaching the bottom with the lead. *Studding-sails*, light four-sided sails set only with a fair wind. *Surge*, to slack back quickly, as a hawser round a capstan, to make it slip up to its place. *Swab*, a large bundle of rope-yarns for soaking up water; a drunkard. *Sway away*, to hoist by running with a rope. *Sweep*, a large oar; to search the bottom with a hawser or chain. *Swifter*, a single shroud, when there is an odd one; to draw rigging together; a rope or bar to keep things equidistant, or in their proper places. *Swinging*, the act of turning to the change of wind and tide. *Swinging boom*, a large spar for spreading the foot of the lower studding-sail; in harbor for making boats fast.

Tabernacle, a frame for receiving the heel of a boat's mast to make it higher. *Tack*, the lower weather corner of every sail; to change course by bringing the wind ahead and round to the other side. *Taken aback*, applied to a vessel when the wind coming ahead reverses the action of all the sails. *Taking in sail*, clewing it up and perhaps furling it. *Taunt*, high masts, comparatively. *Taut* (also *taught*), the only word among seamen to signify tight. *Tending to the tide*, beginning to swing to the change of tide in opposition to the wind. *Thimble*, an iron ring with a score to receive a rope; *union thimble*, two thimbles welded within each other. *Thole pin*, a peg of wood on the gunwale of a boat to confine the oar. *Thorough-foot*, the fall of a tackle being foul, requiring to be unrove or the block turned over between the parts. *Three sheets in the wind*, a ship too close to the wind; a man half drunk. *Throat*, the upper corner of a gaff-sail nearest the mast. *Throat halyards*, for hoisting the end of the gaff nearest the mast. *Thwart*, across; the name of all seats which cross a boat. *Thwart ships*, across the ship. *Tide-way*, an anchorage or position affected by tide. *Tiller*, a lever which moves the rudder. *Toggles*, pieces of wood varying in shape, generally secured to one piece of rope so as to hold the eye of another, as a button. *Top*, a large platform resting on the cross-trees of each lower mast; to top a yard is to raise it by the lift. *Top-rope*, a large rope rove through the heel of the top-mast. *Tow*, one vessel pulling another in any relative position. *Transport a ship*, to move her in a harbor by ropes. *Traveller*, an iron ring covered

with leather, for jibs, royals, and boat sails. *Travelling backstay*, a support to the top-mast always close above the yard. *Traverse*, to make several tacks; the free motion of a sheave or rope. *Trestle-trees*, pieces of wood which rest on the hounds of the mast and support the cross-trees. *Tricing-line*, a small rope used for hoisting up a tackle or larger rope. *Trim of the ship*, neither too deep nor too light, and having the right draught of water forward and aft. *Trim sails*, to brace the yards and adjust the sheets. *Trip*, the anchor is tripped when the shank is raised and the flukes broken out of the ground. *Trough of the sea*, the hollow between long waves, which are generally nearly parallel. *Truck*, a disk of wood at the summit of the mast, generally having sheaves for signal halyards; a long wooden fair lead seized to the shroud. *Trusses*, fitted variously to confine the centre of the lower yards to the mast. *Try-sail*, a foul-weather gaff-sail. *Try-sail-mast*, a smooth spar abaft each mast to support the jaws of the gaff and luff of the sail. *Turning in a dead-eye*, fitting the shroud or stay round it. *Turning to windward*, tacking frequently. *Twice laid*, rope that has been unlaid and retwisted to the desired size. *Twiddling lines*, for securing the wheel when not in use. *Two blocks*, signifying that the two ends of a purchase have come together. *Tye*, a large rope on which the halyards act when hoisting a yard.

Under foot, said of an anchor when dropped without veering more cable. *Under sail*, free from moorings and propelled by sail only. *Under steam*, propelled by steam only. *Under way*, having motion; the anchor off the ground.

Vangs, ropes to steady a gaff. *Veer*, to slack out cable, hawser, or tow-rope; the old expression for "wear." *Veer and haul*, slacking and hauling alternately, by a number of men simultaneously, so as to gain by the jerk.

Waist, the centre part of the ship before the gangway port. *Wake*, the track left in the water. *Warp* a small hawser for moving the ship; yarns or rope stretched over pins for making straps. *Warping-buoys*, buoys moored in suitable positions for ships to warp by, now rendered nearly obsolete by the use of steam-tugs. *Watch*, sailors' watches commence or terminate at 4, 8, and 12 o'clock, also at 6 P.M.; a buoy over an anchor is said to watch while it floats and can be seen. *Water-borne*, to be entirely afloat. *Water-logged*, full of water, unmanageable. *Way*, motion, as under way, headway, sternway. *Wear ship*, to bring the wind on the other side by first running before it. *Weather-bound*, detained by contrary winds or bad weather. *Weather-gage*, being to windward of the enemy. *Weatherly*, sailing well, without much leeway. *Weather-side*, that on which the wind blows. *Weather-tide*, the stream running contrary to the direction of the wind. *Wedging a mast*, securing it in the partners or frame on each deck by wedges made to fit. *Weigh*, to heave up the anchor. *Whip*, a single rope passing through a block. *Whipping*, a light seizing of twine at the end of a rope to prevent fraying. *Whiskers*, projections from the cat-head to spread the jib-guys. *Wind* a ship or boat, to turn her head where her stern was. *To take the wind out of another's sails*, to pass close to windward, as yachts sometimes do. *Windlass*, a machine for heaving in cable. *Wind-rode*, being head to wind though in a tide-way. *Wind-sail*, a canvas ventilator. *Wood-lock*, a chock to keep the rudder in its place. *Woolding*, a stout lashing to secure sprung or fished spars. *Work* a ship, to perform every manœuvre. *Worm*, to heave small line between the strands of a rope to make it smooth.

Yard, a spar which spreads a sail. *Yard-rope*, a rope by which a top-gallant or royal yard is sent up from the deck, and afterwards becomes the tye and halyards. *Yard-tackles*, permanently on the lower yard-arms of large ships for hoisting in things and as preventer braces. *Yaw*, an involuntary deviation from the course. *Yoke*, a bent lever across the ship or boat which acts as a tiller.[1] (H. A. M.)

SEAMEN, LAWS RELATING TO. In most legal systems legislation has interfered to protect the seaman from the consequences of that imprudence which is generally supposed to be one of his distinguishing characteristics. In the United Kingdom there has been a very large amount of legislation dealing with the interests of seamen with unusual fulness of detail, proving the care bestowed by a maritime power upon those to whom its commercial success is so largely due. How far this legislation has had the efficiency which was expected may be doubtful. The loss of life among sailors was one in eighty in 1871, one in seventy-five in 1882. There has been besides a steady diminution in the number of British seamen employed on British ships, nearly one-eighth being foreigners at the present time.

For legislative purposes seamen may be divided into three classes, seamen in the royal navy, merchant seamen and fishermen.

Seamen in the Royal Navy.—It is still lawful to impress men for the naval service, subject to certain exemptions (13 Geo. II. c. 17). Among the persons exempt are seamen in the merchant service. In cases of emergency officers and men of the coastguard and revenue cruisers, seamen riggers, and pensioners may be required to serve in the navy (16 and 17 Vict. c. 73). There appears to be no other instance (now that balloting for the militia is suspended) where a subject may be forced into the service of the crown against his will. The navy is, however, at the present day wholly recruited by voluntary enlistment. The navy estimates of 1885 provided for 59,000 men (see NAVY). Special advantages are afforded by the Merchant Shipping Act, 1854, to merchant seamen enlisting in the navy. They are enabled to leave their ship without punishment or forfeiture in order to join the naval service. The discipline of the navy is, unlike that of the army, for which an annual Army Act is necessary, regulated by a permanent Act of Parliament, that now in force being the Naval Discipline Act, 1866. In addition to numerous hospitals and infirmaries in the United Kingdom and abroad, the great charity of Greenwich Hospital is a mode of provision for old and disabled seamen in the navy (see GREENWICH). At present such seamen are out-pensioners only; the hospital has been for some years used as the Royal Naval College for officer students. The enactments of the Merchant Shipping Act, 1854, as to savings banks were extended to seamen in the navy by 18 and 19 Vict. c. 91, s. 17. Enlistment without the license of the crown in the naval service of a foreign state at war with another foreign state that is at peace with the United Kingdom is an offence punishable under the Foreign Enlistment Act, 1870. Any person buying from a seaman or enticing a seaman to sell Government property is liable to penalties under the Seamen's Clothing Act, 1869.

Merchant Seamen.—Most of the Acts dealing with this subject, commencing with 8 Eliz. c. 13, were repealed by 17 and 18 Vict. c. 120, after having been consolidated and extended by the Merchant Shipping Act, 1854 (17 and 18 Vict. c. 104). The main part of the legislation affecting seamen in the merchant service occurs in the third part of this Act. Since 1854 numerous amending Acts have been passed, amounting to no less than eleven in number. They are cited collectively as "The Merchant's Shipping Acts, 1854 to 1883." The enactment of a new consolidation Act is urgently required, and can be only a question of time. The Merchant Shipping Act, 1854, defines a seaman to be "every person (except masters, pilots, and apprentices duly indentured and registered) employed or engaged in any capacity on board any ship" (s. 2). It should be noticed that most of the enactments relating to merchant seamen do not affect seamen employed on foreign vessels, on fishing boats on the coasts of the United Kingdom, on vessels belonging to the Trinity House, the Commissioners of Northern Lighthouses, and the port of Dublin corporation, and on pleasure yachts. The principal provisions of the Merchant Shipping Acts dealing with seamen are as follows: Where no other reference is given, the Act of 1854 is intended. An elective local marine board under the general supervision of the Board of Trade is appointed in the principal ports of the United Kingdom. One of the duties of the board is the establishment of mercantile marine offices under superintendents or deputy superintendents.[2] It is the general business of such officers to afford facilities for engaging seamen by keeping registries of their names and characters, to superintend and facilitate their engagement and discharge, to provide means for securing the presence on board at the proper times of men who are so engaged, and to facilitate the making of apprenticeships to the sea service (s. 124). A seaman must be hired before a superintendent or deputy superintendent, an officer of customs, or a consular officer on a form sanctioned by the Board of Trade (usually called the shipping articles) containing the following particulars: (1) the nature and, as far as practicable, the duration of the intended voyage or engagement, or the maximum period of the voyage or engagement, and the places or parts of the world (if any) to which the voyage or engagement is not to extend; (2) the number and description of the crew, specifying how many are employed as sailors; (3) the time at which each seaman is to be on board or to begin work; (4) the capacity in which each seaman is to serve; (5) the amount of wages which each seaman is to receive; (6) a scale of the provisions which are to be furnished to each seaman; (7) any regulations as to

[1] For a fuller explanation of some of these terms, see Vice-Admiral W. H. Smyth, *The Sailor's Word Book of Nautical Terms*; Falconer's *Marine Dictionary*, enlarged by W. Burney; P. L. Breslauer, *Illustrated Nautical Polyglot* (six languages).

[2] These offices and officers were called shipping offices and shipping masters in the Act of 1854. The names were changed to the longer and less convenient ones in the text by the Act of 1862 (25 and 26 Vict. c. 63. s. 15).

conduct on board and as to fines, short allowance of provisions, or other lawful punishments for misconduct, which have been sanctioned by the Board of Trade as regulations proper to be adopted, and which the parties agree to adopt. Every agreement is to be framed so as to admit of stipulations as to allotment of wages, and may contain any other stipulations not contrary to law (s. 149, as amended by the Act of 1873 and the Merchant Seamen Act, 1880). Among illegal stipulations would fall any agreement by a seaman to give up his right to salvage, to forfeit his lien on the ship, or to be deprived of any remedy for the recovery of wages to which he would otherwise have been entitled (s. 182). In the case of foreign-going ships the following rules in addition must be observed: (1) every agreement made in the United Kingdom (except agreements with substitutes) is to be signed by each seaman in the presence of the superintendent of a mercantile marine office; (2) the superintendent is to cause the agreement to be read over and explained to each seaman, or otherwise to ascertain that each seaman understands the same before he signs it, and is to attest each signature; (3) the agreement is to be in duplicate, one part to be retained by the superintendent, the other by the master; (4) in the case of substitutes, they are where possible to be engaged before a superintendent, in other cases the agreement is to be read over and explained to the seaman by the master and signed by the seaman in the presence of a witness (s. 150). The only cases where no agreement in writing is necessary is where the hiring is for a coaster of less than eighty tons register or for a foreign vessel. In the case of union apprentices the indentures must be executed in the presence of and attested by two justices. No stamp duty is chargeable on indentures for the sea service. In the case of foreign-going ships making voyages averaging less than six months in duration, running agreements with the crew may be made (s. 151). No person unlicensed by the Board of Trade, other than a master or mate or agent of the owner, may engage or supply seamen. The discharge of a seaman, like his engagement, must take place before a superintendent or an officer of equivalent authority. The seaman is entitled to receive a certificate of service and discharge. His wages must be paid within a limited time from his discharge, varying according to circumstances, and are not now dependent, as they were at common law, upon the earning of freight. If he is discharged before a month's wages are earned, he is entitled to a month's wages. As far as possible, payment is to be made in money and not by bill. In the absence of special stipulations, wages are not generally due until the contract of service is complete. By 8 Geo. I. c. 24 s. 7, a master may not advance a seaman more than half his wages while abroad. Sums recoverable as wages are, in addition to wages properly so called, the expenses of subsistence and of the voyage home when the ship is sold or transferred abroad, and the master does not deposit with a consular officer a sufficient sum for the seaman's expenses pursuant to s. 205; the expenses of a seaman left behind or discharged from a British ship, or a British subject from a foreign ship, out of the United Kingdom; allowance for short or bad provisions; the moneys and effects of a deceased seaman who has been employed on a British ship; expenses caused by illness from want of proper food and accommodation and medicines; and double pay for every day, not exceeding ten, during which payment of wages is delayed without proper cause. Wages cannot be attached. They may be forfeited or reduced by desertion, wilful disobedience, smuggling, want of exertion in case of wreck, illness caused by neglect or default of the seaman, and misconduct of other kinds. Advance notes—that is, documents promising the future payment of money on account of a seaman's wages conditionally on his going to sea and made before the wages have been earned—are void, and no money paid in respect of an advance note can be deducted from the wages earned, Merchant Seamen (Payment of Wages and Rating) Act, 1880 (43 and 44 Vict. c. 16, s. 2). Allotment notes may be made in the form sanctioned by the Board of Trade, and may stipulate for the allotment of not more than half the seaman's wages in favor of a wife, parent, grandparent, child, grandchild, brother or sister (s. 169), or of a savings bank (43 and 44 Vict. c. 16, s. 3). Seamen's savings banks have been established and are administered by the Board of Trade, chiefly under the powers given by the Seamen's Savings Banks Act, 1856. If during the absence of a seaman on a voyage his wife and family become chargeable to the parish, two-thirds of his wages at the most are all that can be recovered by the parish. Careful provision is made for the custody of a deceased seaman's effects and wages, and their delivery to his representatives. The possibility of a seaman's being left destitute abroad is provided against by ss. 206, 207. Consular officers abroad are bound to send home any distressed or shipwrecked seaman, the expenses being chargeable upon the mercantile marine fund. Compensation is to be made for insufficiency or bad quality of provisions or water on board. If a complaint of the quality or sufficiency be frivolous, the persons complaining are liable to forfeit a week's wages. All foreign-going ships are to carry proper medicines and medical stores. Lime and lemon juice and other antiscorbutics are to be provided on ships bound to foreign ports other than ports in Europe and the north of North America. An ounce a day of lime or lemon juice is to be served to each member of the crew after the ship has been at sea for ten days (Act of 1867, 30 and 31 Vict. c. 124, s. 4). A foreign-going ship having one hundred persons or upwards on board must carry a qualified medical man (s. 130). Each seaman or apprentice is entitled to a space of not less than 72 cubic feet, the place to be securely constructed, properly lighted and ventilated, and properly protected from weather and sea, and as far as possible from effluvium caused by cargo or bilge-water. The place is to be inspected and certified by a surveyor of the Board of Trade, and to be kept free from goods and stores. The local marine board (or the Board of Trade where there is no local marine board) may appoint a medical inspector of seamen, who may on application by the master or owner report to the superintendent of the mercantile marine office as to whether any seaman is fit for duty (30 and 31 Vict. c. 124, ss. 9, 10). By-laws and regulations relating to seamen's lodging-houses may be made by the sanitary authority of any seaport town with the sanction of the president of the Board of Trade. Such by-laws and regulations are to provide for the licensing of seamen's lodging-houses, the inspection of the same, the sanitary conditions of the same, the publication of the fact of a house being licensed, the due execution of the by-laws and regulations and the non-obstruction of persons engaged in securing such execution, the preventing of persons not duly licensed holding themselves out as keeping or purporting to keep licensed houses, and the exclusion from licensed houses of persons of improper character (46 and 47 Vict. c. 41, s. 48). Provision is made for the protection of seamen from imposition by crimps and lodging-house keepers. This protection may in certain cases be extended by order in council to foreign ships (s. 237, and 43 and 44 Vict. c. 16, ss. 5, 6). At the time of discharge of the crew in the United Kingdom a list in the form sanctioned by the Board of Trade is to be made out and delivered to a superintendent of a mercantile marine office containing, *inter alia*, the following particulars: (1) the number and date of the ship's register and her registered tonnage; (2) the length and general nature of the voyage or employment; (3) the Christian names, surnames, ages, and places of birth of all the crew, including the master and apprentices, their qualities on board, their last ships or other employments and the dates and places of their joining the ship; (4) the names of any members of the crew who have been maimed or hurt, with the times, places, causes, and circumstances thereof; (5) the wages due at the time of their respective deaths to any of the crew who have died; (6) the clothes and other effects belonging to any of the crew who have died, with a statement of the manner in which they have been dealt with, and the money for which any of them have been sold (s. 273). Every birth or death occurring at sea is to be recorded in the log-book and reported on arrival at any port in the United Kingdom to the registrar-general of shipping and seamen, who forwards a certified copy to the registrar-general of births and deaths (37 and 38 Vict. c. 88, s. 37). An official log-book in a form sanctioned by the Board of Trade is to be kept by the master of every ship except a coaster. It must contain, *inter alia*, (1) every legal conviction of any member of his crew and the punishment inflicted; (2) every offence committed by any member of his crew for which it is intended to prosecute, or to enforce a forfeiture, or to exact a fine, together with a statement concerning the reading over of such entry and concerning the reply (if any) made to the charge; (3) every offence for which punishment is inflicted on board, and the punishment inflicted; (4) a statement of the conduct, character, and qualifications of each of his crew, or a statement that he declines to give an opinion on such particulars; (5) every case of illness or injury happening to any member of the crew, with the nature thereof and the medical treatment adopted (if any); (6) the name of every seaman or apprentice who ceases to be a member of the crew, otherwise than by death, with the time, place, manner, and cause thereof; (7) the amount of wages due to any seaman who enters Her Majesty's service during the voyage; (8) the wages due to any seaman or apprentice who dies during the voyage, and the gross amount of all deductions to be made therefrom; (9) the sale of the effects of any seaman or apprentice who dies during the voyage, including a state-

ment of each article sold and of the sum received for it (s. 282). At common law there was no obligation of the owner to provide a seaworthy ship, but by the Act of 1876 every person who sends or attempts to send, or is party to sending or attempting to send, a British ship to sea in such unseaworthy state that the life of any person is likely to be thereby endangered is guilty of a misdemeanor, unless he proves that he used all reasonable means to insure her being sent to sea in a seaworthy state, or that her going to sea in such unseaworthy state was under the circumstances reasonable and justifiable. A master knowingly taking a British ship to sea in such unseaworthy state that the life of any person is likely to be thereby endangered is guilty of a misdemeanor. In every contract of service between the owner and the master or any seaman and in every indenture of sea apprenticeship, an obligation is implied that the owner, master, and agent shall use all reasonable means to insure the seaworthiness of the ship (39 and 40 Vict. c. 80, ss. 4, 5). A return of certain particulars, such as lists of crews and of distressed seamen sent home from abroad, reports on discharge, births and deaths at sea, must be made to the registrar-general of shipping and seamen, an officer of the Board of Trade. The seaman is privileged in the matter of wills (see WILL), and is exempt from serving in the militia (42 Geo. III. c. 90, s. 43). Assaults upon seamen with intent to prevent them working at their occupation are punishable summarily by 24 and 25 Vict. c. 100, s. 40. There are special enactments in favor of Lascars and foreign seamen on British ships (see 4 Geo. IV. c. 80; 17 and 18 Vict. c. 104, s. 544; 17 and 18 Vict. c. 120, s. 16; 18 and 19 Vict. c. 91, s. 16). In addition to this legislation directly in his interest, the seaman is indirectly protected by the provisions of the Merchant Shipping Acts requiring the possession of certificates of competency by ships' officers, the periodical survey of ships by the Board of Trade, and the enactments against deck cargoes and overloading, as well as by other Acts, such as the Chain Cables and Anchors Acts, enforcing a minimum strength of cables and anchors, and the Passenger Acts, under which a proper supply of life-boats and life-buoys must be provided. The duties of the seamen appear to be to obey the master in all lawful matters relating to the navigation of the ship and to resist enemies, to encourage him in which he may become entitled to prize money under 22 and 23 Car. II. c. 11 (see PRIZE). Any services beyond these would fall under the head of salvage service and be recompensed accordingly. There are certain offences for which the seaman is liable to be summarily punished under the Act of 1854. They comprise desertion, neglect or refusal to join his ship or absence without leave, quitting the ship without leave before she is placed in security, wilful disobedience to a lawful command, either on one occasion or continued, assault upon a master or mate, combining to disobey lawful commands or to neglect duty or to impede the navigation of the ship or the progress of the voyage, wilful damage to the ship, or embezzlement of or wilful damage to her stores or cargo, and smuggling. The punishment varies from forfeiture of all or part of his wages to twelve weeks' imprisonment (s. 243, as amended by the Merchant Seamen Act, 1880). A master, seaman, or apprentice who by lawful breach of duty, or by neglect of duty, or by reason of drunkenness, does any act tending to the immediate loss, destruction, or serious damage of the ship or to immediately endanger the life or limb of any person belonging to or on board of the ship, or who by wilful breach of duty, or by neglect of duty, or by reason of drunkenness refuses or omits to do any lawful act proper and requisite to be done by him for preserving the ship from immediate loss, destruction, or serious damage, or for preserving any person belonging to or on board of the ship from immediate danger to life or limb, is guilty of a misdemeanor (s. 239). A seaman is also punishable at common law for piracy and by statute for piracy and offences against the Slave Trade Acts. A riotous assembly of seamen to prevent the loading or unloading of any ship or to prevent others from working is an offence under 33 Geo. III. c. 67 (see RIOT). Deserters from Portuguese ships are punishable by 12 and 13 Vict. c. 25, and from any foreign ship by 15 and 16 Vict. c. 26, of course by virtue of conventions with Portugal and other foreign powers. The rating of seamen is now regulated by the Merchant Seamen Act, 1880. By that Act a seaman is not entitled to the rating of "A.B." unless he has served four years before the mast, or three years or more in a registered decked fishing vessel and one year at sea in a trading vessel (43 and 44 Vict. c. 16, s. 7). The Act of 1854 enabled contributions to seamen's refuges and hospitals to be charged upon the mercantile marine fund. As a matter of fact, however, there appears to be no grant in support of seamen's hospitals out of any public funds. The principal seamen's hospital is that at Greenwich, established in 1821 and incorporated by 3 and 4 Will. IV. c. 9 under the name of "The Seamen's Hospital Society." Up to 1870 this hospital occupied the old "Dreadnought" at Greenwich, but in that year it obtained the old infirmary of Greenwich Hospital from the admiralty at a nominal rent, in return for which a certain number of beds are to be at the disposal of the admiralty. The hospital is supported by voluntary contributions, including those of many foreign Governments, and has between its foundation and the end of 1884 relieved no less than 253,629 seamen of all nations. There is also a dispensary for seamen at the London Docks, and a floating hospital at Cardiff, equally supported by voluntary contributions. At one time there was an enforced contribution of sixpence [12 cts.] a month from the pay of masters and seamen towards the funds of Greenwich Hospital, levied under the powers of some of the Greenwich Hospital Acts. The payment of these contributions enabled them to receive annuities from the funds of the hospital. These "Greenwich Hospital sixpences," however, became the source of very considerable irritation and have now been discontinued. In their place a purely voluntary seamen's provident fund has been established, its object being to persuade seamen to subscribe sixpence a month towards the seamen's hospital.

The remedies of the seaman for wages are an ordinary action in the Queen's Bench Division or plaint in a county court, an action *in rem* or *in personam* in the Admiralty Division of the High Court (in Scotland in the Court of Session), a Vice-Admiralty Court, or a county court having admiralty jurisdiction, or summary proceedings before justices, naval courts, or superintendents of mercantile marine offices. The master has now the same remedies as the seaman for his wages, under which are included all disbursements made on account of the ship. At common law he had only a personal action against the owner. He has the additional advantage of being able to insure his wages, which a seaman cannot do. A common law action for wages is seldom brought, the statutory remedies being more convenient. By the Admiralty Court Act, 1861, the High Court of Justice (Admiralty Division) has jurisdiction over any claim by a seaman of any ship for wages earned by him on board the ship, whether the same be due under a special contract or otherwise (24 Vict. c. 10, s. 10). This section has been liberally construed and held to apply to such persons as a surgeon, purser, pilot, carpenter, and steward. The court can entertain claims by foreign seamen against a foreign ship, on notice being given to the consul of the foreign country. If he protest, the court has a discretion to determine whether the action shall proceed or not. A claim for wages in the High Court must be brought within six years (4 and 5 Anne, c. 3, s. 17). The Vice-Admiralty Court Act, 1863, gives jurisdiction in claims for wages irrespective of amount to vice-admiralty courts. A county court having admiralty jurisdiction may entertain claims for wages where the amount claimed does not exceed £150 [$729] (31 and 32 Vict. c. 71, s. 3). The jurisdiction of the inferior court is protected by the proviso that if the action be brought in the High Court for a claim not exceeding £150 [$729], the plaintiff may be condemned in costs, and will not be entitled to costs if he recover less than this sum, unless the judge certifies that it was a proper case to be heard in the High Court (s. 9). In actions in all courts of admiralty jurisdiction the seaman has a maritime lien on the ship and freight, ranking next after claims for salvage and damage. The amount recoverable summarily before justices is limited to £50 [$243]. Orders may be enforced by distress of the ship and her tackle. Proceedings must be taken within six months. A naval court on a foreign station may determine questions as to wages without limit of amount. As a rule a seaman cannot sue abroad for wages due for a voyage to terminate in the United Kingdom. The superintendent of a mercantile marine office has power to decide any question whatever between a master or owner and any of his crew which both parties in writing agree to submit to him. These summary remedies are all given by the Act of 1854. The Merchant Seamen Act, 1880, further provides that, where a question as to wages is raised before a superintendent, if the amount in question does not exceed £5 [$24.30], the superintendent may adjudicate finally, unless he is of opinion that a court of law ought to decide it. The same Act extends the provisions of the Employers and Workmen Act, 1875, to seamen. The Act of 1875 itself specially excluded them. A county court or court of summary jurisdiction (the latter limited to claims not exceeding £10 [$48.60]) may under the Act of 1875 determine all disputes between an employer and workman arising out of their relation as such. The jurisdiction of courts of summary jurisdiction is protected by the enactment of the Act of 1854 that no proceeding for the recovery of wages under £50 [$243] is to be instituted in a superior court unless

either the owner of the ship is bankrupt, or the ship is under arrest or sold by the authority of such court, or the justices refer the case to such court, or neither owners nor master is or resides within 20 miles of the place where the seaman is put ashore (s. 189). It should be noticed that claims upon allotment notes may be brought in all county courts and before justices without any limit as to amount (s. 169). In Scotland the sheriff court has concurrent jurisdiction with justices in claims for wages and upon allotment notes.[1]

Fishermen.—The regulations respecting fishermen are contained chiefly in the Sea Fisheries Acts, 1868 and 1883, and in the Merchant Shipping (Fishing-Boats) Act, 1883. The Sea Fisheries Act of 1868 constituted a registry of fishing-boats, and that of 1883 gave powers of enforcing the provisions of the Acts to sea-fishery officers. The Merchant Shipping (Fishing-Boats) Act was passed in consequence of the occurrence of some cases of barbarous treatment of boys by the skippers of North Sea trawlers. The Act provides, *inter alia*, that indentures of apprenticeship are to be in a certain form and entered into before a superintendent of a mercantile marine office, that no boy under thirteen is to be employed in sea-fishery, that agreements with seamen on a fishing-boat are to contain the same particulars as those with merchant seamen, that running agreements may be made in the case of short voyages, that reports of the names of the crew are to be sent to a superintendent of a mercantile marine office, and that accounts of wages and certificates of discharge are to be given to seamen. No fishing-boat is to go to sea without a duly certified skipper. Provision is also made for special reports of cases of death, injury, ill-treatment, or punishment of any of the crew, and for inquiry into the cause of such death, etc. Disputes between skippers or owners and seamen are to be determined at request of any of the parties concerned by a superintendent. For special privileges of fishermen in the use of the seashore, see RIPARIAN LAWS. They are also exempt from Trinity House dues. There are numerous police provisions contained in various Acts of Parliament dealing with the breach of fishery regulations. These provisions act as an indirect protection to honest fishermen in their employment. The rights of British fishermen in foreign waters and foreign fishermen in British waters are in many cases regulated by treaty, generally confirmed in the United Kingdom by Act of Parliament. A royal fund for widows and orphans of fishermen has recently been formed, the nucleus of the fund being part of the profits of the Fisheries Exhibition held in London in 1883.

United States.—The law of the United States is in general accordance with that of England. The law relating to seamen in the navy will be found in the articles for the government of the navy (*Revised Statutes*, s. 1624). Legislation in the interests of merchant seamen dates from 1790. A list of the crew must be delivered to a collector of customs. The shipping articles are the same as those in use in the United Kingdom. For vessels in the coasting trade they are, with certain exceptions, to be in writing or in print. They must in the case of foreign-bound ships be signed before a shipping commissioner appointed by the circuit court or a collector of customs, or (if entered into abroad) a consular officer, where practicable, and must be acknowleged by his signature in a prescribed form. One-third of a seaman's wages earned up to that time is due at every port where the ship unlades and delivers her cargo before the voyage is ended. They must be fully paid in gold or its equivalent within twenty days of the discharge of the cargo. Advance notes can be made only in favor of the seaman himself or his wife or mother. There is a summary remedy for wages before a district court, a justice of the peace, or a commissioner of a district court. A shipping commissioner may act as arbitrator by written consent of the parties. Seaworthiness is an implied condition of the hiring. There may be an examination of the ship on the complaint of the mate and a majority of the crew. The expenses of an unnecessary investigation are a charge upon the wages of those who complain. A seaman may not leave his ship without the consent of the master. For foreign-bound voyages a medicine-chest and antiscorbutics must be carried, also 60 gallons of water, 100 lb of salted meat, and 100 lb of wholesome bread for every person on board, and for every seaman at least one suit of woollen clothing, and fuel for the fire of the seamen's room. An assessment of forty cents per month per seaman is levied on every vessel arriving from a foreign port and on every registered coasting vessel in aid of the fund for the relief of sick and disabled seamen. In the navy a deduction of twenty cents per month from each man's pay is made for the same purpose. The offences and punishments are similar to those in the United Kingdom. There is also the additional offence of wearing a sheath knife on shipboard.[2] (J. WT.)

SEARCH, RIGHT OF. "The right of visiting and searching ships on the high seas," says Lord Stowell, "whatever be the ships, whatever be the cargoes, whatever be the destinations, is an incontestible right of the lawfully commissioned ship of a belligerent nation; because till they are visited and searched it does not appear what the ships or the cargoes or the destinations are; and it is for the purpose of ascertaining these points that the necessity of this right of visitation and search exists. This right is so clear in principle that no man can deny it who admits the right of maritime capture, because if you are not at liberty to ascertain by sufficient inquiry whether there is property which can be legally captured, it is impossible to capture" ("The Maria," 1 C. Robinson's *Reports*, 36). This right of search or visitation and search has not been at all times recognized. The second armed neutrality of the Baltic powers in 1800 attempted to withdraw their vessels from the right. The bombardment of Copenhagen in 1801 was one of the results of this policy. Since the convention which followed that event the right has been regarded as established within proper limits, and is often regulated by treaty, especially as to the search of vessels suspected of being engaged in the slave trade. Apart from treaty, the main rules which govern the right are these. (1) It is a belligerent right, and can be exercised only in time of war, unless in the case of a vessel reasonably suspected of piracy or breach of revenue regulations. (2) It can be exercised only by a ship of war duly commissioned by the sovereign of the belligerent power and only in the case of a merchant vessel, whether of an enemy or neutral power. (3) It cannot be exercised in neutral waters, and an attempt to exercise it in such waters is a gross violation of neutrality. (4) It can be exercised only for certain purposes, such as to examine the ship's papers and to see whether she carries any contraband goods. (5) After the ship of war has raised her flag an affirming gun (*coup d'assurance*) loaded with blank cartridge must be fired to bring the merchant vessel to. (6). In case of reasonable suspicion it is the duty of the ship of war to detain the merchant vessel for the decision of a prize court. Resistance by a neutral vessel, whether alone or in convoy, renders her liable to capture according to the English and United States doctrine. But most Continental authorities lay down that the declaration of the officer in charge of the convoy is to be accepted, and that a refusal to accept such declaration may justify the convoy in resisting search. There is also a conflict of opinion as to whether a neutral loses his neutral rights by loading his goods on board an armed ship of the enemy. It has been held in England that such a proceeding is a violation of neutrality, as affording a presumption of resistance to search.

The right of search is historically interesting, as on two occasions it has brought Great Britain into collision with the United States. One of the causes of the war of 1812 was the right then claimed (but since abandoned) by Great Britain of searching vessels of the United States for British subjects serving in them as seamen, with a view to impressing them for the royal navy. In 1861 the British mail steamer "Trent" was stopped on the high seas by a United States ship of war, and Messrs. Slidell and Mason, two commissioners of the Confederate States proceeding to Europe, were taken out of her and afterwards imprisoned in the United States. On diplomatic representations being made at Washington by the ambassadors of Great Britain and other powers the commissioners were released, and a war was avoided.

See in addition to the ordinary authorities on international law, *Visitation and Search*, by W. B. Lawrence, Boston, U. S, 1858.

SEA-SERPENT. The belief in enormous serpents, both terrestrial and marine, dates from very early

[1] See the works on merchant shipping, such as those of Abbott, Maclachlan, Maude, and Pollock; Roscoe, *Admiralty Law and Practice;* Williams and Bruce, *Admiralty Practice;* also Roscoe, *Modern Legislation for Seamen and for Safety at Sea*, 1885.

[2] See *Revised Statutes*, ss. 4501–4612; Kent, *Comm.*, vol. iii. 177; Parsons, *Law of Shipping*, vol. ii. 32.

times. Pliny (*H. N.*, viii. 14), following Livy (*Epit.*, xviii.), tells us of a land-serpent 120 feet long, which Regulus and his army besieged with balistæ, as though it had been a city, and this story is repeated by several other writers (Florus, ii. 2; Val. Max., i. 8; Gellius, vi. 3). The most prolific in accounts of the sea-serpent, however, are the early Norse writers, to whom the "Sö-Orm" was a subject both for prose and verse. Olaus Magnus (*Hist. Gen. Sept.*, xxi. 24) describes it as 200 feet long and 20 feet round, and states that it not only ate calves, sheep, and swine, but also "disturbs ships, rising up like a mast, and sometimes snaps some of the men from the deck," illustrating his account with a vivid representation of the animal in the very act. Pontoppidan, in his *Natural History* (Eng. tr., 1755, p. 195 *sq.*), says that its existence was generally believed in by the sailors and fishermen of his time, and recounts the means they adopted to escape it, as well as many details regarding the habits of the creature. The more circumstantial records of comparatively modern times may be most conveniently grouped according to the causes which presumably gave rise to the phenomena described. (1) A number of porpoises swimming one behind another may, by their characteristic mode of half emerging from and then re-entering the water during respiration, produce the appearance of a single animal showing a succession of snake-like undulations. The figure given by Pontoppidan was very likely suggested by such an appearance, and a sketch of an animal seen off Llandudno by several observers[1] looks as though it might have had a similar origin, notwithstanding that this hypothesis was rejected by them. (2) A flight of sea-fowl on one occasion recorded by Professor Aldis[2] produced the appearance of a snake swimming at the surface of the water. (3) A large mass of seaweed has on more than one occasion been cautiously approached, and even harpooned under the impression that it was such a monster.[3] (4) A pair of basking sharks (*Selache maxima*) furnish an explanation of some of the recorded observations, as was first pointed out by Frank Buckland. These fish have a habit of swimming in pairs, one following the other with the dorsal fin and the upper lobe of the tail just appearing above the water, and, as each animal is fully 30 feet long, the effect of a body of 60 or more feet long moving through the water is readily produced. To this category belongs the famous serpent cast up on Stronsay, one of the Orkneys, of which an account was read to the Wernerian Society of Edinburgh;[4] some of its vertebræ were preserved in the Royal College of Surgeons of London, and identified as those of *Selache maxima* by both Home and Owen.[5] There is also evidence to show that specimens of *Carcharodon* must have existed more than 100 feet long.[6] (5) Ribbonfish (*Regalecus*), from their snake-like form and great length (sometimes as much as 20 feet), have been suggested as the origin of so-called "sea-serpents," amongst others by Dr. Andrew Wilson;[7] but Dr. Günther,[8] from what is known regarding the habits of these fish, does not regard the theory as tenable. (6) A gigantic squid (*Architeuthus*) was most likely the foundation of the old Norse accounts,[9] and also of those which in the early part of the 19th century came so frequently from the United States as to gain for the animal the sobriquet of "American sea-serpent."[10] These stories were so circumstantial and on the whole so consistent, and vouched for by persons of such eminence, that no doubt was possible (notwithstanding the cavilling of Mitchell)[11] as to the existence of a strange marine monster of definite character in those regions. The description commonly given of it has been summed up by Gosse[12] somewhat thus: (i.) general form that of a serpent; (ii.) length averaging 60 feet; (iii.) head flattened, eye generally not mentioned, some distinctly stating that it was not seen; (iv.) neck 12 to 16 inches in diameter; (v.) appendages on the head, neck, or back (accounts here variable); (vi.) color dark, lighter below; (vii.) swims at the surface, head thrown forward and slightly elevated; (viii.) progression steady and uniform, body straight, but capable of being bent; (ix.) water spouting from it; (x.) in shape like a "nun buoy." The annexed figure (Fig. 1) represents

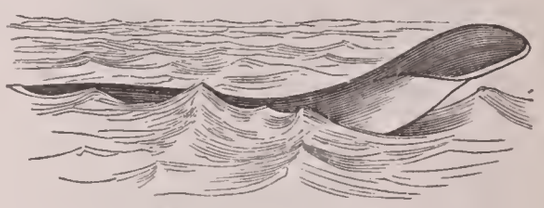


Fig. 1.—Sea-serpent, as seen from H.M.S. "Daedalus."

one which was seen from H.M.S. "Dædalus."[13] To show the reasonableness of this hypothesis, it may be added that gigantic Cephalopods are not unfrequent on the shores of Newfoundland,[14] and are occasionally met with on the coasts of Scandinavia,[15] Denmark, and the British Isles,[16] that their extreme size seems to be above 60 feet, and, furthermore, that their mode of progression is by means of a jet of water forcibly

Fig. 2.—Sea-serpent, as observed by Hans Egede.

expelled from the siphon, which would impart that equable motion to which several observers allude as being evidently not produced by any serpentine bending of the body. A very interesting account of a monster almost certainly originating in one of these squids is that of Hans Egede,[17] the well-known missionary to Greenland; the drawing by Bing, given in his work, is reproduced here (Fig. 2), along with a sketch

[1] Mott, *Nature*, xxvii. pp. 293, 315, 338; also *Land and Water*, September, 1872.

[2] *Nature*, ibid.; also Drew, in vol. xviii. p. 489; Bird, *tom. cit.*, p. 519; Ingleby, *tom. cit.*, p. 541.

[3] F. Smith, *Times*, February, 1858; Herriman, quoted by Gosse, *op. cit. postea*, p 338; Pringle, *Nature*, xviii. p. 519, 1878.

[4] *Mem. Wern. Soc. Edin.*, vol. i. pp. 418-444, pls. ix.-xi., 1811.

[5] *Ann Mag. Nat. Hist.*, scr. 2, vol. ii. p. 461, 1848; for a criticism of these views, see Traill, *Proc. Roy. Soc. Edin.*, vol. iii. p. 208, 1857.

[6] Owen, *Odontography*, p. 30.

[7] *Leisure Time Studies*, p. 115, London, 1879, containing a readable essay on the subject; *Scotsman*, 6th September, 1878; *Nature*, *loc. cit.*

[8] *Study of Fishes*, p. 521, Edinburgh, 1880.

[9] See note 3; also Deinbolt, quoted in *Zoologist*, p. 1604, 1847.

[10] Bigelow, *Amer. Journ. Sci.*, vol. ii. p. 147-165, 1820; Warburton, *ib.*, vol. xii. p. 375, 1823; *Zoologist*, p. 1714, 1847.

[11] *Amer. Journ. Sci.*, vol. xv. p. 351, 1829.

[12] *Romance of Natural History*, p. 345, London, 1859.

[13] M'Quahae, *Times*, October, 1848; *Ill. Lond. News*, October, 1848.

[14] Verrill, *Trans. Connect. Acad.*, vol. v. part i., 1880, containing an account of all authenticated specimens of gigantic squids.

[15] Steenstrup, *Forhandl. Skand. Naturf., 7de Möde*, pp. 182-185, Christiania, 1857.

[16] Saville Kent, *Proc. Zool. Soc. Lond.*, p. 178, 1874; More, *Zoologist*, p. 4526, 1875; also *Ann. Mag. Nat Hist.*, ser. 4, vol. vi. p. 123.

[17] *Det gamle Grönlands nye Perlustration*, Copenhagen, 1741 (Eng. trans., *A Description of Greenland*, London, 1745, pp.86-9); also Paul Egede, *Efterretninger om Grönland*, Copenhagen, n.d., pp. 45, 46.

of a squid in the act of rearing itself out from the water (Fig. 3), an action which they have been observed in aquaria habitually to perform. Numerous other accounts seem to be explicable by this hypothesis.[1] (7) A sea-lion or "Anson's seal" (*Morunga elephantina*), was suggested by Owen[2] as a possible explanation of the serpent seen from H.M.S. "Dædalus;" but as this was afterwards rejected by Captain M'Quahae,[3] who stated that it could not have been any animal of the seal kind, it seems better to refer the appearance to a squid as above stated. (8) A plesiosaurus, or some other of the huge marine reptiles usually believed to be extinct, might certainly have produced the

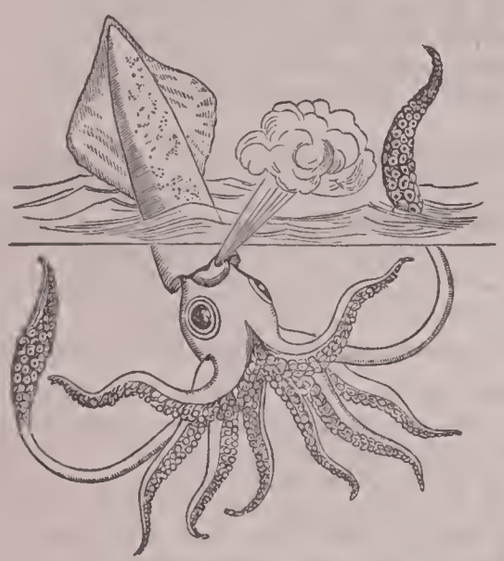


FIG. 3.—Squid, rearing itself out of the water.

phenomena described, granting the possibility of one having survived to the present time. Newman[4] and Gosse[5] have both supported this theory, the former citing as evidence in its favor the report of a creature with the body of an alligator, a long neck, and four paddles having been seen by Captain Hope of H.M.S. "Fly" in the Gulf of California.[6] (9) No satisfactory explanation has yet been given of certain descriptions of the sea-serpent; among others of this class may be mentioned the huge snake seen by certain of the crew[7] of the "Pauline" in the South Atlantic Ocean, which was coiled twice round a large sperm whale, and then towered up many feet into the air, and finally dragged the whale to the bottom. Perhaps the most remarkable, however, is Lieutenant Hayne's[8] account of a creature seen from H.M. yacht "Osborne." Two different aspects were recorded,—the first being a ridge, 30 feet in length, of triangular fins, each rising 5 to 6 feet above the water, while the second view showed a large round head 6 feet in diameter, with huge flappers, which moved like those of a turtle.[9] It would thus appear that, while, with very few exceptions, all the so-called "sea-serpents" can be explained by reference to some well-known animal or other natural object, there is still a residuum sufficient to prevent modern zoologists from denying the possibility that some such creature may after all exist.

Quite distinct in origin from the stories already touched on is the legend of the sea-serpent or *tinnín* among the Arabs (Mas'údí, i. 266 *sq.*; Kazwíní, i. 132 *sq.*; Damiri, i. 186 *sq.*), which is described in such a way as to leave no doubt that the waterspout is the phenomenon on which the fable rests. The *tinnín* is the Hebrew *tannín* (E.V. "whale," "dragon"), which in Ps. cxlviii. 7 might in the context be appropriately rendered "waterspout."

In addition to the sources already cited, the reader may consult *Blackwood's Magazine*, vol. iii., 1818; Lee, *Sea Monsters Unmasked* (International Fisheries Exhibition *Handbook*), London, 1883; Cogswell, *Zoologist*, pp. 1841, 1911 (1847); and Hoyle, *Proc. Roy. Phys. Soc. Edin.*, vol. ix.

(W. E. HO.)

SEA-SICKNESS, a peculiar set of symptoms experienced by many persons when subjected to the pitching and rolling motion of a vessel at sea, of which depression, giddiness, nausea, and vomiting are the most prominent.

Although the vast majority of persons appear to be liable to this ailment on exposure to its exciting cause (the instances of complete and constant immunity being rare), they do not all suffer alike. Many endure distress of a most acute and even alarming kind, while others are simply conscious of transient feelings of nausea and discomfort. In long voyages, while many are affected with sea-sickness for the first few days only, others are tormented with it during the entire period, especially on the occurrence of rough weather. In short voyages, such as across the English Channel, not a few even of those susceptible escape, while others suffer in an extreme degree, the sickness persisting long after arrival on shore.

The symptoms generally show themselves soon after the vessel has begun to roll by the onset of giddiness and discomfort in the head, together with a sense of nausea and sinking at the stomach, which soon develops into intense sickness and vomiting. At first the contents of the stomach only are ejected; but thereafter bilious matter, and occasionally even blood, are brought up by the violence of the retching. The vomiting is liable to exacerbations according to the amount of oscillation of the ship; but seasons of rest, sometimes admitting of sleep, occasionally intervene. Along with the sickness there is great physical prostration, as shown in the pallor of the skin, cold sweats and feeble pulse, accompanied with mental depression and wretchedness. In almost all instances the attack has a favorable termination, and it is extremely rare that serious results arise, except in the cases of persons weakened by other diseases, although occasionally the symptoms are for a time sufficiently alarming.

The causes giving rise to sea-sickness have long been discussed, and a vast number of theories have been proposed. The conditions concerned in the production of the malady are apparently of complex character, embracing more than one set of causes. In the first place, the rolling or heaving of the vessel disturbs that feeling of the relation of the body to surrounding objects upon which our sense of security rests. The nervous system being thus subjected to a succession of shocks or surprises fails to effect the necessary adjustments for equilibrium. Giddiness and with it nausea and vomiting follow, aided probably by the profound vaso-motor disturbance which produces such manifest depression of the circulation. Much has been made by some of the effects of the displacement of the abdominal viscera, especially the stomach, by the rolling of the vessel; but, while this may possibly operate to some extent, it can only be as an accessory cause. The same may be said of the influence of the changing impressions made upon the vision, which has been regarded by some as so powerful in the matter, since attacks of sea-sickness occur also in the dark and in the case of blind persons. Other contributory causes may be mentioned, such as the feeling that sickness is certain to come, which may bring on the attack in some persons even before the vessel has begun to move; the sense of the body being in a liquid or yielding medium as it descends with the vessel into the trough of the sea, the various odors to be met with

[1] L. de Ferry, quoted by Pontoppidan, *op. cit.*; Davidson and Sanford, quoted in *Zoologist*, p. 2459, 1849; Senior, *Graphic*, 19th April, 1879; Barnett, *Nature*, vol. xx. p. 289, 1879.
[2] *Ann. Mag. Nat. Hist.*, ser. 2, vol. ii. p. 461, 1848.
[3] *Times*, 21st November, 1848.
[4] *Zoologist*, p. 2395.
[5] *Op. cit.*, p. 358.
[6] *Zoologist*, p. 2356, 1849.
[7] Penny, *Ill. Lond. News*, vol. lxvii. p. 515, 20th November, 1875.
[8] *Graphic*, 30th June, 1877.
[9] Dr. Andrew Wilson has claimed this monster as a ribbon-fish. *Times*, 15th June, 1877.

on board ship, and circumstances of a like nature tend also to precipitate or aggravate an attack. Dr. Chapman's view is that the essential cause is an undue afflux of blood to the spinal cord. But, in the few rare instances where sea-sickness has proved fatal, *post-mortem* appearances have been almost entirely negative, and only such as are met with in death from syncope.

Innumerable preventatives and remedies have been proposed; but most of them fall far short of the success claimed for them. No means has yet been discovered which can altogether prevent the occurrence of sea-sickness, nor is it likely that any will be found, since it is largely due to the pitching movements of the vessel, which cannot be averted. Swinging couches or chambers have not proved of any practical utility. No doubt there is less risk of sickness in a large and well-ballasted vessel than in a small one; but, even though the rolling may be considerly modified, the ascending and descending movements which so readily produce nausea continue. None of the medicinal agents proposed possess infallible properties, a remedy which suits one person will often wholly fail with another. There appears to be a wide concurrence of opinion that nerve sedatives are among the most potent drugs which can be employed; and full medicinal doses of bromide of potassium, chloral, or opium (the last two only under strict medical direction) taken before sailing appear to act usefully in the case of many persons. On the other hand, some high authorities have recommended the employment of nerve stimulants, such as a small cupful of very strong coffee to be taken about two hours before sailing, which will frequently prevent or mitigate the sickness. When the vessel is in motion or even before starting, the recumbent position with the head low and the eyes closed should be assumed by those at all likely to suffer, and should the weather admit, on deck rather than below,—the body, especially the extremities, being well covered. Many persons, however, find comfort and relief from lying down in their berths with a hot bottle to the feet, by which means sleep may be obtained, and with it a temporary abatement of the distressing giddiness and nausea. Should sickness supervene small quantities of some light food, such as thin arrowroot, gruel, or soup, ought to be swallowed if possible, in order to lessen the sense of exhaustion, which is often extreme. The vomiting may be mitigated by saline effervescing drinks, ice, chloroform, hydrocyanic acid or opium. Alcohol, although occasionally useful in great prostration, is not generally found to be of much service, but tends rather to aggravate the sickness. Dr. Chapman, in accordauce with his view of the cause of the sickness, introduced a spinal ice-bag, which has been extensively employed and recommended; but, like every other plan of treatment, it has only occasional success. The more recently proposed remedies, such as nitrite of amyl and cocaine, do not seem to yield any better results than the agents already mentioned.

SEATTLE, county seat of King county, Washington Territory, United States, on Seattle Bay, east side of Puget Sound, with Lake Union, 3 miles long, on the north, and Lake Washington, 25 miles long, on the east, is the largest city of the Territory. A ship canal to connect these lakes with Puget Sound is now (1886) in course of construction. Seattle has shipyards, foundries, machine-shops, sawmills, lumber-yards, breweries, and manufactories of furniture, carriages, cigars, crackers, patent medicines, boxes and barrels. It possesses the Territorial university. The Columbia and Puget Sound and the Puget Sound Shore Railroads have their terminus here, whence large shipments of coal take place. The population in 1880 was 3533, and in 1885 it was estimated at 12,000.

SEA WATER.[1] The ocean covers very nearly eight-elevenths of the total area of the globe; its average depth may be estimated as 2000 fathoms, and its total mass at 1.322×10^{18} (*i.e.*, 1.3 million million millions) tons. Its general configuration must be assumed to have been substantially the same as it is now for thousands of years; hence we may safely conclude that the absolute composition of the ocean as a whole is constant in the sense of being only subject to very slow progressive millennial variation, and that, taking one part of the ocean with another, the percentage composition of the fixed part of the *solutum* can oscillate only within narrow limits. The composition of this solutum is very complex. According to Forchhammer, ocean salt in addition to the chlorides and sulphates of sodium, magnesium, potassium, and calcium—which had long been known to be its principal components—includes silica, boric acid, bromine, iodine, fluorine as acid, and the oxides of nickel, cobalt, manganese, aluminium, zinc, silver, lead, copper, barium, and strontium as basic components. Arsenic, gold, lithium, rubidium, cæsium have been discovered since Forchhammer wrote. But all these subsidiary components, as the investigator found, amount to very little,—so little that in his numerous quantatitive analyses of waters which he had procured from all quarters of the globe he confined himself to the determination of the chlorine, sulphuric acid, magnesia, lime, potash, and soda. The soda, however, he determined only by difference, assuming that the muriatic and sulphuric acids are united with the bases into perfectly neutral salts. As a general result he found that, in the open ocean, the ratio to one another of the several acids and bases named is subject to only slight variations. But his samples had all been collected at the surface; the potash had been determined by an insufficiently exact method; and the assumed neutrality of the total salt had not been proved. With the view primarily of supplementing Forchhammer's work, Dittmar made complete analyses of 77 of the samples brought home by the "Challenger," so selected that 34 out of the 77 represented depths of 1000 fathoms or more. His analyses brought out a small surplus of base, proving the presence of carbonate in all the waters; but the numerical values thus found for the "alkalinity," being charged with the observational errors of the whole series of determinations, could not be relied on. Dittmar therefore subsequently availed himself of a very easy and yet exact

TABLE I.—*Average Composition of Ocean-Water Salts.*

	Per 100 parts of Total Salts.	Per 100 of Halogen calculated as Chlorine.	
	Dittmar.	Dittmar.	Forchhammer.
Chlorine	55.292	99.848	Not determined.
Bromine	0.188 [2]	0.340	Not determined.
Sulphuric acid, SO_3	6.410	11.576	11.88
Carbonic acid,[3] CO_2	0.152	0.274	Not determined.
Lime, CaO	1.676	3.026	2.93
Magnesia, MgO	6.209	11.212	11.03
Potash, K_2O	1.332	2.405	1.93
Soda, Na_2O	41.234	74.462	Not determined.
(Basic oxygen, equivalent to the halogens)	(—12.493)	(—22.559)	.....
Total salts	100.000	180.584	181.1

[1] All our knowledge of the subject of chemical oceanography—a branch of physical geography which has only lately come to be extensively cultivated—is derived from a series of investigations chiefly embodied in the following publications: (1) Forchhammer, "On the Composition of Sea Water," etc., in *Phil. Trans.*, i. 155, pp. 203–262 (1865); (2) Oscar Jacobsen, *Ann. d. Chem.*, vol. clxvii. p. 1 *sq.* (1873); (3) *Den Norske Nordhavs Expedition*, 1876–78: *Chemi*, by Tornöe); (4) the *Jahresberichte* of the Kiel committee for the scientific investigation of the German Ocean, 1873–82; (5) *Physics and Chemistry of the Voyage of H. M. S. "Challenger"*—I. "Report on Researches into the Composition of Ocean Water," etc., by Prof. W. Dittmar, January, 1884; II. "Report on the Specific Gravity of samples of Ocean Water," etc., by J. Y. Buchanan, January, 1884; III. "Report on Deep-sea Temperature," etc., by the officers of the expedition. A shorter and more popular exposition of the whole is found in—(6) *Narrative of the Cruise of H. M. S. "Challenger"* (1885). The excellent *Handbuch der Oceanographie* (Stuttgart), by Prof. G. von Boguslawski, may be referred to as being almost up to date.

[2] Equal conjointly to 55.376 parts of chlorine, which accordingly is the percentage of "halogen reckoned as chlorine" in the real total solids.

[3] Calculating the surplus base as normal carbonate. In Table II. this carbonate is represented as so much $CaOCO^2$.

method for the direct determination of this quantity, which meanwhile had been discovered by Tornöe, and applied it to over 130 "Challenger" samples. He besides made a special inquiry into the relation between the quantity of lime and the depth at which the water had been collected, and a similar inquiry in regard to the bromine. As a general summary he gives Tables I., II., and III. The total salts contained in ocean water amount on an average to about 3.5 per cent., thus leaving 96.5 per cent. for the water proper.

TABLE II.—*Results from combining Acids and Bases* (Dittmar).

Chloride of sodium	77.758	Sulphate of potash	2.465
Chloride of magnesium	10.878	Bromide of magnesium	0.217
Sulphate of magnesium	4.737	Carbonate of lime	0.345
Sulphate of lime	3.600		
		Total salts	100.000

Reducing to the absolute mass of the ocean as given above, we arrive at the following numbers:

TABLE III.—*Absolute Composition of the Salts of the Ocean.*

Unit = 1 million million = 10^{12} tons.

Chloride of sodium	35990	Sulphate of potash	1141
Chloride of magnesium	5034	Bromide of magnesium	100
Sulphate of magnesium	2192	Carbonate of lime	160
Sulphate of lime	1666		
			46283

Total bromine.....87.2 (Dittmar).
Total iodine..... 0.03 (Köttstorfer).
Total chloride of rubidium.25.0 (C. Schmidt).

Of the several quantities recorded in columns 2 or 3 of Table I. "carbonic acid" is proved to be subject to variation; all the rest, including even the bromine, are practically constant. This shows that Forchhammer's proposition holds for ocean water from all depths, with one important qualification; special research on the lime showed that its quantity increases slightly but appreciably with the depth. Taking s, m, d as representing the lime per 100 of chlorine in shallow, medium-depth, and deep-sea water respectively, Dittmar found as mean results of analyses which agreed very well together:

	$s = 3.0175$	$m = 3.0300$	$d = 3.0308$
Probable error,	± 0.0012	± 0.0014	± 0.0011

But $m - s = 0.0124$ and $d - s = 0.0132$. One explanation of this result is that the crustaceans, foraminifera, and molluscs which form carbonate of lime shells live chiefly in surface waters, but after their death sink to the bottom, where—especially in great depths—their carbonate of lime is partially redissolved.

Oceanic Carbonic Acid.—It is well known that not only in the neighborhood of actual volcanoes but in thousands of other places on the dry land carbonic acid gas is constantly streaming forth into the atmosphere, and it is generally admitted now that this supply of telluric carbonic acid amounts to more than all that is furnished by processes of combustion and respiration. That carbonic acid springs should be absent from the bottom of the ocean is too absurd an assumption to be entertained; hence, supposing even the water of the ocean were perfectly neutral, it could not but contain dissolved carbonic acid. But such carbonic acid, at the ocean surface at least, would constantly tend to assume, and in general probably actually would come down to, the small limit value prescribed to it by the given proportion by volume of the carbonic acid in the atmosphere and the laws of gas-absorption. This proportion, according to the best modern researches, is almost constant, everywhere amounting to very nearly 0.0003 volume per unit volume of air. The coefficient of absorption by even pure water is 1.8 at 0° and 1.0 at 15° C. Hence, even in the polar regions, the surface water could not hold in permanent solution more than about 0.54 c.c., or say one milligramme per litre of water. Jacobsen, in his numerous analyses of North Sea water, found from 90 to 100 milligrammes per litre; but he also observed that only a small portion of the carbonic acid is eliminated on boiling: the rest comes out only when the water is distilled to dryness. He presumed that the gas was retained chemically by the chloride of magnesium. Buchanan, who inquired into the subject synthetically, arrived at the conclusion that it was the sulphates[1] in sea water (*qua* sulphates) which retained the carbonic acid. Accordingly in his numerous carbonic acid determinations he liberated the gas by distilling the water down with an excess of chloride of barium. Tornöe was the first to prove that the carbonic acid in sea water is present as carbouate, and that, in the northern part of the North Atlantic at least, the total carbonic acid, while considerably greater than the quantity which would convert the surplus base into normal, falls short of that which would be required to produce fully saturated acid carbonate.

Even without Tornöe's discovery it would have been necessary to find the true interpretation of the results of the numerous carbonic acid determiuations made during the voyage of the "Challenger" by Buchanan. Dittmar had no difficulty in proving the non-existence of the alleged affinity of sulphates for carbonic acid, and naturally concluded that the chloride of barium used in the processes liberates the *loose* part of the carbonic acid by converting the normal carbonate part into a precipitate of carbonate of baryta, thus—$R''CO_3 + xCO_2 + BaCl_2 = R''Cl_2 + BaCO_3 + xCO_2$. A series of synthetical experiments showed that this is substantially, though not exactly, correct. If Buchanan's *modus operandi* be rigorously followed, the carbonic acid obtained, as a rule, falls somewhat short of the actual amount of loose carbonic acid present, while on resuming the distillation after addition of fresh water an appreciable part of fixed carbonic acid passes away as gas. Yet, Buchanan's results being of great value, Dittmar discussed them (conjointly with his own alkalinity determinations) on the basis of the assumption that they afforded a fair approximation to the proportions of loose carbonic acid in the respective waters. His general conclusions are as follows: Taking "alkalinity" as meaning the "weight" of the carbonic acid, CO_2, in the normal carbonate part of the carbonate present per 100 parts of total solids, the alkalinity in the water samples analyzed (omitting a few obviously abnormal cases) was found to be as follows (Table IV.):

TABLE IV.

Alkalinity ranges from	Number of Cases.	Alkalinity ranges from	Number of Cases.
0.1400 to 0.1439...	9	0.1640 to 0.1719...	6
0.1440 " 0.1479...	34	Alk. = 0.1731...	1
0.1480 " 0.1519...	40	" = 0.1888...	1
0.1520 " 0.1559...	19	" = 0.2079...	1
0.1560 " 0.1599...	12		
0.1600 " 0.1639...	4	0.1400 to 0.2079...	127

Values above 0.16 are obviously exceptional; hence the normal range may be said to be from 0.14 to 0.16. The most frequently occurring values were found to be about 0.146 in the case of surface or shallow sea water, and in the case of bottom water about 0.152. In regard to the loose carbonic acid a full discussion of Buchanan's results led to the following conclusions: (1) carbonic acid rarely occurs in the free state; as a rule it falls short of the quantity which would produce bicarbonate; (2) in surface waters it is relatively high where the natural temperature is relatively low, and *vice versa;* (3) within equal ranges of temperature it seems to be less in the surface water of the Pacific than it is in that of the Atlantic Ocean. Of the 195 samples of sea water which Buchanan analyzed for carbonic acid only 22 contained fully saturated bicarbonate, and only 2 out of these are proved by the analyzes to have contained free carbonic acid in addition to bicarbonate. In all the remaining 173 samples the "carbonic acid deficit" (meaning the proportion of carbonic acid which was wanted to completely transform the carbonate into bicarbonate) assumed tangible and often considerable values. We are probably safe in concluding that the ocean as a whole will have to continue taking in carbonic acid for thousands of years before its carbonic acid deficit has been reduced to nothing. But it is as well to observe that at its surface in the warmer latitudes the attainment of this condition is a physical impossibility as long as the percentage of carbonic acid in the air retains its present low value.

A solution of a bicarbonate when shaken, say in a bottle, with pure air (free of carbonic acid) at summer heat gives up its combined carbonic acid to the air space in the bottle until the partial tension of the acid gas there has come up to a limit value p, which is called the dissociation tension of the bicarbonate at the prevailing temperature t. Gen-

[1] See GEOLOGY, vol. x. p. 198.

eral experience concerning such phenomena warrants the presumption that, up to a certain (low) temperature t_0, $p=0$, and thence onwards, p increases with t. It does not follow that the bicarbonate in a solution when shaken again and again with even pure air tends to become normal carbonate; for aught we know, the elimination of carbonic acid may stop as soon as the residual carbonate has come down to some composition $R''O(1+x)CO_2$ (where x is less than 1), and x may be a function of temperature. Dittmar has attempted to determine the course of the function $1+x=f(t)$ in reference to natural sea water on the one hand and to pure air (air freed of its carbonic acid) and ordinary air on the other. One sample of sea water containing its surplus base as practically bicarbonate served for all the experiments. It was shaken again and again at a fixed temperature t with one or the other kind of air, until (after "N" shakings, always with renewed air) the stage of saturation appeared to have become constant. The investigation is not completed yet; the following table (V.) gives the results which have come out so far. The final carbonate was $R_2O.nCO_2$.

TABLE V.

t.	N.	Pure air. n_0.	Ordinary air. n_1.	t.	N.	Pure air. n_0.	Ordinary air. n_1.
2° C.	200	1.90	...	15°	200	1.50	...
2°	200	2.04	...	20°	200	1.42 (?)	...
2°	52	...	2.06	25°	52	1.53	...
10°	200	1.70	...	32°	52	1.53	...
13°	50	...	1.841	32°	52	...	1.89
15°	100	1.63	...	32°	150	...	1.82

Hence we see that even at the highest temperature, and with air free from carbonic acid, the carbonate never came down below the state of sesquicarbonate, while with ordinary air, even at 32° C., it never fell below $n=1.8$. At 2° n_0 as well as n_1 was $=2$, the value characteristic of bicarbonate. Now Buchanan reports a good number of cases where, even at lower temperatures n was considerably less than 1.8 at any rate. Hence, if his numbers are correct, unless the atmosphere acts more powerfully than the air in Dittmar's bottle, it would appear that deep-sea water is in general below even the stage of carbonic acid saturation which it could attain at the surface at high temperatures.

In any mixed solution of salts every base is combined with every acid; hence the "carbonate" of sea water is strictly speaking a complex plural. But as a matter of probability the carbonic acid has very little chance of uniting with any of the potash or soda, and the overwhelmingly large quantity of alkaline chloride would no doubt convert any carbonate of magnesia that was introduced into double chloride of magnesium and alkali metal; hence it is fair to assume that oceanic carbonate is chiefly carbonate of lime. Now immense quantities of this compound are being constantly introduced into the ocean by rivers. Dumas once gave it as his opinion that this imported carbonate remains dissolved in the ocean as long as and wherever the carbonate there is at the bicarbonate stage; but, as soon as part of the loose carbonic acid goes off into the air, the corresponding weight of normal carbonate separates out as an addition, ultimately, to the solids on the bottom. Dittmar has tried to test this notion synthetically, but without arriving at very definite results. According to his experiments sea water which contains free carbonic acid dissolves added solid carbonate of lime, and more largely carbonate of magnesia; sea water which contains fully or almost fully, saturated bicarbonate dissolves carbonate of magnesia very appreciably, but would not appear to act on carbonate of lime at all. But, when carbonate of lime was produced in the water by successive additions of potential calcium carbonate in the form of dissolved sodium carbonate and its equivalent of calcium chloride, the original carbonate of lime could be increased very largely, with formation of solutions which remained clear during a long-continued period of observation. As a set-off against this a few of the many hundred samples of sea water which he received from the "Challenger" deposited in the course of a number of years crystalline crusts of carbonate of lime on the sides of the bottles; and the mother-liquor never contained more than the normal quantity of lime per 100 parts of chlorine. In discussing this question Dittmar gives an estimate, based on data furnished by Boguslawski's work, of the total carbonate of lime introduced into the ocean annually by the thirteen principal rivers; and by doubling the quantity he estimates the carbonate of lime introduced by all rivers as equal to about 1.34×10^9 tons. Now the sum total of carbonate of lime, $CaCO_3$, in the ocean amounts to about 160×10^{12} tons; hence it would take 1190 years to increase the present stock of carbonate of lime in the ocean by one per cent. of its value.

Absorbed Oxygen and Nitrogen in Ocean Water.—As a matter of physical necessity these two gases must be present in the water of the ocean—and they may be presumed in general to pervade it to its greatest depth—because the whole of the surface of the sea is in constant contact with the atmosphere. Our knowledge regarding their distribution in the ocean may be said to date from 1872, when Jacobsen inquired into the matter in a most masterly manner in connection with the German North Sea expedition. The work of his predecessors possesses no scientific value, because they employed inadequate methods. Unlike them, Jacobsen did not attempt to analyze a sample of sea-water air on board ship: he extracted the air from measured samples (by an excellent method of his own) and then sealed them up in glass tubes, to measure and analyze them after his return home. Buchanan, during the "Challenger" cruise adopted Jacobsen's method. Of the 164 samples which he sealed up successfully 69 came from the surface and 95 from depths varying from 5 to 4575 fathoms. A good number of these he analyzed himself after his return; the majority, however, were analyzed and all were measured by Dittmar. The latter, in order to be able to interpret the results, also investigated the absorption of oxygen and nitrogen gas from air by sea water. The following table (VI.) gives the result of his investigations. One litre (1000 volumes) of ocean water when saturated with constantly renewed air at $t°$, and a pressure of 760 millimètres[1] plus tension of steam at $t°$ C., takes up the following volumes, measured dry at 0° C. and 760 millimètres pressure,[1] of the pure gases.

TABLE VI.

Temperature.	Dissolved Nitrogen and Oxygen in Cubic Centimètres (volumes).		Percentage of Oxygen in Dissolved Gas.
C.	Nitrogen.	Oxygen.	
0°	15.60	8.18	34.40
5°	13.86	7.22	34.24
10°	12.47	6.45	34.09
15°	11.34	5.83	33.93
20°	10.41	5.31	33.78
25°	9.62	4.87	33.62
30°	8.94	4.50	33.47
35°	8.36	4.17	33.31

The method used for obtaining these numbers adapted itself closely to the one which Buchanan had employed for extracting the gas samples. In the calculations it was assumed that atmospheric air contains 21.0 volumes of oxygen for 79.0 volumes of nitrogen, the slight variation in this ratio, which is known to occasionally present itself, being neglected. From the table we can calculate approximately the limits between which the proportions of dissolved oxygen and nitrogen in the water of the ocean must be presumed to oscillate in nature. The pressure of the atmosphere at the sea-level, though by no means constant, is never far removed from that of 760 mm. of mercury. The temperature of the surface water (with rare exceptions) may be said to vary from −2° C. (in the liquid part of the ocean in the arctic and antarctic regions) to about 30° C. (in the tropics). The ocean receives all its dissolved oxygen and nitrogen from the surface; neither gas comes in from below, except perhaps a relatively insignificant quantity of nitrogen derived from the decay of dead organisms, which may safely be neglected. Hence the ocean can contain nowhere more than 15.6 c.c. of nitrogen or more than 8.18 c.c. of oxygen per litre, and the nitrogen will never fall below 8.55 c.c. We cannot make a similar assertion in regard to the oxygen, because its theoretical minimum of 4.30 c.c. per litre is liable to further diminution by processes of life and putrefaction and by oxidation generally.[2]

At any point in the surface of the ocean the water constantly tends to assume the composition demanded for the prevailing temperature by the laws of gas absorption. But it is rarely possible for it to assume this composition, owing to the water being in a continual state of motion; and, supposing a certain area of the ocean surface were in a state of stagnation, the temperature would vary in diurnal

[1] Theoretically any number may be substituted for 760; for calculating purposes read "1 millimètre."

[2] In calculating these limit values the tension of the vapor of water is taken into account; hence the apparent non-agreement with the entries in the table.

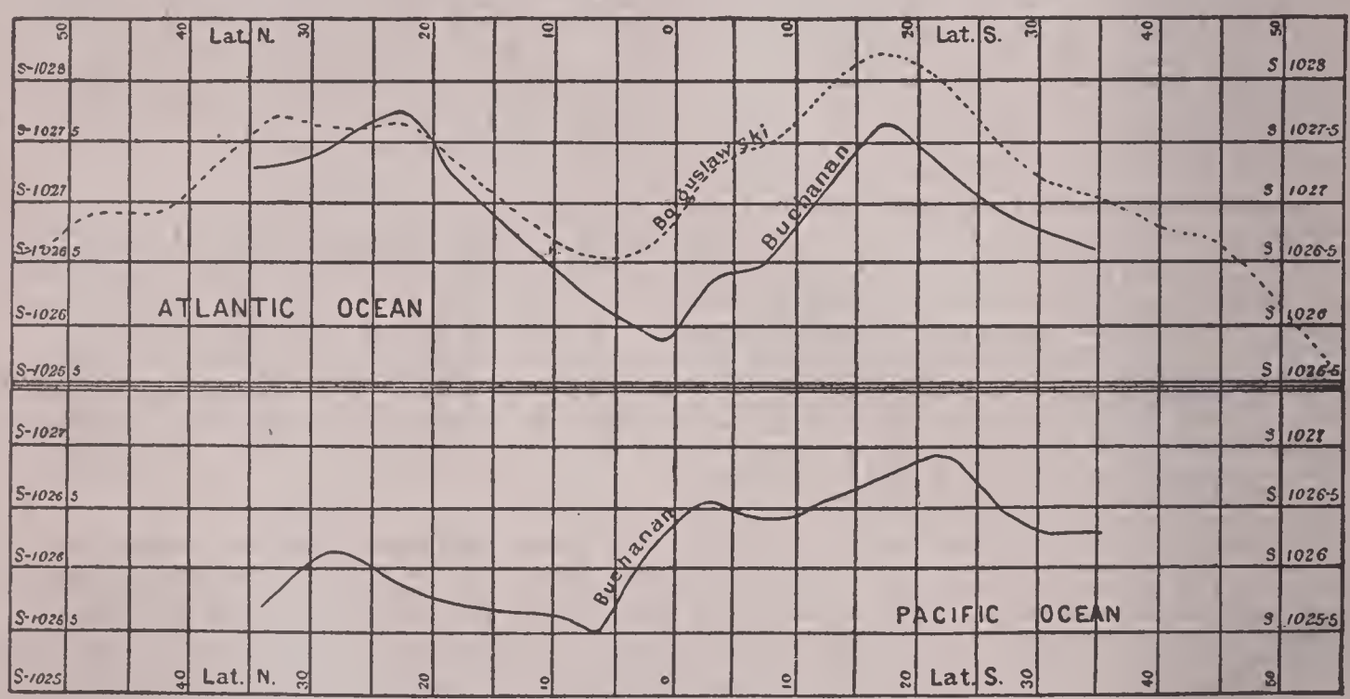
cycles, and even the calculated volume of nitrogen per litre would be a periodic function of time, exhibiting its maximum at the hour of minimum temperature, and *vice versa*. The process of absorptiometric exchange, however, even at the constantly oscillating surface of the ocean, is slow; it could not keep pace with the change of temperature, and the actual nitrogen curve would never go as high up or as low down as the theoretical one. In addition to this, the lower strata of the water constantly add to, or take away from, the surface nitrogen by diffusion and occasional intermixture. All this holds for the oxygen likewise, except that it is liable to constant diminution by oxidation. On the whole we may assume that all the disturbing influences will only modify, not efface, the course of events as prescribed by the laws of gas-absorption.

In regard to non-surface water we have to confront a greater complexity of phenomena. The gas-contents of deep-sea water, of course, have nothing to do with the low temperature and the high pressure which in general prevail there. For the purpose of a preliminary survey, let us imagine a deep-sea water formed from one kind of surface water, which took up its air at a constant temperature (t), and then sank down unmixed with other waters. The volumes of the oxygen and nitrogen per litre have at first the values assigned to them by the laws of gas-absorption. But, while the nitrogen (as long as the water remains unmixed with other water) remains constant, the oxygen will become less and less through the processes of oxidation ing influence on the atmospheric carbonic acid has so far defied the powers of chemical analysis.

Salinity of Ocean Water.—Even in the open ocean the "salinity"—meaning in a given quantity the ratio between the weight of dissolved salt and the weight or volume of the whole—is subject to considerable variation; and it obviously is one of the foremost duties of observing oceanographers to collect the data by means of which it may be possible one day to represent that quantity mathematically as a function of geographic position, depth, and time. For the quantitative determination of the salinity an obvious, easy, and sufficient method is to determine the specific gravity S at a convenient temperature t; this in fact is the method which has so far been employed by all observers almost to the exclusion of every other. Buchanan used it during the "Challenger" cruise perhaps more extensively than any of his predecessors had done. Of the arithmetical relation between salinity on the one hand and S and t on the other the successive researches of Ekman (as supplemented by Tornöe), Thorpe and Rücker, Dittmar, and others have given us a practically sufficient knowledge. According to Dittmar the function (within the limits of Buchanan's values) coincides practically with the formula

$$_4S_t - {}_4W_t = \chi\,(a + bt + ct^2).$$

where $_4S_t$ means the specific gravity at $t°$ C. referred to that of pure water of $+4°$ C. as equal to 1000; $_4W_t$ has a similar meaning in refcrence to pure water; χ stands for the



Curves showing variation of surface salinity of ocean with latitude.

which go on in the deep without compensation. Hence if there were absolute stagnation in the ocean anywhere the proportion of oxygen there might be reduced ultimately to nothing. Among the many "Challenger" deep-sea specimens which were analyzed for their gas-contents none was found quite free from absorbed oxygen; and this confirms the conclusion that absolute stagnation exists nowhere in the ocean, not even at its greatest depth. Occasionally, however, the oxygen was found to have sunk down to very little, as shown by the following two examples:

No. of Sample.	C.c. per Litre of Nitrogen.	C.c. of Oxygen.	C.c. of Oxygen calculated from Nitrogen.	Depth in Fathoms.
1001	15.08	0.6	8.21	2875
1645	13.38	2.04	6.95	1500

There must have been an approximation to absolute rest at these two places at any rate. On the whole, the results of the gas analysis, as interpreted on the basis of Dittmar's absorptiometric determinations, agreed fairly well with the inferences which we have just been deducing from physical laws. There was no lack of anomalous results, but it was not found possible to trace them to natural causes. The equilibrium in regard to the absorbed nitrogen and oxygen in the ocean is maintained by the atmosphere; and, from the fact that the air contained in surface water is always richer in oxygen than is atmospheric air, one naturally concludes that the ocean should constantly add to the percentage of oxygen in the air in the tropics and constantly diminish it in the colder latitudes. But Regnault's numerous air-analyses do not confirm this. Nor need this be wondered at, since, as we have seen, even the correspondweight of total halogen calculated as chlorine per 1000 parts, by weight, of sea water; and $a = 1.45993$, $b = -0.005592$, $c = +0.0000649$. For oceanographic purposes, however, it is not necessary to go back to χ; it suffices from series of values $_4S_t$ to deduce the corresponding values $_4S_{t0}$ for a convenient standard temperature, and to reason on these reduced numbers as if they measured the salinity, just as we take the readings of a thermometer as in themselves representing "temperatures." This, in fact, is always done; only unfortunately different standard temperatures have been chosen by different observers; Buchanan adopted 15.56° C. = 60° Fahr. Before going further, let us observe that the specific gravity of sea-water, taking it as it is *in situ*, has an important oceanographic significance, even as such. But this quantity in the case of deep-sea water is influenced very largely[1] by the pressure of the superincumbent layer of water—which in itself is a complex function of the successive temperatures and salinities—and unfortunately we still lack the constants and formulæ for making the necessary reductions with adequate exactitude. Meanwhile all our statistics of sea-water specific gravities, valuable as they are, constitute statistics of only salinities and nothing else.

At the surface of the ocean the salinity is liable chiefly to three influences,—(1) concentration by formation of ice or by the action of dry winds; (2) dilution through the

[1] According to Grassi's experiments, if sea water under the pressure of one atmosphere has the specific gravity 1026, it assumes at depths = 1000, 2000, 3000 fathoms a density of 1026 + 1, 2, 3 times 7.9 units = 1033.9, 1041.8, 1049.7 respectively.

melting of ice or the falling of rain; (3) concentration or dilution through the virtual addition of salt or water by inflowing currents of salter or fresher water respectively. The effect of the formation or melting of ice, though great within the arctic circles, does not tell much on the non-polar seas. More important in regard to these is the effect of the southeast and the northeast trade winds, which in the Pacific blow between about 3° and 21° S. lat. and between about 2° and 20° N. lat. respectively, leaving between the two a belt of 5° of a region of calms (see more exactly, METEOROLOGY, vol. xvi. p. 149). In the Atlantic the limiting lines of both trades oscillate annually, so that the equatorial boundary of the northeast trade shifts from 3° to 11° N. lat., and that of the southeast trade from about 1° to 3° N. lat. Both trades blowing from colder into warmer regions absorb water largely and thus raise the salinity within their areas of action. The western anti-trades which blow on the polar sides of the two trades, passing from hotter to colder regions, should dilute the ocean there; but they do not seem to act so powerfully in this direction as might be expected. In the belt of equatorial calms between the two trades abundant rains fall frequently and dilute the water very perceptibly.

What has been said thus far about the distribution of surface salinity applies chiefly to the Atlantic, which in fact is far more completely known in this respect than any other ocean. The accompanying diagram shows how on the average the surface salinity varies there with the latitude. The bolder curve is drawn after a table given by Buchanan in his part of the *Narrative of the Cruise of the "Challenger,"* the other after a more extensive table given by Boguslawski as embodying the mean results of many observations by different authorities with reference to standard temperatures varying from 15° to 17.5° C.,—coast waters affected by the influx of large rivers having been omitted.[1] In the North Atlantic there is an area of maximum (surface) salinity (S = 1028.5) between 25° and 35° N. lat. and 30° and 20° W. long. The zone of minimum salinity lies between 15° N. lat. and the equator. In the South Atlantic (surface) there are two concentration centres,—an eastern about St. Helena and between that island and Ascension, and a western north of San Trinidad,—both nearer the equator than that of the North Atlantic. As pointed out by Buchanan, a relatively high salinity (not merely on the surface) is quite a characteristic feature of the Atlantic, and in its northern part prevails up to the high latitudes of the Norwegian Sea, which was so thoroughly investigated by Swensden (1876) and Tornöe (1877 and 1878) during the Norwegian expeditions. The salt (and heat) conveying influence of the Gulf Stream makes itself felt up to Spitzbergen (76° N. lat.). On both sides of the Faroe Islands the specific gravity $_{17.5}S_{17.5}$ comes up to 1027.0; at the Bear Islands it sinks to 1026.7, and thence farther northwards to 1026.1. While the Gulf Stream pushes northwards, a current of relatively fresh polar water travels southwards and, creeping along the eastern coast of the United States, forms what is known as the "cold wall." In passing from the surface to the depth of the ocean the general rule (Buchanan) is that the actual specific gravity *in situ* increases with the depth; but this does not hold for the salinity (or specific gravity reduced to standard temperature). In places where there is active dilution at the surface (*e. g.*, in the belt of equatorial calms) the salinity as a rule increases down to some 50 or 100 fathoms; but thence downwards it follows the general rule, that is, it *decreases* down to 800 or 1000 fathoms, and thence increases steadily to the bottom. In the South Atlantic the salinity of the bottom water has an almost constant value ($_4S_{15.5} = 1025.7$ to 1025.9); but northwards it increases to from 1026.16 to 1026.32 at 2000 to 4000 fathoms (Buchanan).

In regard to the Pacific our knowledge is far less complete. A glance at the curve shows that the (surface) salinity at a given latitude is less there than it is in the Atlantic. In the whole of the Pacific there is only one concentration centre, which lies about the Society Islands, with a maximum salinity corresponding to $_4S_{15.5} = 1027.19$.

(W. D.)

SEA-WOLF, also SEA-CAT and WOLF-FISH (*Anarrhichas lupus*), a marine fish, the largest kind of the family *Blenniidæ* or Blennies. In spite of its large size, it has retained the bodily form and general external characteristics of the small blennies, which are so abundant on every rocky part of the coast. Its body is long, subcylindrical in front, compressed in the caudal portion, smooth and slippery, the rudimentary scales being embedded and almost hidden in the skin. An even dorsal fin extends along the whole length of the back, and a similar fin from the vent to the caudal fin, as in blennies. But its formidable dentition distinguishes the sea-wolf from all the other members of the family. Both jaws are armed in front with strong conical teeth, and on the sides with two series of large tubercular molars, a biserial band of similar molars occupying the middle of the palate. By these teeth the sea-wolf is able to crush the hard carapaces or shells of the crustaceans and molluscs on which it feeds; but whether it uses the teeth as a weapon of defence and deserves the character of ferocity generally attributed to it would appear to be rather questionable from observations made on specimens in the aquarium at Hamburg, which allowed themselves to be handled without in any way resenting the loss of their liberty. It must, however, be added that the small blennies bite readily when caught. Sea-wolves are inhabitants

Teeth of the lower and upper jaws of the sea-wolf.

of the northern seas of both hemispheres, one (*A. lupus*) being common on the coasts of Scandinavia and North Britain, and two in the seas round Iceland and Greenland. Two others occur in the corresponding latitudes of the North Pacific. They attain to a length exceeding 6 feet, and in the north are esteemed as food, both fresh and preserved. The oil extracted from the liver is said to be in quality equal to the best cod-liver oil. Of late years small numbers have reached the English markets, where, however, the prejudice which attaches to all scaleless fishes, particularly such as possess a varied pattern of coloration, limits their use as food.

SEBASTE. See SIVAS.

SEBASTIAN, DOM. See PORTUGAL, vol. xix. pp. 561–2.

SEBASTIAN, ST., the patron saint against plague and pestilence, was by birth a Narbonese. According to the Roman breviary his nobility and bravery had endeared him to the emperor Diocletian, who made him captain of the first cohort. Having secretly become a Christian, he was wont to encourage those of his brethren who in the hour of trial seemed wavering in their profession. This was conspicuously the case when the brothers Marcus and Marcellinus were being led forth to death; by his exhortations he prevailed on them to resist the entreaties and tears of their wives and children. The emperor having been informed of this conduct sent for him and earnestly remonstrated with him, but, finding him inflexible, ordered that he should be bound to a stake and shot to death. After the archers had left him for dead a devout woman, Irene, came by night to take his body away for burial, but, finding him still alive, carried him to her house, where his wounds were dressed. No sooner had he wholly recovered than he hastened to confront the emperor, reproaching him with his impiety; Diocletian, filled with astonishment, which soon changed into fury, ordered him to be instantly carried off and beaten to death with rods (288). The sentence was forthwith executed, his body being thrown into the cloaca, where, however, it was found by another pious matron, Lucina, whom Sebastian visited in a dream, directing her to bury him in the Catacombs

[1] For the sake of comparison there is shown on the lower part of the diagram the surface salinity curve for the Pacific drawn after Buchanan's summary tabulation of his results.

under the site of the church now called by his name. He is celebrated by the Roman Church on 20th January (duplex). His cult is chiefly diffused along the eastern coast of Italy and in other districts liable to visitations of plague. As a young and beautiful soldier, he is a favorite subject of sacred art, being most generally represented as undraped and severely, though not mortally, wounded with arrows.

SEBASTIANO DEL PIOMBO (1485–1547), painter, was born at Venice in 1485, and belongs to the Venetian school, exceptionally modified by the Florentine or Roman. His family name was Luciani. He was at first a musician, chiefly a solo-player on the lute, and was in great request among the Venetian nobility. He soon showed a turn for painting, and became a pupil of Giovanni Bellini and afterwards of Giorgione. His first painting of note was done for the church of St. John Chrysostom in Venice, and is so closely modelled on the style of Giorgione that in its author's time it often passed for the work of that master. It represents Chrysostom reading aloud at a desk, a grand Magdalene in front, and two other female and three male saints. Towards 1512 Sebastiano was invited to Rome by the wealthy Sienese merchant Agostino Chigi, who occupied a villa by the Tiber, since named the Farnesina; he executed some frescos here, other leading artists being employed at the same time. The Venetian mode of color was then a startling novelty in Rome. Michelangelo saw and approved the work of Luciani, became his personal friend, and entered into a peculiar arrangement with him. At this period the pictorial ability of Michelangelo (apart from his general power as an artist, regarding which there arose no question) was somewhat decried in Rome, the rival faculty of Raphael being invidiously exalted in comparison; in especial it was contended that Buonarroti fell short as a colorist. He therefore thought that he might try whether, by furnishing designs for pictures and leaving to Sebastiano the execution of them in color, he could not maintain at its highest level his own general supremacy in the art, leaving Raphael to sustain the competition as he best might. In this there seems to have been nothing particularly unfair, always assuming that the compact was not fraudulently concealed; and the facts are so openly stated by Michelangelo's friend Vasari (not to speak of other writers) that there appears to have been little or no disguise in the matter. Besides, the pictures are there to speak for themselves; and connoisseurs have always acknowledged that the quality of Michelangelo's unmatched design is patent on the face of them. Of late years, however, some writers, unnecessarily jealous for Buonarroti's personal rectitude, have denied that his handiwork is to be traced in the pictures bearing the name of Sebastiano. Four leading pictures which Sebastiano painted in pursuance of his league with Buonarroti are the Pietà (earliest of the four), in the church of the Conventuali, Viterbo; the Transfiguration and the Flagellation, in the church of S. Pietro in Montorio, Rome; and, most celebrated of all, the Raising of Lazarus, now in the London National Gallery. This grand work—more remarkable for general strength of pictorial perception than for qualities of detailed intellectual or emotional expression—is more than 12 by 9 feet in dimensions, with the principal figures of the natural size; it is inscribed "Sebastianus Venetus faciebat," and was transferred from wood to canvas in 1771. It was painted in 1517–19 for Giulio de' Medici, then bishop of Narbonne, afterwards Pope Clement VII.; and it remained in Narbonne cathedral until purchased by the duke of Orleans early in the 18th century,—coming to England with the Orleans gallery in 1792. It is generally admitted that the design of Michelangelo appears in the figure of Lazarus and of those who are busied about him (the British Museum contains two sketches of the Lazarus regarded as Michelangelo's handiwork); but whether he actually touched the panel, as has often been said, appears more than doubtful, as he left Rome about the time when the picture was commenced. Raphael's Transfiguration was painted for the same patron and the same destination. The two works were exhibited together, and some admirers did not scruple to give the preference to Sebastiano's. The third of the four pictures above mentioned, the Flagellation of Christ, though ordinarily termed a fresco, is, according to Vasari, painted in oil upon the wall. This was a method first practiced by Domenico Veneziano, and afterwards by some other artists; but Sebastiano alone succeeded in preventing the blackening of the colors. The contour of the figure of Christ in this picture is supposed by many to have been supplied by Buonarroti's own hand. Sebastiano, always a tardy worker, was occupied about six years upon this work, along with its companion the Transfiguration, and the allied figures of saints.

After the elevation of Giulio de' Medici to the pontificate, the office of the "piombo" or leaden seal—that is, the office of sealer of briefs of the apostolic chamber—became vacant; two painters competed for it, Sebastiano Luciani, hitherto a comparatively poor man, and Giovanni da Udine. Finally Sebastiano, assuming the habit of a friar, secured the very lucrative appointment,—with the proviso, however, that he should pay out of his emolument 300 scudi [$294] per annum to Giovanni. If he had heretofore been slow in painting, he became now supine and indifferent in a marked degree. He lived on the fat of the land, cultivated sprightly literary and other society, to which he contributed his own full quota of amusement, and would scarcely handle a brush, saying jocularly that he benefited the profession by leaving all the more work for other artists to do. Berni, one of his intimates, addressed a *capitolo* to him, and Sebastiano responded in like versified form. One of the few subject-pictures which he executed after taking office was Christ carrying the Cross for the patriarch of Aquileia, also a Madonna with the body of Christ. The former painting is done on stone, a method invented by Sebastiano himself. He likewise painted at times on slate,—as in the instance of Christ on the Cross, now in the Berlin gallery, where the slate constitutes the background. In the same method, and also in the same gallery, is the Dead Christ supported by Joseph of Arimathea, with a weeping Magdalene,—colossal half-length figures. Late in life Sebastiano had a serious disagreement with Michelangelo with reference to the Florentine's great picture of the Last Judgment. Sebastiano encouraged the pope to insist that this picture should be executed in oil. Michelangelo, determined from the first upon nothing but fresco, tartly replied to his holiness that oil was only fit for women and for sluggards like Friar Sebastian; and the coolness between the two painters lasted almost up to the friar's death. This event, consequent upon a violent fever acting rapidly upon a very sanguine temperament, took place at Rome in 1547. Sebastiano directed that his burial, in the church of S. Maria del Popolo, should be conducted without ceremony of priests, friars, or lights, and that the cost thus saved should go to the poor; in this he was obeyed.

Numerous pupils sought training from Sebastiano del Piombo; but, owing to his dilatory and self-indulgent habits, they learned little from him, with the exception of Tommaso Laureti. Sebastiano, conscious of his deficiency in the higher sphere of invention, made himself especially celebrated as a portrait painter: the likeness of Andrea Doria, in the Doria Palace, Rome, is one of the most renowned. In the London National Gallery are two fine specimens: one canvas represents the friar himself, along with Cardinal Ippolito de' Medici; the other, a portrait of a lady in the character of St. Agatha, used to be identified with one of Sebastiano's prime works, the likeness of Julia Gonzaga (painted for her lover, the aforenamed cardinal), but this assumption is now discredited. There were also portraits of Marcantonio Colonna, Vittoria Colonna, Ferdi-

nand marquis of Pescara, Popes Adrian VI., Clement VII. (Studj Gallery, Naples), and Paul III., Sanmicheli, Anton Francesco degli Albizzi, and Pietro Aretino. One likeness of the last-named sitter is in Arezzo and another in the Berlin gallery.

SEBASTOPOL, or SEVASTOPOL, the chief naval station of Russia on the Black Sea, is situated in the southwest of the Crimea, in 44° 37′ N. lat. and 33° 31′ E. long., 935 miles from Moscow, with which it is connected by rail *via* Kharkoff. The estuary, which is one of the best roadsteads in Europe and could shelter the combined fleets of Europe, is a deep and thoroughly sheltered indentation among chalky cliffs, running east and west for nearly 3¾ miles, with a width of three-quarters of a mile, narrowing to 930 yards at the entrance, where it is protected by two small promontories. It has a depth of from 6 to 10 fathoms, with a good bottom, and large ships can anchor at a cable's length from the shore. The main inlet has also four smaller indentations,—Quarantine Bay at its entrance, Yuzhnaya (Southern) Bay, which penetrates more than a mile to the south, with a depth of from 4 to 9 fathoms, Dockyard Bay, and Artillery Bay. A small river, the Tchornaya, enters the head of the inlet. The main part of the town, with an elevation ranging from 30 to 190 feet, stands on the southern shore of the chief inlet, between Yuzhnaya and Artillery Bays. To the east are situated the barracks, hospitals, and storehouses; a few buildings on the other shore of the chief bay constitute the "northern side." Before the Crimean war of 1853–56 Sebastopol was a well-built city, beautified by gardens, and had 43,000 inhabitants; but at the end of the siege it had not more than fourteen buildings which had not been badly injured. After the war many privileges were granted by the Government in order to attract population and trade to the town; but both increased slowly, and at the end of seven years its population numbered only 5750. The railway line connecting Sebastopol with Moscow gave some animation to trade, and it was thought at the time that Sebastopol, although precluded by the treaty of Paris from reacquiring its military importance, might yet become a commercial city. In November, 1870, during the Franco-German War, the Russian Government publicly threw off the obligation of those clauses of the treaty of Paris which related to the Black Sea fleet and fortresses, and it was decided again to make Sebastopol a naval arsenal. In 1882 Sebastopol had a population of 26,150 inhabitants, largely military. The town has been rebuilt on a new plan, and a fine church occupies a prominent site. There are now two lyceums and a zoological marine station. Although belonging to the government of Taurida, Sebastopol and its environs are under a separate military governor.

The peninsula between the Bay of Sebastopol and the Black Sea became known in the 7th century as the Heracleotic Chersonese (see vol. vi. p. 519). In the 5th century B.C. a Greek colony was founded here and remained independent for three centuries, when it became part of the kingdom of the Bosphorus, and subsequently tributary to Rome. Under the Byzantine emperors Chersonesus was an administrative centre to their possessions in Taurida. According to the Russian annals, Vladimir, prince of Kieff, conquered Chersonesus (Korsuñ) before being baptized there, and restored it to the Greeks on marrying the princess Anna. Subsequently the Slavonians were cut off from relations with Taurida by the Mongols, and only made occasional raids, such as that of the Lithuanian prince Olgerd. In the 16th century a new influx of colonizers, the Tatars, occupied Chersonesus and founded a settlement named Akhtiar. This village, after the Russian conquest in 1783, was selected for the chief naval station of the empire in the Black Sea and received its present name ("The August City"). In 1826 strong fortifications were begun, and in 1853 it was a formidable fortress. In September, 1854, after having defeated the Russians in the battle of the Alma, the Anglo-French laid siege to the southern portion of the town, and on 17th October began a heavy bombardment. Sebastopol, which was nearly quite open from the land, was strengthened by earthworks thrown up under the fire of the besiegers, and sustained a memorable eleven months' siege. On 8th September, 1855, it was evacuated by the Russians, who retired to the north side. The fortifications were blown up by the allies, and by the Paris treaty the Russians were bound not to restore them.

SEBENICO (*Sibenik*), a town of Austrian Dalmatia, on the coast of the Adriatic, about half-way between Zara and Spalato, is situated on an irregular basin at the mouth of the Kerka, connected with the sea by a winding channel 3 miles long. The channel is defended by a fort designed by Sanmicheli, and the town itself, picturesquely situated on the abrupt slope of a rocky hill, is guarded by three old castles, now dismantled. There is also a wall on the landward side. Sebenico is the seat of a bishop, and its Italian Gothic cathedral, dating from the 15th and 16th centuries, is considered the finest church in Dalmatia. Its excellent harbor and its situation at the entrance of the Kerka valley combine to make Sebenico the entrepôt of a considerable trade. Fishing is carried on extensively. The population of the commune in 1880 was 18,104, of the town proper about 8000.

SECCHI, ANGELO (1818–1878), Italian astronomer, was born on 29th June, 1818, at Reggio in Lombardy, and entered the Society of Jesus at an early age.[1] In 1849 he was appointed director of the observatory of the Collegio Romano, which was rebuilt in 1853; there he devoted himself with great perseverance to researches in physical astronomy and meteorology till his death at Rome on 26th February, 1878.

The results of Secchi's observations are contained in a great number of papers and memoirs. From about 1864 he occupied himself almost exclusively with spectrum analysis, both of stars (*Catalogo delle Stelle di cui si è determinato lo Spettro Luminoso*, Paris, 1867, 8vo; "Sugli Spettri Prismatici delle Stelle Fisse," two parts, 1868, in the *Atti della Soc. Ital.*) and of the sun (*Le Soleil*, Paris, 1870, 8vo; 2d ed. 1877). Though his publications always bear witness of his indefatigable zeal and energy, they are often uncritical and wanting in accuracy.

SECKENDORF, VEIT LUDWIG VON (1626–1692), a German statesman and scholar of the 17th century, was the most distinguished member of an ancient and wide-spread German noble family, which took its name from the village Seckendorf between Nuremberg and Langenzenn, and is said to have been ennobled by the emperor Otho I. in 950, though it traces its own genealogy no further back than 1262. The family was divided into eleven distinct lines, but at present only three are preserved, widely distributed throughout Prussia, Würtemberg, and Bavaria.[2] Veit Ludwig von Seckendorf, son of Joachim Ludwig, of the Gudentine line, was born at Herzogenaurach (near Erlangen) in Upper Franconia, 20th December, 1626. His youth fell in the midst of the Thirty Years' War, in which his father was actively engaged. But his talented and noble mother carefully watched over his education. In Coburg, Mühlhausen, and finally in Erfurt, whither his mother removed in 1636, he acquired the Latin, Greek, and French languages. In 1639 he returned to Coburg, and the reigning duke, Ernest the Pious, made him his *protégé*. Entering the university of Strasburg in 1642, he devoted himself to history and jurisprudence. After he finished his university course his patron gave him an appointment in his court at Gotha, with the charge of his valuable library. He there laid the foundation of his great collection of historical materials and mastered the principal modern languages. In 1652 he was appointed to important judicial positions and sent on weighty embassages. In 1656 he was made judge in the ducal court at Jena, a position which he held

[1] [From 1848 to 1850 Secchi was at the Jesuit College in Georgetown, D.C., as pupil and teacher.—AM. ED.]

[2] Amongst the Seckendorfs less known to fame than Veit Ludwig are his nephew, Friedrich Heinrich (1673–1763), soldier and diplomatist; Leo (1773–1809), poet, literary man, and soldier; the brothers Christian Adolf (1767–1833) and Gustav Anton ("Patrik Peale") (1775–1823), both literary men of some note.

many years and in which he took the leading part in the numerous beneficent reforms of the duke. In 1664 he resigned office under Duke Ernest, who had just made him chancellor and with whom he continued on excellent terms, and entered the service of Duke Maurice of Zeitz (Altenburg), with the view of lightening his official duties. After the death of Maurice in 1681 he retired to his estate, Meuselwitz in Altenburg, from nearly all public offices, and devoted himself to his intellectual labors. Although living in retirement, he kept up a correspondence with the principal learned men of the day. He was especially interested in the endeavors of the pietist Spener to effect a practical reform of the German church, although he was hardly himself a pietist. In 1692 he was appointed chancellor of the new university of Halle, but died a few weeks afterwards, on the 18th of December.

Seckendorf's principal works were the following: *Deutscher Fürstenstaat* (1656 and often afterwards), a handbook of German public law; *Der Christenstaat* (1685), partly an apology for Christianity and partly suggestions for the reformation of the church, founded on Pascal's *Pensées* and embodying the fundamental ideas of Spener; *Commentarius historicus et apologeticus de Lutheranismo sive de Reformatione* (3 vols., Leipsic, 1692) occasioned by the Jesuit Maimbourg's *Histoire du Luthéranisme* (Paris, 1680), his most important work, and still indispensable to the historian of the Reformation as a rich storehouse of authentic materials.

See D. G. Schreber's *Historia vitæ ac meritorum Viti Ludovici a Seckendorf* (Leipsic, 1733); Schröckh, *Lebensbeschreibungen berühmter Männer* (Leipsic, 1790); Nasemann, "Veit Ludwig von Seckendorf," in *Preussiche Jahrbücher* (vol. xii., 1863, p. 257 *sq.*); W. Roscher, "Zwei sächsische Staatswirthe im 16ten und 17ten Jahrhundert," in *Weber's Archiv für die sächsische Geschichte* (vol. i., 1862); and Theodor Kolde, "Seckendorf," in Herzog-Plitt's *Real-encyklepädie* (1884).

SECRETARY-BIRD, a very singular African animal first accurately made known, from an example living in the menagerie of the prince of Orange, in 1769 by Vosmaer,[1] in a treatise published simultaneously in Dutch and French, and afterwards included in his collected works issued under the title of *Regnum Animale*, in 1804. He was told that at the Cape of Good Hope this bird was known as the "Sagittarius" or Archer, from its striding gait being thought to resemble that of a bowman advancing to shoot, but that this name had been corrupted into that of "Secretarius." In August, 1770, Edwards saw an example (apparently alive, and the survivor of a pair which had been brought to England) in the possession of Mr. Raymond near Ilford in Essex; and, being unacquainted with Vosmaer's work, he figured and described it as "of a new genus," in the *Philosophical Transactions* for the following year (lxi., pp. 55, 56, pl. ii.). In 1776 Sonnerat (*Voy. Nouv. Guinée*, p. 87, pl. 50) again described and figured, but not at all correctly, the species, saying (but no doubt wrongly) that he found it in 1771 in the Philippine Islands. A better representation was given by D'Aubenton in the *Planches Enluminées* (721); in 1780 Buffon (*Oiseaux*, vii., p. 330) published some additional information derived from Querhoent, saying also that it was to be seen in some English menageries; and the following year Latham (*Synopsis*, i., p. 20, pl. 2) described and figured it from three examples which he had seen alive in England. None of these authors, however, gave the bird a scientific name, and the first conferred upon it seems to have been that of *Falco serpentarius*, inscribed on a plate bearing date 1779, by John Frederick Miller (*Ill. Nat. History*, xxviii.), which plate appears also in Shaw's *Cimelia Physica* (No. 28) and is a misleading caricature. In 1786 Scopoli called it *Otis secretarius*—thus referring it to the Bustards,[2] and Cuvier in 1798 designated the genus to which it belonged, and of which it still remains the sole representative,[3] *Serpentarius*. Succeeding systematists have, however, encumbered it with many other names, among which the generic terms *Gypogeranus* and *Ophiotheres*, and the specific epithets *reptilivorus* and *cristatus*, require mention here.[4] The Secretary-bird is of remarkable appearance, standing nearly 4 feet in height, the great length of its legs giving it a resemblance to a Crane or a Heron; but the expert will at once notice that, unlike those birds, its tibiæ are feathered all the way down. From the back of the head and the nape hangs, loosely and in pairs, a series of black elongated feathers, capable of erection and dilation in periods of excitement.[5] The skin round the eyes is bare and of an orange color. The head, neck, and upper parts of the body and wing-coverts are bluish-gray; but the carpal feathers, including the primaries, are black, as also are the feathers of the vent and tibiæ,—the last being in some examples tipped with white. The tail-quills are gray for the greater part of their length, then barred with black and tipped with white; but the two middle feathers are more than twice as long as those next to them, and drooping downwards present a very unique appearance.

Secretary-Bird.

The habits of the Secretary-bird have been very frequently described, one of the best accounts of them being by Verreaux in the Zoological Society's *Proceedings* for 1856 (pp. 348–352). Its chief prey consists of insects and reptiles, and as a foe to snakes it is held in high esteem. Making every allowance for exaggeration, it seems to possess a strange partiality for the destruction of the latter, and suc-

[1] Le Vaillant (*Sec. Voy. Afrique*, ii., p. 273) truly states that Kolben in 1719 (*Caput Bonæ Spei hodiernum*, p. 182, French version, ii., p. 198) had mentioned this bird under its local name of "Snake-eater" (*Slangenvreeter*, Dutch translation, i., p. 214); but that author, who was a bad naturalist, thought it was a Pelican and also confounded it with the Spoonbill, which is figured to illustrate his account of it. Though he doubtless had seen, and perhaps tried to describe, the Secretary-bird, he certainly failed to convey any correct idea of it. Latham's suggestion (*loc. infra cit.*) that the figure of the "Grus Capensis cauda cristata" in Petiver's *Gazophylacium* (tab. xii., Fig. 12) was meant for this bird is negatived by his description of it (p. 20). The figure was probably copied from one of Sherard's paintings and is more likely to have had its origin in a Crane of some species. Vosmaer's plate is lettered "Amerikaanischen Roof-Vogel," of course by mistake for "Afrikaanischen."

[2] Curiously enough, Boddaert in 1783 omitted to give it a scientific name.

[3] Ogilby's attempt to distinguish three species (*Proc. Zool. Society*, 1835, pp. 104, 105) has met with no encouragement; but examples from the north of the equator are somewhat smaller than those from the south.

[4] The scientific synonymy of the species is given at great length by Drs. Finsch and Hartlaub (*Vögel Ost-Afrikas*, p. 93) and by Mr. Sharpe (*Cat B. Brit. Museum*, i., p. 45); but each list has some errors in common.

[5] It is from the fancied resemblance of these feathers to the pens which a clerk is supposed to stick above his ear that the bird's name of Secretary is really derived.

cessfully attacks the most venomous species, striking them with its knobbed wings and kicking forwards at them with its feet, until they are rendered incapable of offence, when it swallows them. The nest is a huge structure, placed in a bush or tree, and in it two white eggs, spotted with rust-color, are laid. The young remain in the nest for a long while, and even when four months old are unable to stand upright. They are very frequently brought up tame, and become agreeable not to say useful pets about a house, the chief drawbacks to them being that when hungry they will help themselves to the small poultry, and the fragility of their legs, which follows on any sudden alarm, and ends in their death. The Secretary-bird is found, but not very abundantly and only in some localities, over the greater part of Africa, especially in the south, extending northwards on the west to the Gambia and in the interior to Khartum, where Von Heuglin observed it breeding.

The systematic position of the genus *Serpentarius* has long been a matter of discussion, and is still one of much interest, though of late classifiers have been pretty well agreed in placing it in the Order *Accipitres*. Most of them, however, have shown great want of perception by putting it in the Family *Falconidæ*. No anatomist can doubt its forming a peculiar Family, *Serpentariidæ*, differing more from the *Falconidæ* than do the *Vulturidæ;* and the fact of Prof. A. Milne-Edwards having recognized in the Miocene of the Allier the fossil bone of a species of this genus, *S. robustus* (*Ois. foss. France*, ii. pp. 465–468, pl. 186, figs. 1–6), proves that it is an ancient form, one possibly carrying on a direct and not much modified descent from a generalized form, whence may have sprung not only the *Falconidæ* but perhaps the progenitors of the *Ardeidæ* and *Ciconiidæ*, as well as the puzzling *Cariamidæ* (SERIEMA, *q.v.*). (A. N.)

SECULAR GAMES were celebrated at Rome for three days and nights with great ceremony to mark the commencement of a new *sæculum* or generation. Originally they were a propitiatory festival, imported from Etruria under the name of Ludi Terentini, and held at irregular intervals, in view of extraordinary prodigies; but in 249 B.C. it was decreed that they should be celebrated in every hundredth year after that date. This decree was frequently disregarded, partly for political reasons and partly because in Augustus's time and with his approval the quindecemviri, acting under Greek influence, sanctioned the longer period of 110 years.

The dates of the actual celebrations are as follows: the first in 509 B.C., the second in 348, the third in 249, the fourth in 146, the fifth by Augustus in 17 (for this occasion Horace wrote his *Carmen Sæculare*), the sixth by Claudius in 47 A.D. = 800 A.U.C., the seventh by Domitian in 88, the eighth by Antoninus Pius in 147 = 900 A.U.C., the ninth by Severus in 204 (220 years after the Augustan celebration), the tenth by Philip in 248, the eleventh and last by Gallienus *c.* 262. The projected celebration of Maximian in 304 did not take place.

Censorinus, *De Die Natali*, c. 17; Zosimus, ii. 1 *sq.;* Val. Max., ii. c. 5. The dates of the first two celebrations appear to rest only on the authority of Valerius Antias; the others are certain. The quindecemviral books assigned fictitious dates for the pre-Augustan celebrations. Comp. Marquardt, *Die römische Staatsverwaltung*, iii. p. 369 *sq.*

SECUNDERÁBÁD, one of the chief British military cantonments in India, is situated in the native state of Haidarábád (Hyderabad) or the Nizam's Dominions, in 17° 26′ 30″ N. lat. and 78° 33′ E. long., 1830 feet above the level of the sea, and 6 miles northeast of Haidarábád city. Secunderábád is the largest military station in India and forms the headquarters of the Haidarábád subsidiary force, which constitutes a division of the Madras army. The strength of the military force stationed at Secunderábád in 1883 was 5632, European troops numbering 2276 and native troops 3356. To the southwest of the cantonment there is a large reservoir or tank, known as the Husain Ságar, about 3 miles in circumference. Secunderábád town, which forms the cantonment bazaar, contains a population of over 30,000. Adjoining this cantonment to the north is the Bolárum cantonment, one of the stations of the Haidarábád contingent, under the immediate command of the nizam; and 2 miles to the south of Secunderábád cantonment are the lines of the Haidarábád reformed troops, also belonging to the nizam. During the mutiny (1857–58) both the subsidiary force and the Haidarábád contingent rendered good service.

SECUNDUS, JOHANNES, or JOHANN EVERTS (1511–1536), Latin poet, was born at The Hague on 10th November, 1511. He was descended from an ancient and honorable family in the Netherlands; his father, Nicholas Everts, or Everard, seems to have been high in the favor of the emperor Charles V. On what account the son was called Secundus is not known. His father intended him for the law; but though he took his degree at Bourges it does not appear that he devoted much time to legal pursuits. Poetry and the sister arts of painting and sculpture engaged his mind at a very early period. In 1533 he went to Spain, and soon afterwards became secretary to the cardinal-archbishop of Toledo, in a department of business which required no other qualification than that which he possessed in a very eminent degree,—a facility in writing with elegance the Latin language. It was during this period that he composed his most famous work, the *Basia*, a series of amatory poems, of which the fifth, seventh, and ninth *Carmina* of Catullus seem to have given the hint. In 1534 he accompanied Charles V. to the siege of Tunis, but gained few laurels as a soldier. After quitting the service of the archbishop, Secundus was employed as secretary by the bishop of Utrecht; and so much did he distinguish himself by the classical elegance of his compositions that he was called upon to fill the important post of private Latin secretary to the emperor, who was then in Italy. But, having arrived at St. Amand, near Tournay, he was cut off by a violent fever on 8th October, 1536.

SEDAINE, MICHEL JEAN (1719–1797), dramatist, was born at Paris on 4th July, 1719. Few men of letters have risen from a lower station. Although his father was an architect, he died when Sedaine was quite young, leaving no fortune, and the boy began life as a mason's laborer.[1] He worked himself up in his trade and was at last taken as pupil and partner by the builder who employed him. Meanwhile he had done his best to repair his deficiencies of education, and in 1753 he published a volume of poems of some merit. He then took to the theatre and after composing various vaudevilles and operettas attracted the attention of Diderot, and had two remarkable plays accepted and performed at the Théâtre Français. The first and longest, the *Philosophe sans le Savoir*, was acted in 1765; the second, a lively one-act piece, *La Gageure Imprévue*, in 1768. These two at once took their place as stock pieces and are still ranked among the best French plays, each of its class. Sedaine inclined somewhat to the school of *drame* or *tragédie bourgeoise*, but he was free from the excessive sentimentality which in the hands of Diderot and others marred the style, and he had a vein of singularly natural and original comedy. Indeed his originality is one of his chief points, though except the two pieces mentioned little or nothing of his has kept the stage or the shelves. Sedaine, who became a member of the Academy, secretary for architecture of the fine arts division, and a prosperous man generally was personally both popular and respected. He lived to a considerable age, dying at Paris on 17th May, 1797.

SEDALIA, a city of the United States, county town of Pettis county, Missouri, lies 189 miles west of St. Louis, on the highest swell of a rolling prairie, which drains by small streams northeast to the Missouri. It is a railroad centre, and besides the machine-shops and carriage-factories of two railway companies (the Missouri, Kansas and Texas, and the Missouri Pacific, Middle Division), it contains foundries, flour-mills, and establishments for the manufacture of furniture, woollen goods, soap, beer, etc. Among the public buildings are two opera-houses, a public library, a high

[1] [A. Jal, *Dict. Critique de Biog. et d'Histoire*, places his birthday on June 2d, and is unable to find any evidence that he was a mason's laborer.—AM. ED.]

school, and a gymnasium. Founded in 1860 by General George R. Smith, Sedalia had 4560 inhabitants in 1870, and 9561 in 1880.

SEDAN, a town of France, the chef-lieu of an arrondissement in the department of Ardennes, lies on the right bank of the Meuse, 13 miles east-southeast of Mezières by the railway to Thionville (Lorraine), and is surrounded by heights of about 1000 feet. Since its fortifications were *déclassés*, a process of embellishment has been going on. Place Turenne takes its name from the statue of the illustrious marshal, who was born in the town in 1611. The public buildings include a Protestant church, a synagogue, a museum, and a college. The manufacture of fine black cloth has long been, and still continues to be, the staple industry, employing in the town and neighborhood more than 10,000 workmen, and producing to the value of 40,000,000 francs [$7,720,000] annually. Several spinning-mills have been erected by Alsatian refugees since 1871. Considerable activity is also displayed in various departments of metal-working, especially in the surrounding villages. The population was 13,807 in 1872, and 19,240 in 1881 (19,556 in the commune).

Sedan was in the 13th century a dependency of the abbey of Mouzon, the possession of which was disputed by the bishops of Liége and Rheims. United to the crown of France by Charles V., it was ceded by Charles VI. to Guillaume de Braquemont, who sold it to the La Marcks. For two centuries this powerful family managed to continue masters of the place in spite of the bishops of Liége and the dukes of Burgundy and Lorraine; and in the person of Henri Robert they adopted the title "prince of Sedan." In the 16th century the town was an asylum for many Protestant refugees, who laid the basis of its industrial prosperity, and it became the seat of a Protestant seminary. The last heiress of the La Marck family brought Sedan and the duchy of Bouillon to Henri de la Tour d'Auvergne, viscount of Turenne. When the new duke attempted to maintain his independence, Henry IV. captured Sedan in three days; and the second duke (eldest brother of the great marshal), who had several times revolted against Louis XIII., was at last, after his share in the conspiracy of Cinq-Mars, obliged to surrender his principality. Sedan thus became part of the royal domain in 1641. On 1st September, 1870, the fortress was the centre of the most disastrous conflict of the Franco-German War. Shut in by the Germans, who had occupied the surrounding heights, the whole French army, after a terrific contest, was obliged to capitulate,—the emperor, 39 generals, 230 staff-officers, 2600 officers, and 83,000 men becoming prisoners of war. The village of Bazeilles was the scene of the heroic stand made by the marines under Martin des Pallières. It now contains the great ossuary, and a monument to the memory of the marines; and the house which has been rendered famous by Neuville's painting, "Les Dernières Cartouches," is a museum of objects found on the battlefield.

SEDDON, Thomas (1821–1856), landscape painter, was born in London on 28th August, 1821. His father was a cabinetmaker, and the son for some time followed the same occupation; but in 1842 he was sent to Paris to study ornamental art. On his return he executed designs for furniture for his father, and in 1848 gained a silver medal from the Society of Arts. In the following year he made sketching expeditions in Wales and France, and in 1852 began to exhibit in the Royal Academy, sending a figure-piece, Penelope, and afterwards landscapes, deriving their subjects from Brittany. In the end of 1853 he started for the East and joined Mr. Holman Hunt at Cairo. He worked for a year in Egypt and Palestine, executing views which Mr. Ruskin has pronounced to be "the first landscapes uniting perfect artistical skill with topographical accuracy; being directed, with stern self-restraint, to no other purpose than that of giving to persons who cannot travel trustworthy knowledge of the scenes which ought to be most interesting to them." Seddon's Eastern subjects were exhibited in Berners Street, London, in 1855, and in Conduit Street in 1856. In October, 1856, Seddon again visited Cairo, where, after a very brief illness, he died on 23d November. In 1857 his works were collected and exhibited in the rooms of the Society of Arts, and his important and elaborately finished picture, Jerusalem and the Valley of Jehoshaphat, was purchased by subscription and presented to the National Gallery. A memoir of Seddon, by his brother, was published in 1858.

SEDGWICK, Adam (1785–1873), geologist, was born in 1785 at Dent, Yorkshire, where his father was vicar of the parish. He was educated at Sedbergh school and at Trinity College, Cambridge, where he graduated as fifth wrangler in 1808, and was elected a fellow in 1809. For some years he devoted himself chiefly to the studies and duties of academic life, but gradually he acquired an absorbing interest in geology and natural science, which was fostered by long excursions into the country, rendered necessary by the state of his health. In 1818 he succeeded Professor Hailstone in the Woodwardian chair of Geology. Among his principal discoveries, which appeared for the most part in the *Cambridge Transactions* and the *Transactions of the Geological Society*, were those of the true position and succession of the Palæozoic strata of Devonshire and Cornwall, of the geological relation of the beds afterwards named Permian in the north and northwest of England, and of the general structure of North Wales,—a subject which led him into controversy with Murchison. In 1834 he published a *Discourse on the Studies of the University of Cambridge*, which reached a fifth edition. By his generosity and energy he succeeded in rendering the geological collection of the Woodwardian Museum one of the most complete in the kingdom. He was one of the original secretaries of the Cambridge Philosophical Society established in 1819, and was president of the Geological Society of London from 1829 to 1831. Having taken holy orders, he was advanced to the dignity of canon of Norwich cathedral, and for some time also he was vice-master of Trinity College. Sedgwick died at Cambridge on 27th January, 1873.

SEDITION in Roman law was considered as [*læsa*] *majestas* or treason. In English law it is a very elastic term, including offences ranging from libel to Treason (*q.v.*). It is rarely used except in its adjectival form, *e.g.*, seditious libel, seditious meeting, or seditious conspiracy. "As to sedition itself," says Mr. Justice Stephen, "I do not think that any such offence is known to English law" (*Hist. Crim. Law*, vol. ii. chap. xxiv.).[1] The same high authority lays down the law in the following terms, which were substantially adopted by the Draft Criminal Code Commissioners.

"Every one commits a misdemeanor who publishes verbally or otherwise any words or any document with a seditious intention. If the matter so published consists of words spoken, the offence is called the speaking of seditious words. If the matter so published is contained in anything capable of being a libel, the offence is called the publication of a seditious libel. Every one commits a misdemeanor who agrees with any other person or persons to do any act for the furtherance of any seditious intention common to both or all of them. Such an offence is called a seditious conspiracy. A seditious intention is an intention to bring into hatred or contempt or to excite disaffection against the person of Her Majesty, her heirs and successors, or the Government and constitution of the United Kingdom, as by law established, or either House of Parliament, or the administration of justice, or to excite Her Majesty's subjects to attempt otherwise than by lawful means the alteration of any matter in church or state by law established, or to raise discontent or disaffection amongst Her Majesty's subjects, or to promote feelings of ill-will and hostility between different classes of Her Majesty's subjects. An intention to show that Her Majesty has been misled or mistaken in her measures, or to point out errors or defects in the Government or constitution as by law established, with a view to their reformation, or to excite Her Majesty's subjects to attempt by lawful means the alteration of any matter in church or state by law established, or to point out, in order to their removal, matters which are producing or have a tendency to produce feelings of hatred and ill-will between different classes of Her Majesty's subjects, is not a seditious

[1] The word "sedition" occurs, however, in 40 and 41 Vict. c. 21, s. 40.

intention. In determining whether the intention with which any words were spoken, any document was published, or any agreement was made, was or was not seditious, every person must be deemed to intend the consequences which would naturally follow from his conduct at the time and under the circumstances in which he so conducted himself" (*Digest of the Criminal Law*, §§ 91–94).

The principal enactments now in force dealing with seditious offences were all passed during the last twenty-five years of the reign of George III. They are 37 Geo. III. c. 123, prohibiting the administering or taking of unlawful oaths (see OATH) or the belonging to an unlawful confederacy; 60 Geo. III. and 1 Geo. IV. c. 1, prohibiting unlawful drilling and military exercises; and the Acts for the suppression of corresponding societies, 39 Geo. III. c. 79 and 57 Geo. III. c. 19. No proceedings can be instituted under these last two Acts without the authority of the law officers of the crown (9 and 10 Vict. c. 33). Under the head of statutes aimed at seditious offences may also be classed 2 Ric. II. st. 1, c. 5 and 12 Ric. II. c. 11, against *scandalum magnatum*, or slander of great men, such as peers, judges, or great officers of state, whereby discord may arise within the realm, and 13 Car. II. c. 5, against tumultuous petitioning (see PETITION). There has been no prosecution in recent times for seditious words as distinguished from seditious libel, but such words have been admitted as evidence in proceedings for seditious CONSPIRACY (*q.v.*), as in the prosecution of O'Connell in 1844 and of Mr. Parnell and others in 1880 (see Reg. *v.* Parnell, Cox's *Criminal Cases*, vol. xiv. 508). By the Prison Act, 1877, any prisoner under sentence for sedition or seditious libel is to be treated as a misdemeanant of the first division (40 and 41 Vict. c. 21, s. 40).

Scotland.—"All acts by which the minds of the people may be incited to defeat the Government or control legislation by violent or unconstitutional means are seditious" (Macdonald, *Criminal Law*, 229). Sedition is punishable by fine or imprisonment or both (6 Geo. IV. c. 47). A very large number of Acts of the Scottish Parliament dealt with seditiou, beginning as early as 1184 with the assize of William the Lion, c. 29. Leasing-making is to be distinguished from sedition, as it attacked only the sovereign individually, not the Government.

United States.—In the Acts of Congress the word "sedition" appears to occur only in the army and navy articles. A soldier joining any sedition, or who, being present at any sedition, does not use his utmost endeavor to suppress the same is punishable with death. A sailor uttering seditious words is punishable at the discretion of a court-martial. In 1798 an Act of Congress called the Sedition Act was passed, which expired by effluxion of time in 1801. Its constitutionality was violently assailed at the time. (See Story on the Constitution of the United States, §§ 1293–4.) Several prosecutions under the Act will be found in Wharton's *State Trials*. Sedition is also dealt with by the State laws, mostly in a very liberal spirit. Thus the Louisiana Code, § 394, enacts that "there is no such offence known to our law as defamation of the Government or either of its branches, either under the name of libel, slander, seditious writing, or other appellation." By § 111, to constitute the offence of sedition, "there must be not only a design to dismember the State, or to subvert or change its constitution, but an attempt must be made to do it by force."

Continent of Europe.—The Continental codes, as a rule, are a little more definite than English law in their treatment of sedition. In Germany a distinction is drawn between *Auflauf*, the remaining together of a mob after the authorities have thrice bid it disperse, and *Aufruhr* or *Aufstand*, an organized resistance to the authorities; but no definition is given of the terms. The Hungarian penal code defines *Aufstand* to be an armed assembly which has the intention of attacking a class of citizens, a nationality, or a religious body. The French penal code recognizes a difference between *sédition* and *réunion séditieuse*. If carried out with sufficient numbers and sufficient force, *sédition* becomes *rébellion*. Section 100 exempts from the penalties of sedition those who have merely been present at a seditious meeting without taking any active part therein, and have dispersed at the first warning of the military or civil authorities.

SEDLEY, SIR CHARLES (1639–1701), a noted "wit" and patron of literature in the Restoration period, the "Lisideius" of Dryden's *Essay of Dramatic Poesy*. He was born in 1639, the son of Sir John Sedley of Aylesford in Kent. Like many other men of rank and fashion at the court of "the merry monarch," Sedley had poetical ambition, and wrote comedies and songs. His most famous song, "Phyllis," is much more widely known now than the author's name. His first comedy, *The Mulberry Garden*, was published in 1668, but it does not sustain Sedley's contemporary reputation for wit in conversation. He was probably too indolent to master the art of providing continuous opportunities for brilliant sayings, although he continued to try, wrote two more comedies, and left a comedy and two tragedies behind him to be published after his death. An indecent frolic in Bow Street, for which he was heavily fined, made him notorious in his youth, but later on he sobered down, entered Parliament for New Romney (Kent), and took an active part in politics. A speech of his on the civil list after the Revolution is cited by Macaulay as a proof (which his plays do not afford) that his reputation as a man of wit and ability was deserved. His *bon mot* at the expense of James II. is another well-known fragment of his wit. The king had seduced his daughter and created her countess of Dorchester, whereupon Sedley remarked that he hated ingratitude, and, as the king had made his daughter a countess, he would endeavor to make the king's daughter a queen. Sedley died on 20th August, 1701.

SEDUCTION. The action for seduction of an unmarried woman in England stands in a somewhat anomalous position. The theory of English law is that the woman herself has suffered no wrong; the wrong has been suffered by the parent or person *in loco parentis*, who must sue for the damage arising from the loss of service caused by the seduction of the woman. Some evidence of service must be given, but very slight evidence will be sufficient. Although the action is nominally for loss of service, still exemplary damages may be given for the dishonor of the plaintiff's family beyond recompense for the mere loss of service. An action for seduction cannot be brought in the county court except by agreement of the parties. As to seduction of a married woman, the old action for criminal conversation was abolished by the Divorce Act, 1857, which substituted for it a claim for damages against the co-respondent in a divorce suit. Seduction in England is not as a rule a criminal offence. But a conspiracy to seduce is indictable at common law. And the Criminal Law Amendment Act, 1885 (which extends to the United Kingdom), makes it a felony to seduce a girl under the age of thirteen, and misdemeanor to seduce a girl between thirteen and sixteen (48 and 49 Vict. c. 69, §§ 4, 5). The same Act also deals severely with the cognate offences of procuration, abduction, and unlawful detention with the intent to seduce a woman of any age. In Scotland the seduced woman may sue on her own account.

United States.—In the United States, State legislation has generally modified the common law. In some States the father brings the action as the representative of the family whose purity has been invaded; in others the woman herself may bring the action. In many States there is a criminal, as well as a civil, remedy. The penal codes of New York, New Jersey, Louisiana, and other States, make it a crime to seduce under promise of marriage an unmarried woman of good reputation. Subsequent intermarriage of the parties is in most cases a bar to criminal proceedings. Massachusetts goes still further. By the law of that State, if a man commits fornication with a single woman, each of them shall be punished by imprisonment not exceeding three months, or by fine not exceeding $30. The seduction of a female passenger on a vessel of the United States is an offence punishable by fine or imprisonment. The fine may be ordered by the court to be paid to the person seduced or her child (Act of Congress of 24th March, 1860). The State legislation of the United States is in remarkable opposition to the rule of the canon law, by which the seduction of a

woman by her betrothed was not punishable on account of the inchoate right over her person given by the betrothal.

SEDULIUS, Cœlius, a Christian poet of the 5th century, was the author of an abecedarian *Hymnus de Christo* in iambic dimeters, portions of which maintain their ground in the offices of the Church of Rome, viz., in the Christmas hymn "A solis ortus cardine," and in that for Epiphany (altered from "Herodes hostis impie"). His other works are *Paschale Carmen s. Mirabilium Divinorum Libri V.*, originally in four or five books in hexameter verse and afterwards enlarged and turned into prose, and *Veteris et Novi Testamenti Collatio*, in elegiac verse. *De Verbi Incarnatione*, a Virgilian cento, has also been ascribed to him, but on insufficient grounds. Of his personal history nothing is known, except that he is called a presbyter by Isidore of Seville; by some other writers of less authority he is designated "antistes" or "episcopus." A Scoto-Irish origin has sometimes been claimed for him; but at all events he must not be confounded with Sedulius the grammarian, an Irish Scot who lived in the 9th century. The best edition of his works is that of Arevalus (4to, Rome, 1794).

SEDUM. About 120 species are enumerated in this genus of *Crassulaceæ*, mostly perennial herbs with succulent leaves of varied form, but never compound. The individual flowers are usually small and grouped in cymes. In color they range from white and yellow to pink. They have a calyx of five sepals, as many petals, usually ten stamens, and five distinct carpels, which have as many glands at their base and ripen into as many dry seed-pods. Several species are British, including some with tuberous roots and large leaves (*Telephium*), and others of smaller size, chiefly found on rocks, walls, and dry banks. Many are cultivated for the beauty of their flowers, and many are remarkable for their prolonged vitality under adverse circumstances. Sedums are very closely allied to Sempervivums (see Houseleek).

SEELAND. See Zealand.

SÉES, a town of France and a bishop's see, in the department of Orne, is situated on the Orne, 4 miles from its source and 13 miles north of Alençon by the railway from Le Mans to Caen. The very fine cathedral, dating to a large extent from the 13th and 14th centuries, occupies the site of churches founded in 440, 996, and 1053. The west front has two stately spires of open work 230 feet high, which have been restored more than once in the 19th century. The nave, built in the beginning of the 13th century, was remodelled in its upper portion fifty or sixty years after its erection; the choir, built about 1230 and restored in 1260 after a great fire, is remarkable for the lightness of its construction,—the inner galleries of the presbytery being the boldest venture ever made in this kind. In the choir are four bas-reliefs of great beauty and delicacy representing scenes in the life of the Virgin; and the altar is adorned with another depicting the removal of the relics of St. Gervais and St. Protais. Most of the stained windows are good. Around the cathedral are the cloisters of the canons; the episcopal palace (1778), with a pretty chapel; the great seminary, located in the old abbey of St. Martin (supposed to be one of the fourteen or fifteen monasteries founded in the 6th century by St. Evroult); the hôtel de ville; and the statue of Conté, a member of the Egyptian expedition of 1798. The population of Sées was 3483 in 1881, and that of the commune 4687.

The first bishop of Sées (*Sagium*) was St. Lain, who lived at the close of the 3d or the beginning of the 4th century. In the 9th century it was a fortified town and fell a prey to the Normans; and the stones from its ruined ramparts were used for the erection of a church in the close of the 10th century. In the 12th century Sées belonged to the count of Alençon and consisted of two distinct parts, separated by the Orne,—the bishop's burgh, and to the south the new or count's burgh (*Bourg le Compte*). Captured in 1154 by Henry II. of England, it was recovered in the following year by Guillaume de Bellême; and in 1136 it was partly burned by the count of Anjou. After being taken by Philip Augustus it enjoyed some years of peace, during which a hospital and a Franciscan monastery were built; but it was one of the first towns of Normandy to fall into the hands of the English (1417), who retained possession until their final expulsion from France. Pillaged by the Protestants during the Wars of Religion, Sées attached itself to the League in 1589, but voluntarily surrendered to Henry IV. in 1590.

SEETZEN, Ulrich Jasper (1767–1811), one of the most distinguished of modern travellers in the East, was born the son of a yeoman, in the little lordship of Jever in German Frisia, on 30th January, 1767. His father, who was a man of substance, sent him to the university of Göttingen, where he graduated in medicine. His chief interests, however, were in natural history and technology; he wrote a number of papers on both these subjects which gained him some reputation, and had both in view in a series of journeys which he made from time to time through various parts of Holland and Germany. He also engaged practically in various small manufactures, and in 1802 obtained a Government post in Jever. In 1801, however, the interest which he had long felt in geographical exploration had culminated in a resolution to travel by Constantinople to Syria and Arabia, and then, when familiarized with Mohammedan ways, to try to penetrate into Central Africa. He relied mainly on his own resources, but received a small subvention from Gotha, where also he learned from Zach to make astronomical observations. In the summer of 1802 he started down the Danube with a companion Jacobsen, who broke down at Smyrna a year later. His journey was by Constantinople, where he stayed six months, thence through Asia Minor to Smyrna, then again through the heart of Asia Minor to Aleppo, where he remained from November, 1803, to April, 1805, and made himself sufficiently at home with Arabic speech and ways to travel as a native and without an interpreter. Now began the part of his travels of which a full journal has been published (April, 1805, to March, 1809), a series of most instructive journeys in eastern and western Palestine and the wilderness of Sinai, and so on to Cairo and the Fayyûm. His chief exploit was a tour round the Dead Sea, which he made without a companion and in the disguise of a beggar. From Egypt he went by sea to Jeddah and reached Mecca as a pilgrim in October, 1809. In Arabia he made extensive journeys, ranging from Medina to Lahak and returning to Mocha, from which place his last letters to Europe were written in November, 1810. In September of the following year he left Mocha with the hope of reaching Muscat, and was found dead two days later, having, it is believed, been poisoned by the command of the imám of Sana'a. For the parts of Seetzen's journeys not covered by the published journal (*Reisen*, ed. Kruse, 4 vols., Berlin, 1854) the only printed records are a series of letters and papers in Zach's *Monatliche Correspondenz* and Hammer's *Fundgruben*. Many papers and collections were lost through his death or never reached Europe. The collections that were saved form the Oriental museum and the chief part of the Oriental MSS. of the ducal library in Gotha.

SE-GAN FOO, the capital of the province of Shense in northwestern China, is situated in 34° 17′ N. lat. and 108° 58′ E. long. Like most Chinese cities, Se-gan Foo has repeatedly changed its name during its history, which dates back to the time of Che Hwang-te (246–210 B.C.), the first universal emperor, whose name will be ever notorious as that of the monarch who built the Great Wall, burnt the books, and established his capital at Kwang-chung, the site of the modern Se-gan Foo. Under the succeeding Han dynasty (206 B.C.–25 A.D.) this city was called Wei-nan and Nuy-she; under the Eastern Han (25–221 A.D.) it was known as Yung Chow; under the T'ang (618–907) as

Kwan-nuy; under the Sung (960–1127) as Yung-hing; under the Yuen and Ming (1260–1644) as Gan-se; and under the present dynasty as Se-gan. During the Ts'in, Han, and T'ang dynasties it was the capital of the empire, and is at the present time second only to Peking in size, population, and importance. The city, which is a square, measuring 10 Chinese miles each way, is prettily situated on ground rising from the river Wei, and includes within its limits the two district cities of Ch'ang-gan and Hien-ning. Its walls are little inferior in height and massiveness to those of Peking, while its gates are handsomer and better defended than any of which the capital can boast. The population is said to be 1,000,000, of whom 50,000 are Mohammedans. Situated in the basin of the Wei river, along which runs the great road which connects northern China with Central Asia, at a point where the valley opens out on the plains of China, Se-gan Foo occupies a strategical position of great importance, and repeatedly in the annals of the empire has history been made around and within its walls. During the late Mohammedan rebellion it was besieged by the rebels for two years (1868–70), but owing to the strength of the fortifications it defied the efforts of its assailants. From its eastern side three great roads radiate, one reaching to Shan-se, one to Ho-nan, and one to Hoo-pih; while from it runs in a southwesterly direction the great highway into Sze-chuen. It is thus admirably situated as a trade centre and serves as a depôt for the silk from Che-keang and Sze-chuen, the tea from Hoo-pih and Ho-nan, and the sugar from Sze-chuen destined for the markets of Cansuh, Turkistan, Ili, and Russia. Marco Polo speaking of Kenjanfu, as the city was then also called, says that it was a place "of great trade and industry. They have great abundance of silk, from which they weave cloths of silk and gold of divers kinds, and they also manufacture all sorts of equipments for an army. They have every necessary of man's life very cheap." Many of the temples and public buildings are very fine, and not a few historical monuments are found within and about the walls. Of these the most notable is a Nestorian tablet,[1] which was accidentally discovered in 1625 in the Ch'ang-gan suburb. The stone slab which bears the inscription is 7½ feet high by 3 wide, and at present stands embedded in a brick wall, which forms part of a dilapidated temple.[2] From a Chinese point of view, however, the Pei Lin or "forest of tablets" is a place of even greater interest than the above-mentioned temple. For there are collected tablets of the Han, T'ang, Sung, Yuen and Ming dynasties, some of which bear historical legends, notably a set of stone tablets having the thirteen classics inscribed upon them, while others are symbolical or pictorial; among these last is a full-sized likeness of Confucius. As might be expected on a site which has played so prominent a part in Chinese history, antiquities are constantly being discovered in the neighborhood of the city, *e.g.*, rich stores of coins and bronzes, bearing dates ranging from 200 B.C. onwards.

SEGESTA, a very ancient city near the northwestern extremity of Sicily, so named by the natives and by the Romans, while the Greeks called it Egesta or Ægesta. Its origin was ascribed by tradition sometimes to Trojan refugees, and sometimes to Phocians, followers of Philoctetes; the accounts agree only in making Segesta older than the Greek colonization of Sicily in the 7th century B.C. A tribe named Elymi, distinct from both the Siculi and the Greeks, occupied the country around the city. The scanty references to the history of Segesta show it in continual warfare with the Greek city Selinus from the year 580 B.C. downwards. As early as 426 B.C. it concluded an alliance with Athens; and in 416 a great Athenian fleet sailed to Sicily, ostensibly to aid Segesta against its enemies Selinus and Syracuse, but really to attempt the conquest of the island. After the destruction of the Athenian fleet and army, the Segestans turned to the Carthaginians. But when Hannibal destroyed Selinus (see SELINUS) in 409 B.C. and Himera, and established the Carthaginian power firmly in the western part of Sicily, Segesta sank to the position of a dependent ally. In 397 it suffered a long siege from Dionysius of Syracuse, but at last was relieved by Himilco. In 307, however, the Greek arms had better success; Agathocles of Syracuse sold the inhabitants into slavery, after massacring 10,000 men, and changed the name of the city to Dicæopolis. But it soon recovered its old name and passed again to the Carthaginians. In the beginning of the First Punic War the Segestans murdered the Carthaginian garrison and became allies of Rome. Being soon after besieged by the Carthaginians, they were relieved by the great naval victory of Duilius, 260 B.C. Segesta was always highly favored by the Romans, both on account of its early adhesion to their cause and from its supposed Trojan origin. Its site is now deserted, having been exposed to the Saracen depredations in the 10th century; but the ruins are very fine. Segesta was about 6 miles from the sea, and the modern town of Castellamare probably occupies the site of the ancient harbor. The Crimisus, which is represented on coins of Segesta, is probably the river S. Bartolommeo, about 6 miles to the south. There were hot springs and baths not far from the city.

SEGOVIA, a province of Spain, formerly a part of Old Castile, is bounded on the N. and N.E. by the provinces of Burgos and Soria, on the S.E. by those of Guadalajara and Madrid, on the S.W. by Avila, and on the N.W. by Valladolid. It has an area of 2670 square miles, and the population in 1877 was 149,961. The greater portion of the country consists of a dry arable tableland, lifted some 2500 feet above the sea, monotonous enough in appearance, and burnt to a dull brown during summer, but yet producing some of the finest corn in the Peninsula. Along the whole southeastern boundary the Guadarrama range of mountains rises up suddenly, like a huge barrier, separating Old from New Castile and the basin of the Douro from that of the Tagus,—affording, too, among its ravines and upon its slopes some remarkably fine scenery. There are two well-known passes or "puertos" over the sierra, those of the Nava Cerrada and of Somosiera. The former has been, until quite a recent date, the chief means of communication with the outer world, save when blocked by winter snows. It winds round the lower southern slope of the Peñalara (8500 feet). The Puerto de Somosiera lies north of the Peñalara. By it in 1808 Napoleon descended upon Madrid. Though to the eye of the stranger almost desert-like in appearance, the province of Segovia is

[1] The contents of this Nestorian inscription, which consists of 1780 characters, may be described as follows. (1) An abstract of Christian doctrine of a vague and figurative kind. (2) An account of the arrival of the missionary Olopun (probably a Chinese form of Rabban=Monk), from Tats'in in the year 635, bringing sacred books and images; of the translation of the said books; of the imperial approval of the doctrine and permission to teach it publicly. Then follows a decree of the emperor (T'ait-sung, a very famous prince), issued in 638, in favor of the new doctrine, and ordering a church to be built in the square of justice and peace (*Ining Fang*) in the capital. The emperor's portrait was to be placed in this church. After this comes a description of Tats'in, and then some account of the fortunes of the church in China. Kaoutsung (650–683, the devout patron also of the Buddhist traveller and doctor, Hwen Ts'ang), it is added, continued to favor the new faith. In the end of the century Buddhism got the upper hand, but under Yuen-tsung (713–755) the church recovered its prestige, and Kiho, a new missionary, arrived. Under Tih-tsung (780–783) the monument was erected, and this part of the inscription ends with a eulogy of I-sze, a statesman and benefactor of the church. (3) Then follows a recapitulation of the above in octosyllabic verse. The Chinese inscription, which concludes with the date of erection, viz., 781, is followed by a series of short inscriptions in Syriac and the *Estrangelo* character, containing the date of the erection, the name of the reigning Nestorian patriarch, Mar Hanan Ishua, that of Adam, bishop and pope of China, and those of the clerical staff of the capital. Then follow sixty-seven names of persons in Syriac characters, most of whom are characterized as priests, and sixty-one names of persons in Chinese, all priests but one.

[2] See Yule, *Marco Polo*, London, 1875; Williamson, *Journeys in North China*, London, 1870; and S. Wells Williams, *The Middle Kingdom*, London, 1883.

well watered by the streams which rise in the Guadarrama range and flow northwards to the Douro, and by careful methods of irrigation. The Eresma, Cega, Duraton, and Riaza are the principal watercourses. With the exception of Segovia and Sepulveda, there is no town of any importance,—the inhabitants being for the most part employed in agricultural and pastoral pursuits and backward in civilization. Since the completion (1883) of the railway from Medina del Campo to the city of Segovia, however, the towns *en route* have begun to show signs of animation; and, as the province contains monuments of deepest interest to the historian and ecclesiologist, it bids fair to receive its due measure of attention and enlightenment. At the foot of the Nava Cerrada pass lies the royal demesne and summer residence of La Granja, or San Ildefonso, one of the great show places of the Peninsula. The chief trades and manufactures formerly carried on in the province—weaving, tanning, making of earthenware, etc.,—have been drawn away to more commercial centres. Paper-making holds its own to some extent, owing to the excellence of the water; and for the same reason, together with the superior quality of the breed of sheep, the picturesque scenes attendant upon the preparation of the fleeces may still be witnessed. Such prosperity, however, as Segovia retains is dependent upon its agricultural produce—wheat, rye, barley, peas, hemp, flax, etc.—together with the rearing of sheep, cattle, mules and pigs. The sierras yield excellent granite, marble, and limestone; but hitherto the difficulty of transport has prevented any development of mineral wealth.

SEGOVIA, the capital of the above province, clusters upon a narrow ridge of rock which rises in the valley of the Eresma, where this river is joined by its turbulent little tributary the Clamores, and is one of the best specimens extant of the Gotho-Castilian cities. Founded originally as a Roman pleasure resort, it became in the Middle Ages a great royal and religious centre, and was surrounded by Alphonso VI. with the walls and towers which still give to it, even in their dilapidation, the air of a military stronghold. The streets are steep, irregular, and narrow, and are lined with quaint old-fashioned houses as irregular and forbidding, built for the most part of granite from the neighboring sierra. The place teems with records and monuments of the many vicissitudes of fortune and art through which it has passed, foremost among the latter being the ancient Alcázar, the cathedral, the aqueduct of Trajan, and a notable array of churches and other ecclesiastical edifices. The Alcázar is perched upon the western tip of the long tongue of rock upon which the city is built, and which at this point has a sheer descent upon three sides into the valley. Of the original Middle-Age fortress but little remains save the noble façade,—the building having been wantonly fired in 1862 by the students of the artillery school then domiciled within its walls, and all but destroyed. It is now in course of slow but praiseworthy restoration. The work is Gotho-Moorish, with an admixture of Renaissance in the decoration. Some of the rooms deserve notice, especially the Sala del Trono and the Sala de Recibimiento. The views obtained over the outlying *vega* from the towers and windows are superb. The 16th-century cathedral (1521–1577), the work of Juan Gil de Ontañon and his son Rodrigo, occupies the site of a former church of the 11th century, of which the present cloisters, rebuilt in 1524, formed part. It is a well-proportioned and delicate piece of Late Gothic—the latest of its kind in Spain—317 feet long by 177 wide. The central nave rises 99 feet and the tower 330. The exterior is the least satisfactory portion, at once bald and over-decorated; the interior is light and pure, with an effectiveness greatly enhanced by some very fine stained glass. The churches of Segovia are legion, though many of them are closed and fast falling into disrepair. The most remarkable are those of La Vera Cruz (Knights Templar, Romanesque of the early 13th century), San Millan and San Juan (both Romanesque of the second half of the 13th century), El Parral (Gothic of early 16th century), and Corpus Christi, an ancient Jewish sanctuary and an interesting specimen of Moorish work. The towers and external cloistering, or *corredores*, of several of the later churches—especially those of San Estéban and San Martin—are fine. The great aqueduct, however, called El Puente del Diablo, ranks usually as the glory of Segovia, and is remarkable alike for its colossal proportions, its history, its picturesqueness, and the art with which it is put together. Erected first, according to fairly reliable tradition, in the time of the emperor Trajan, and several times barely escaping destruction, it is now, after nearly eighteen hundred years, in perfect working order, bringing the pure waters of the Rio Frio down from the Sierra Fonfria, distant 10 miles to the south. The bridge portion striding across the valley into the city is 847 yards long, and consists of a double tier of superimposed arches, built of rough-hewn granite blocks, laid without lime or cement. The three centre arches are 102 feet in height. Segovia finally lost its ancient prosperity when it was taken and sacked by the French in 1808. Some insignificant manufactories of cloth, leather, paper, and rude earthenware still exist in the suburb of San Lorenzo, but the trade of the place languishes year by year. The city is the see of a bishop, suffragan to Valladolid. The population in 1877 was 11,318.

SEIGNORY, or SEIGNIORY, is the relation of the lord of a fee or a manor to his tenant. There is no land in England without its lord: "Nulle terre sans seigneur" is the old feudal maxim. Where no other lord can be discovered the crown is lord as lord paramount. The principal incidents of a seignory were fealty and rent-service. In return for these privileges the lord was liable to forfeit his rights if he neglected to protect and defend the tenant or did anything injurious to the feudal relation. Every seignory now existing must have been created before the Statute of *Quia Emptores*, which forbade the future creation of estates in fee-simple by subinfeudation (see REAL ESTATE). The only seignories of any importance at present are the lordships of manors. They are regarded as incorporeal hereditaments, and are either appendant or in gross. A seignory appendant passes with the grant of the manor; a seignory in gross—that is, a seignory which has been severed from the demesne lands of the manor to which it was originally appendant—must be specially conveyed by deed of grant.

SEINE. This, one of the chief rivers of France (Lat. *Sequana*), rises on the eastern slope of the plateau of Langres, 18 miles to the northwest of Dijon. It keeps the same general direction (northwestwards) throughout its entire course, but has numerous windings: between its source and its mouth in the English Channel the air distance is only 250 miles, but that actually traversed (through the departments of Côte-d'Or, Aube, Seine-et-Marne, Seine-et-Oise, Seine, Eure, and Seine-Inférieure) is 482. Though shorter than the Loire and inferior in volume to the streams of the Rhone system when these are at their fullest, the Seine derives an exceptional importance from the regularity of its flow. This feature is due to the geological character of its basin, an area of 19,400,000 acres, entirely belonging to France (with the exception of a few communes in Belgium), and formed in three-fourths of its extent of permeable strata, which absorb the atmospheric precipitation to restore it gently to the river by perennial springs. It is believed that the Seine never attains a volume so high as 90,000 cubic feet per second. At Paris its average per second is 9000, and after it has received all its tributaries it ranges between 24,000 and 25,000 cubic feet. At Paris it falls as low as 2650 cubic feet and in exceptional droughts the figure of 1200 has

been reached. During the flood of 1876, which lasted fifty-five days, the volume between the quays at Paris rose to 58,600 cubic feet per second.

Rising at a height of 1545 feet above sea-level, at the base of the statue of a nymph erected on the spot by the city of Paris, the Seine is at first such an insignificant streamlet that it is often dry in summer as far as to Chatillon (722 feet.) At Bar (531 feet) its waters feed the Haute-Seine Canal, so that there is uninterrupted navigation from this point to the sea (395 miles). At Troyes it has descended to 331 feet. It next passes Méry, and at Marcilly receives the Aube (right), from which point it becomes navigable; here it is deflected in a southwesterly direction by the heights of La Brie, the base of which it skirts past Nogent and Montereau, at the latter point receiving the Yonne, its most important left-hand tributary. It then resumes its general northwesterly direction, receiving the Loing (left) at Moret, then passing Melun (121 feet), being joined at Corbeil by the Essonne (left), and after its junction with the Marne (right), a tributary longer than itself by 31 miles, reaches Paris. From this point to the sea its channel has been so deepened by recent works that vessels of 9 to 10 feet draught can reach the capital. The river then winds through a pleasant champaign country past St. Cloud, St. Denis, Argenteuil, St. Germain, Conflans (where it is joined from the right by the Oise, 56 feet above the sea), Poissy, Mantes, Les Andelys, and Poses, where the tide first begins to be perceptible. It next receives the Eure (left), and passes Pont de l'Arche, Elbeuf, and Rouen, where the sea navigation commences. The river has been dyked to Rouen so as to admit vessels of 20 feet draught, and large areas have thus been reclaimed for cultivation.[1] At every tide there is a "bore" (*barre or mascaret*), ranging usually from 8 to 10 feet. Between Rouen and the sea there are numerous windings, as in the neighborhood of Paris; after Caudebec and Quillebœuf (where the Rille is received from the left) the estuary begins, set with extensive sandbanks, between which flows a narrow navigable channel. At Tancarville (right) is the commencement of a canal to enable river boats for Havre to avoid the sea passage. The river finally falls into the English Channel between Honfleur on the left and Havre on the right. The Marne brings to the Seine the waters of the Ornain, the Ourcq, and the Morin; the Oise those of the Aisne; the Yonne those of the Armançon. The low elevation of the bounding hills has rendered it comparatively easy to connect the Seine and its affluents with adjoining river basins by means of canals. The Oise and Somme are connected by the Picardy or Crozat Canal, which in turn is continued to the Scheldt by means of the St. Quentin Canal and the Oise, and to the Sambre by that of Oise and Sambre. Between the Aisne and the Meuse is the Ardennes Canal, and the Aisne and the Marne are united by a canal which passes Rheims. The Marne has similar communication with the Meuse and the Rhine, the Yonne with the Saône (by the Burgundy Canal) and with the Loire (by that of Nivernais). The Seine itself is connected with the Loire by the Loing Canal dividing at Montargis into two branches,—those of Orleans and Briare.

SEINE, the department of France which has Paris as its chief town, was formed in 1790 of part of the province of Ile-de-France. It lies between 48° 44′ and 48° 58′ N. lat. and 2° 10′ and 2° 34′ E. long. and is entirely surrounded by the department of Seine-et-Oise, from which it is separated at certain parts by the Seine, the Marne, and the Bièvre. The area of the department is only 118,306 acres, and of this surface a seventh or a sixth is occupied by Paris; the suburban villages also are close together and very populous. In actual population (2,799,329 in 1881) as well as in density (23.7 persons per acre) it holds the first place. Flowing from southeast to northwest through the department, the Seine forms three links; on the right it receives above Paris the Marne, and below Paris the Rouillon, and on the left hand the Bièvre within the precincts of the city. The left bank of the Seine is in general higher than the right and consists of the Villejuif and Chatillon plateaus separated by the Bièvre; the highest point (568 feet) is above Chatillon and the lowest (105) at the exit of the Seine. Below Paris the river flows between the plain of Gennevilliers and Nanterre (commanded by Mont Valérien) on the left and the plain of St. Denis on the right. On the right side, to the east of Paris, are the heights of Avron and Vincennes commanding the course of the Marne. Communication is further facilitated by various canals (see PARIS).

Market gardens occupy about 3700 acres within and without the city, and by means of irrigation and manuring are made to yield from ten to eleven crops per annum (see PARIS). Some districts are specially celebrated,—Montreuil for its peaches, Fontenay-aux-Roses for its strawberries and roses, and other places for flowers and nurseries. The department produced in 1883, 326,326 bushels of wheat, 4042 of meslin, 75,003 of rye, 3415 of barley, 337,837 of oats, 1,656,009 of potatoes, 14,650 of pulse, and 15,400 tons of beetroot. Altogether, 60,000 persons are engaged in agriculture. The live stock in 1881 comprised 95,796 horses (70,296 in Paris), 4174 cattle, 280 calves, 8159 sheep, 3626 pigs, and 660 goats. Vineyards producing 366,748 gallons of wine annually, cover 2460 acres. The principal woods (Boulogne and Vincennes) belong to Paris. It is partly owing to the number of quarries in the district that Paris owes its origin; Chatillon and Montrouge in the south yield freestone, and Bagneux and Clamart in the south and Montreuil and Romainville in the east possess the richest plaster quarries in France. Within the circuit of Paris are certain old quarries now forming the catacombs. Most of the industrial establishments in the department are situated in Paris or at St. Denis. Pantin (17,857 inhabitants in 1881) on the Ourcq Canal is the seat of a national factory of tobacco, and also of glass-works, and Aubervilliers (19,437) on the St. Denis Canal is the seat of great chemical works. Along the Seine, below Paris, Boulogne (25,615) is partly occupied by laundry establishments; Puteaux (15,586) manufactures woollen goods, and has dye-works, printing works, cloth-dressing works, and engineering works of considerable importance; Clichy (24,320) manufactures crystal and has a large gaswork, etc. Above Paris, Ivry (18,442) has iron-works and engineering works; Choisy-le-Roi (6978) has factories for the making of porcelain, glass, soda, chemicals, morocco, and waxcloth; Montreuil (18,693), near Vincennes, makes patent leather, porcelain, etc. The department is of course traversed by all the railway lines which converge in Paris, and also contains the inner circuit railway and part of the outer circuit,—making a total of 122 miles of railway, to which are to be added numerous tramways, 72 miles of national roads, and 458 of other roads. There are 3 arrondissements (Paris, St. Denis, and Sceaux), 28 cantons (20 in Paris), and 72 communes. The department forms the archiepiscopal diocese of Paris, falls within the jurisdiction of the Paris court of appeal, and is divided between the four *corps d' armée* of Amiens, Rouen, Le Mans, and Orleans. Among the important institutions in the department are the lyceums of Vanves and Sceaux, the lunatic asylum at Charenton, the veterinary college of Maisons-Alfort, and the great Bicêtre hospital at Gentilly.

SEINE-ET-MARNE, a department of northern France, was formed in 1790 of almost the entire district of Brie (half of which belonged to Champagne and half to Ile-de-France) and a portion of Gâtinais (from Ile-de-France and Orléanais). Lying between 48° 7′ and 49° 6′ N. lat. and 2° 23′ and 3° 13′ E. long., it is bounded N. by the departments of Oise and Aisne, E. by Marne and Aube, S. by Yonne and Loiret, and W. by Seine-et-Oise. The whole department belongs to the basin of the Seine, and is drained partly by that river and partly by its tributaries the Yonne and the Loing from the left, and from the right the Voulzie, the Yères, and the Marne, with its affluents the Ourcq, the Petit Morin, and the Grand Morin. With the exception of the Loing, flowing from south to north, all these streams cross the department from east to west, following the general slope of the surface, which is broken up into several plateaus from 300 to 500 feet in height (highest point, in the northeast, 705 feet, lowest 105), and separated from each other by deep valleys. Most of the plateaus belong to the Brie, a fertile and well-wooded district of a clayey character. In the southwest lies the dry sandy district of the Fontainebleau sandstones. The climate is rather more "continental" than that of Paris,—the summers warmer, the winters colder; the annual rainfall does not exceed 16 inches. There is a striking difference between the south of the department, where the

[1] Comp. RIVER ENGINEERING, vol. xx. p. 594; see also the valuable paper "The River Seine," in *Proc. Inst. Civ. Eng* vol. lxxiv., 1886, by L. F. Vernon-Harcourt.

famous white grape (*chasselas*) of Fontainebleau ripens, and the country to the north of the Marne,—this river marking pretty exactly the northern limit of the vine.

With a total area of 1,417,534 acres, Seine-et-Marne had in 1879 261,074 under wheat, 274,808 under oats, 53,362 under beetroot, 51,130 under vines. Besides these, meslin, rye, barley, pulse, potatoes are the principal crops grown. In 1884 the yield was 6,567,547 bushels of wheat, 231,959 of meslin, 665,505 of rye, 471,251 of barley, 9,104,254 of oats, 3,035,167 of potatoes, 924,210 tons of beetroot, and 401,427 tons of green fodder (lucerne, clover, sainfoin, etc.). The live stock in 1879 included 40,400 horses, 5190 asses, 522,700 sheep (173,290 superior breed), 101,100 cattle, 16,840 pigs, 3714 goats, and 11,440 beehives (75 tons of honey, 15 of wax). Cereals occupy two-fifths of the department and yield an annual value of £2,400,000 [$11,664,000], while all other products of the soil do not reach £1,600,000 [$7,776,000]. The wheat and oats of Brie are especially esteemed, as are also the white grapes of Fontainebleau and the roses of Provins (see vol. xix. p. 911). Thousands of the well-known Brie cheeses are manufactured, and large numbers of calves and poultry are reared. The forests (covering a fifth of the surface) are planted with oak, beech, chestnut, hornbeam, birch, wild cherry, linden, willow, poplar, and conifers. Best known and most important is the forest of Fontainebleau, the annual product of which is worth £14,000 [$68,040]. Excellent freestone is quarried in the department, especially in the valley of the Loing, mill-stones at La Ferté-sous-Jouarre; the Fontainebleau sandstone, used extensively for pavements, gives employment to 300 establishments, and the white sand which is found along with it is in great request for the manufacture of glass. Along the Marne are numerous plaster-quarries; lime-kilns occur throughout the department; and peat is found in the valleys of the Ourcq and the Voulzie. Beds of common clay and porcelain clay supply the potteries of Fontainebleau, and especially those of Montereau, where upwards of 700 hands are employed. Other industrial establishments are the numerous large flour-mills, the sugar-factories, beetroot distilleries, paper-mills (the Marais paper-mill manufactures bank-notes, etc., both for France and foreign markets), saw-mills, foundries, printing works, tanneries, tawing works, glove factories, chemical works, etc. Most of the motive-power used in these establishments is supplied by the streams. The Seine, the Yonne, the Marne, and the Grand Morin are navigable, and, with the canals of the Loing and the Ourcq and those of Chalifert, Cornillon, and Chelles, which cut off the windings of the Marne, form a total waterway of 219 miles. There are 242 miles of railway. With its 348,991 inhabitants in 1881, Seine-et-Marne is in density of population slightly below the average of France. It has 5 arrondissements, 29 cantons, 530 communes, forms the diocese of Meaux, belongs to the jurisdiction of the Paris court of appeal, and to the district of the Orleans *corps d'armée*. Among the places of note in the department, Montereau (7107 inhabitants in 1881), distinguished as Montereau-faut-Yonne because of its situation at the confluence of the Yonne with the Seine, deserves to be mentioned not only for its porcelain manufacture but also as a great railway station on the route from Paris to Lyons at the junction of the Troyes line, as the scene of the assassination of John the Bold, duke of Burgundy, and as one of the battlefields of Napoleon I. in the campaign of 1814. Its church is an historical monument of the 13th, 14th, 15th, and 16th centuries. A statue of Napoleon stands between the two bridges.

SEINE-ET OISE, a department of northern France, formed in 1790 of part of the old province of Ile-de-France, and traversed from southeast to northwest by the Seine, which is joined by the Oise from the right. Lying between 48° 17′ and 49° 14′ N. lat. and 1° 27′ and 2° 37′ E. long., it is surrounded by the departments of Seine-et-Marne on the east, Loiret on the south, Eure-et-Loir on the west, Eure on the northwest, and Oise on the north. It encloses the department of Seine. The Epte on the northwest is almost the only natural boundary of the department. The streams (all belonging to the basin of the Seine) are, on the right the Yères, the Marne, the Oise, and the Epte, and on the left the Essonne (joined by the Juine, which passes by Étampes), the Orge, the Bièvre, and the Mauldre. Seine-et-Oise belongs in part to the tableland of Beauce in the south and to that of Brie in the east. In the centre are the high wooded hills which make the charm of Versailles, Marly, and St. Germain. But it is in the northwest, in the Vexin, that the culminating point of 690 feet is reached, while the lowest point, where the Seine leaves the department, is hardly 40 feet above the sea. The mean temperature is 51° Fahr.

Of the 1,384,695 acres 912,205 are arable soil, 50,330 meadows, 42,852 vineyards, and 199,864 woods. In 1881 the live stock comprised 48,540 horses, 5626 asses, 162 mules, 70,600 cattle, 341,600 sheep (wool-clip, 1110 tons), 16,200 pigs, 4500 goats, and 13,500 beehives. Seine-et-Oise is a great agricultural and horticultural department. The crops in 1883 were—wheat, 5,817,858 bushels; meslin, 353,127; rye, 1,034,572; barley, 641,894; oats, 8,705,193; buckwheat, 3800; potatoes, 6,479,000; beetroot for sugar 206,645 tons, and for fodder 237,915; colza seed, 415 tons; hay, 48,242; clover, 13,505; lucerne, 140,354; sainfoin, 57,283. Oaks, hornbeams, birch, chestnuts are the prevailing trees in the forests, most of which belong to the state. Building, paving, and mill stones (1978 workmen), lime, plaster, marl, chalk, sand, clay, and peat (along the Essonne) are all found in the department. At Enghien are cold mineral springs, and Forges has a hydropathic establishment, where the town of Paris maintains a hospital for scrofulous children. The most important industrial establishments are the national porcelain factory at Sèvres; the Government powder-mills at Sevran and Bouchet; the paper-mills and cardboard mills (1570 workmen) of Corbeil (population 6566 in 1881), Étampes (7465), and Pontoise (6675), but by far the largest is at Essonne (4999); the flax-spinning mills (6368 spindles), cotton-mills (17,830 spindles), silk-mills (5726), wool-mills (8890); the foundries and boat and bridge building yards at Argenteuil (10,167); the engineering and railway roads at Corbeil, etc.; the agricultural implement factories at Dourdan (2819); the sugar-refineries with thousands of workmen; distilleries on most of the large farms; starch-works, laundries, large printing establishments close to Paris; factories for chemical products, candles, embroidery, hosiery, perfumery, shoes, and buttons; one of the finest zinc-works in France; saw-mills, etc. Besides the navigation of the Seine, the Marne, the Oise, and the Canal d'Ourcq, the department has 420 miles of railroad, 457 of national roads, and 3958 of other roads. The population of the department in 1881 was 577,798 inhabitants (one and a half times the average density of the French departments). There are 6 arrondissements, 37 cantons, and 686 communes; the department forms the diocese of Versailles, is divided between the *corps d'armée* of Amiens, Rouen, Le Maus, and Orleans, and has its court of appeal at Paris. The commune of Argenteuil (11,849 inhabitants) is not only important for its manufactures but also for its market gardens (asparagus, figs, grapes, etc.); and its church, rebuilt in the 19th century in the Romanesque style, is a fashionable place of pilgrimage.

SEINE INFÉRIEURE, a department of the north of France, formed in 1790 of four districts (Norman Vexin, Bray, Caux, and Roumois) belonging to the province of Normandy. Lying between 49° 15′ and 50° 4′ N. lat. and 1° 52′ and 0° 4′ E. long., it is bounded N.W. and N. by the English Channel for a distance of 80 miles, N.E. by Somme, from which it is separated by the Bresle, E. by Oise, S. by Eure and the estuary of the Seine, which separates the department from Calvados. It is divided almost equally between the basin of the Seine in the south and the basins of certain coast streams in the north. The Seine receives from the right hand before it reaches the department the Epte and the Andelle from the Bray district, and then the Darnétal, the Cailly, the Austreberte, the Bolbec, and the Lézarde. The main coast streams are the Bresle (which forms the ports of Eu and Tréport), the Yères, the Arques or Dieppe stream (formed by the junction of the Varennes, the Béthune, and the Eaulne), the Scie, the Saane, the Durdent. As a whole the department may be described as an elevated plateau culminating towards the east in a point 807 feet above the sea and terminating along the Seine in high bluffs and towards the sea in steep chalk cliffs 300 to 400 feet high, which are continually being eaten away and transformed into beds of shingle. There is no striking line of parting between the basins of the Seine and the Channel, but deep valleys have been hollowed out by the streams.

The Bray district in the southeast is a broad valley of denudation formed by the sea as it retired, and it is traversed by smaller valleys and covered with excellent pasture. In the comparatively regular outline of the coast there are a few breaks, as at Tréport, Dieppe, St. Valery-en-Caux, Fécamp, and Havre, the Cap de la Hève, which commands this last port, and Cape Antifer, 12 or 13 miles further north. Tréport, Dieppe, Veules, St. Valery, Fécamp, Yport, Etretat, and Ste. Adresse (to mention only the more important) are fashionable watering-places with the Parisians. The winters are not quite so cold nor is the summer so hot as in Paris, and the average temperature of the year is higher. The rainfall is 24 inches per annum, increasing from Rouen to Dieppe as the sea is approached.

With a total area of 1,491,458 acres, Seine Inférieure has 911,938 acres of arable ground, 151,125 of wood, 99,703 grass, 32,977 moorland and pasturage. Out of a total population of 814,068 in 1881 those dependent on agriculture numbered 233,536. The live stock in the same year comprised 81,561 horses of good breeds, 1421 asses, 125 mules, 236,493 cattle, 259,677 sheep of ordinary kinds and 27,523 of special breeds (wool-clip, 560 tons), 78,186 pigs, 3341 goats, 13,202 beehives (54 tons of honey and 13 of wax . Milch cows are kept in great numbers, and Gournay butter and Gournay and Neufchâtel cheese are in repute. The farms of the Caux plateau are each surrounded by an earthen dyke, on which are planted forest trees, generally beech and oak. Within the shelter thus provided apple and pear trees grow, which produce the cider generally drunk by the inhabitants (38,602,036 gallons in 1883). The other crops in 1883 were—wheat, 6,667,650 bushels; meslin, 59,950; rye, 654,489; barley, 443,751; oats, 7,017,609; potatoes, 2,954,457; pulse, 98,736; beetroot for sugar, 28,837 tons, and for fodder 118,099; colza seed, 29,076 tons; and 457,047 tons of ordinary fodder. In general the department is fertile and well cultivated. Along the Seine fine meadow-land has been reclaimed by dyking; and sandy and barren districts have been planted with trees, mostly with oaks and beeches, and they often attain magnificent dimensions, especially in the forest of Arques and along the railway from Rouen to Dieppe; *Pinus sylvestris* is the principal component of the forest of Rouvray opposite Rouen. With the exception of a little peat and a number of quarries, employing 745 workmen, Seine Inférieure has no mineral source of wealth; but manufacturing industry is well developed. Rouen is the chief centre of the cotton-trade, which is in the department represented by 190 spinning and weaving factories, employing 22,947 hands, 1,400,000 spindles, 14,000 power-looms, and 4000 hand-looms, and working up 30,000 tons of cotton annually. Hand-loom weaving, carried on throughout the country districts, employs 18,000 looms; in the branch of the cotton trade known as *rouennerie* 190 manufacturers are employed, producing to the value of £2,400,000 [$11,664,000] per annum; in that of the *indiennes* 20 establishments with 5000 workpeople turn out yearly 1,000,000 pieces of 115 yards each. There are 22 establishments for dyeing cotton cloth with 700 workmen, and for dyeing cotton yarn 32 establishments with 1200 workmen. The woollen manufacture, of which Elbeuf is the centre, employs 24,000 workmen and produces goods valued at about £3,500,000 [$17,010,000], with raw material valued at £1,720,000 [$8,359,200], mainly imported from Australia and partly from the La Plata ports. The wool-spinning mills (at Elbeuf and Darnétal) have 92,000 spindles, and there are 650 power-looms and 3800 hand-looms. At Elbeuf (22,883 inhabitants in 1881) there are 17 dyeworks, 50 twist factories, a manufactory of carding machines, and 45 cloth-dressing factories. About 18,000 spindles are employed in flax-spinning, an industry more widely distributed throughout the department. Engineering works, foundries, and iron shipbuilding yards occur at Havre (population 105,540 in 1881) and Rouen (105,860). Wooden ships are also built at Havre, Rouen, Dieppe (21,585), and Fécamp (11,919). Other establishments of importance are the national tobacco-factories at Dieppe (1100 hands) and Havre (580 hands), sugar-refineries (£1,440,000 [$6,998,400] worth of sugar in 1881), glass-works (873 workmen), soap-works, chemical-works, candle-factories, flour-mills, oil-factories, ivory-works, lace-works, clock-factories, etc. The total number of industrial establishments in the department is 975; and it is estimated that 305,460 persons depend on industrial pursuits. The fisheries are a great resource for the inhabitants of the seaboard. Fécamp sends yearly £100,000 [$486,000] worth of cod and £80,000 [$388,800] worth of herrings, mackerel, etc., into the market; Dieppe has the supplying of Paris with fresh fish; St. Valery sends its boats as far as Iceland. The principal ports for foreign trade are Havre, Rouen, and Dieppe. There are 364 miles of railway, 370 of national roads, 6543 of other roads, 98 of Seine navigation, and the Bresle is canalized for 2 miles. In population Seine Inférieure stands fourth in the list of French departments; it has consequently been proposed to divide it into the two departments of Seine Inférieure and Seine Maritime. The density of population is double the average of France. There are 5 arrondissements, 51 cantons (of which 3 are in Havre and 6 in Rouen), and 759 communes. The department forms the archbishopric of Rouen; the court of appeal and the headquarters of the *corps d'armée* are also in that city. Places of importance are Elbeuf; Fécamp, a fishing port, with sea-bathing, distilling, etc.; Bolbec (10,226 inhabitants), with weaving and spinning factories; and Eu (4827 inhabitants), with a celebrated castle belonging to Louis Philippe and the Orleans family.

SEISIN. "Seisin of the freehold may be defined to be the possession of such an estate in land as was anciently thought worthy to be held by a free man" (Williams, *On Seisin*, p. 2). Seisin is now confined to possession of the freehold, though at one time it appears to have been used for simple possession without regard to the estate of the possessor. (See Possession.) Its importance is considerably less than it was at one time owing to the old form of conveyance by feoffment with livery of seisin having been superseded by a deed of grant (see Real Estate), and the old rule of descent from the person last seised having been abolished in favor of descent from the purchaser. (See Inheritance.) At one time the right of the wife to dower and of the husband to an estate by curtesy depended upon the doctrine of seisin. The Dower Act, 3 and 4 Will. IV. c. 105, has, however, rendered the fact of the seisin of the husband of no importance, and the Married Women's Property Act, 1882, appears to have practically abolished the old law of curtesy. In the case of a conveyance operating under the Statute of Uses, seisin is deemed to be given by the effect of the statute. This constructive seisin may still be of importance where the question arises how long a person has been in actual possession. Thus in *Orme's Case* (Law Rep., 8 Common Pleas, 281) the right to a county vote depended upon the form of the conveyance of a rent-charge to the voter. If the conveyance had been under the statute, the claimant would have been seised for a sufficient time; the court, however, held that the conveyance was a common law grant, and that the grantee must have been in actual receipt of the rent in order to entitle him to be registered.

Primer seisin was a feudal burden at one time incident to the king's tenants *in capite*, whether by knight service or in socage. It was the right of the crown to receive of the heir, after the death of a tenant *in capite*, one year's profits of lands in possession and half a year's profits of lands in reversion. The right was abandoned by the Act abolishing feudal tenures (12 Car. II. c. 24).

In Scotch law the corresponding term is "sasine." Like seisin in England, sasine has become of little legal importance owing to recent legislation. By 8 and 9 Vict. c. 35 actual sasine on the lands was made unnecessary. By 21 and 22 Vict. c. 76 the instrument of sasine was superseded by the recording of the conveyance with a warrant of registration thereon. For the register of sasines, see Registration.

SEISMOMETER. This name was originally given to instruments designed to measure the movement of the ground during earthquakes. Recent observations have shown that, in addition to the comparatively great and sudden displacements which occur in earthquakes, the ground is subject to other movements. Some of these, which may be called "earth-tremors," resemble earthquakes in the rapidity with which they occur, but differ from earthquakes in being imperceptible (owing to the smallness of the motion) until instrumental means are used to detect them. Others, which may be called "earth-tiltings," show themselves by a slow bending and unbending of the surface, so

that a post stuck in the ground, vertical to begin with, does not remain vertical, but inclines now to one side and now to another, the plane of the ground in which it stands shifting relatively to the horizon. No sharp distinction can be drawn between these classes of movements. Earthquakes and earth-tremors grade into one another, and in almost every earthquake there is some tilting of the surface. The term "seismometer" may conveniently be extended (and will here be understood) to cover all instruments which are designed to measure movements of the ground.

Measurements of earth-movements are of two distinct types. In one type, which is applicable to ordinary earthquakes and earth-tremors, the thing measured is the displacement of a point in the earth's crust. In the second type, which is applicable to slow tiltings, the thing measured is any change in the plane of the earth's surface relatively to the vertical. Under EARTHQUAKE mention is made of instruments designed by Palmieri and others to register the occurrence of earthquakes, and in some cases to give a general idea of their severity. While some of those instruments act well as seismoscopes, none of them serve to determine with precision the character or the magnitude of the motion. In this article notice will be taken only of instruments intended for exact measurement.

Earthquake displacements are in general vertical as well as horizontal. For the purpose of measurement it is convenient to treat the vertical component separately, and in some cases to resolve the horizontal motion into two components at right angles to each other.

Inertia Method.—In the first type of measurements what may be called the "inertia" method is followed. A mass is suspended with freedom to move in the direction of that component of the earth's motion which is to be measured. When an impulse occurs the supports move, but the mass is prevented by its inertia from accompanying them. It supplies a steady point, to be used as a standard of reference in determining the extent through which the ground has moved in the direction in question. But, in order that the suspended mass shall not acquire motion when its supports move, one essential condition must be satisfied. Its equilibrium must be neutral, or nearly so, in order that, when the supports are displaced, little or no force may be brought into operation tending to bring the mass into the same position relative to the supports as it occupied before disturbance. This can be made plain by considering the case of a common pendulum hung from a support which is rigidly fixed to the ground. When the ground moves in any horizontal direction the pendulum's inertia causes a certain point in it (the centre of percussion) to remain for the instant at rest. But this contrivance does not yield a steady point, because the stability of the pendulum makes the bob swing down to recover its place directly under the support; and in fact, if a succession of oscillations of the ground occur, the bob acquires a motion often much greater than the motion of the support itself. This tendency may be corrected, and the pendulum made fit to act as a seismometer, by any contrivance which (without introducing friction) will reduce its stability so much as to make the equilibrium of the bob very nearly neutral. In all instruments designed to furnish a steady point the suspended mass must have some small stability, else it would be unmanageable; but its period of free oscillation must be much greater than that of the earthquake-motions which it is employed to measure. Even a simple pendulum can have its stability reduced sufficiently to fit it for seismometric work by making it very long. The same result is, however, much more conveniently achieved by combining a common pendulum with an inverted pendulum placed just beneath it. The common pendulum being stable and the inverted pendulum unstable, if the bobs are jointed so that they must move together, the combination can be made as nearly astatic as may be desired.[1] Figs. 1 and 2 illustrate how this combination is applied in seismometry. The stable bob *a*, hung from a fixed support above by three parallel wires, is connected with the inverted pendulum *b* by a ball-and-tube joint. A lever *c*, carried by a gimbal joint in the fixed bracket *d*, is geared also by a ball-and-tube joint to the upper bob. Its long arm carries a jointed index *e*, which projects out and touches a smoked-glass plate *f*, held on a fixed shelf. Any horizontal motion of the ground acts on the lever by the bracket *d*, and causes the index to trace a magnified record on the smoked-glass plate. Fig. 1 is taken from a photograph of an instrument of this kind, constructed to give a much magnified record

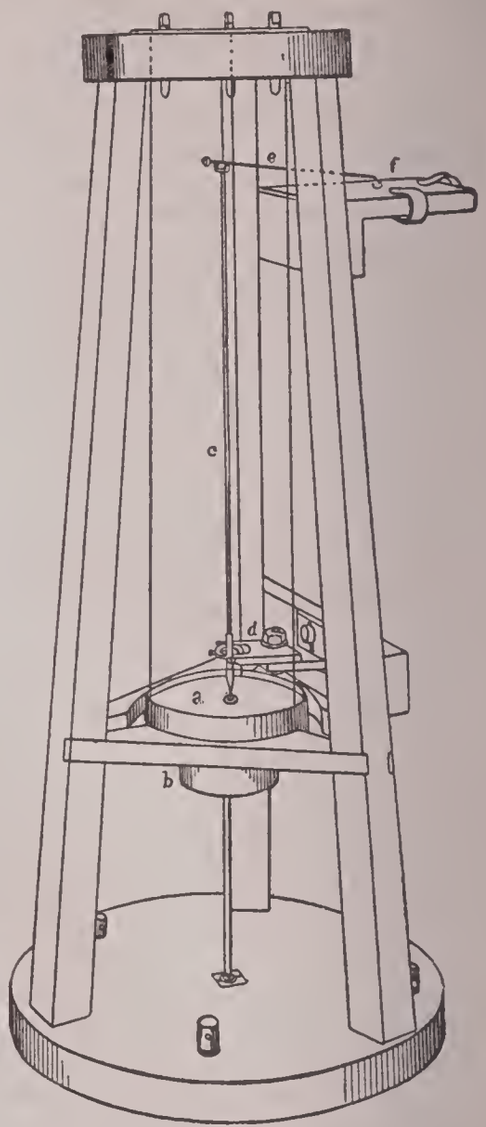


FIG. 1.—Duplex pendulum seismograph.

of small movements. When large earthquakes are to be recorded the multiplying lever is dispensed with, and the index is attached directly to one of the bobs. Observations with instruments of this class exhibit well the very complicated motion which the earth's surface undergoes during an earthquake. In small earthquakes (such as are only slightly or not at all destructive) the greatest amplitude of

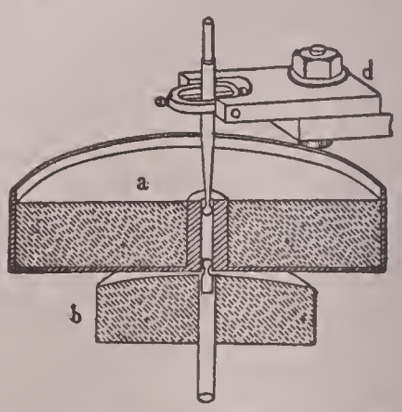


FIG. 2.—Duplex pendulum showing details.

motion is often less than a millimetre, and rarely more than a centimetre; the disturbance nevertheless consists of a multitude of successive movements, quite irregular in amplitude, period, and direction. Fig. 3 is a fac-simile of the record given by a duplex pendulum seismograph during one of the earthquakes which occur frequently in the

[1] J. A. Ewing, "A Duplex Pendulum Seismometer," in *Transactions of the Seismological Society of Japan*, vol. v., 1882, p. 89.

plain of Yedo, Japan. The record as engraved, is three and a half times the earth's actual motion. Instead of two pendulums, a single inverted pendulum has been used, with a spring stretched between it and a fixed support above. By adjusting the spring so that a proper proportion of the weight is borne by it and the remainder by the rigid stem of the pendulum, an approach to neutral equilibrium can be made.[1] In Forbes's inverted pendulum seismometer[2] a somewhat similar plan was adopted: the foot of the pendulum was attached to an elastic wire which tended to restore it to its normal vertical position when displaced.

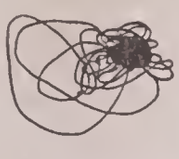


Fig. 3.—Record of earthquake motion.

Another group of instruments designed to furnish two degrees of freedom for the purpose of recording all motions in a horizontal plane, but much less satisfactory on account of their friction, is that in which a rolling sphere either itself supplies inertia or forms a support for a second inertia-giving mass. Probably the earliest was one used in Japan by Dr. G. F. Verbeck in 1876 (see Fig. 4). On a

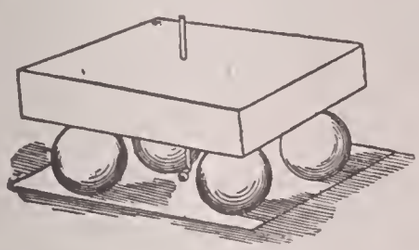


Fig. 4.—Rolling sphere seismograph.

marble table, ground plane and carefully levelled, four balls of rock-crystal were placed, carrying a massive block of hard wood. A pencil, sliding in a hole in the block, registered the relative motion of the table and the block on a sheet of paper fixed below. The motion registered is (or would be, if there were no friction) somewhat larger than the true motion of the table, for the system is kinetically equivalent to four upright pieces whose centres of percussion lie in a plane nearly, but not quite, as high as the tops of the balls. This forms what may be called the steady plane; its position depends on the relative masses of block and balls, and is easily calculated. When the ground moves in any direction the block moves through a short distance in the opposite direction, and the record is magnified in a fixed ratio. Various forms of rolling-sphere seismometers have been proposed by Mr. T. Gray,[3] Mr. C. A. Stevenson,[4] and others. Probably the best form would be that of a light spherical segment rolling on a level plane base and carrying a heavy bob fixed to it. To give some stability the bob should be placed so as to bring the centre of gravity a little under the centre of curvature. The centre of percussion, somewhat higher than this, would of course be the steady point, and a multiplying pointer might take the motion either from it or from any other convenient part of the rolling piece. All rolling seismometers —including rolling cylinders, which have been proposed by Mr. Gray as single-freedom instruments, to register one component of horizontal motion—fail to act well, partly because of the comparatively great frictional or quasi-frictional resistance which is presented to the motion of the free mass, and partly because, owing to imperfections in the construction and want of perfect rigidity in the materials, the ball or cylinder takes up a position in which there is an objectionably great stability as regards very small displacements. These objections make the use of rolling seismometers unadvisable, except perhaps for the rough measurement of violent earthquakes.

The seismographs which have been described draw a horizontal plan of the path pursued during an earthquake by a point on the earth's surface. They take no note of the relation of the displacement to time,—an element which is required if we are to form any estimate of the violence of an earthquake from the record. With this view a different method of registration is also followed. The whole movement is resolved into rectilinear components, and these are separately recorded (by single-freedom seismometers) on a plate or drum which is kept in continuous movement, so that the record of each component takes the form of an undulating line, from which the number, succession, amplitude, velocity, and acceleration of the component movements can be deduced and the resultant motion determined. A single steady mass with two degrees of freedom may still be employed to record, separately, two components of horizontal motion; but it is generally preferable to provide two distinct masses, each with one degree of freedom. The principal instrument of this class is the horizontal pendulum seismograph,[5] which has been used to record Japanese earthquakes since 1880. It consists of two horizontal pendulums, set at right angles to each other, each supplying a steady point with respect to horizontal motions transverse to its own length. Each pendulum is pivoted about two points, on an axis which is nearly vertical, but inclined slightly forwards to give a suitable degree of stability. In some forms of the instrument the pivoted frame of the pendulum is light, and the inertia is practically all furnished by a second piece or bob pivoted on the frame about a vertical axis through the centre of percussion of the frame. This construction has the advantage of compactness and of making the position of the steady point at once determinate. But a simpler construction is to attach the bob rigidly to the frame. This shifts the steady point a little way outwards from the position it would have if the bob were pivoted. In either construction a prolongation of the pendulum beyond the bob forms a convenient multiplying index. Fig. 5 shows a complete horizontal pendulum seismograph (with pivoted bobs).

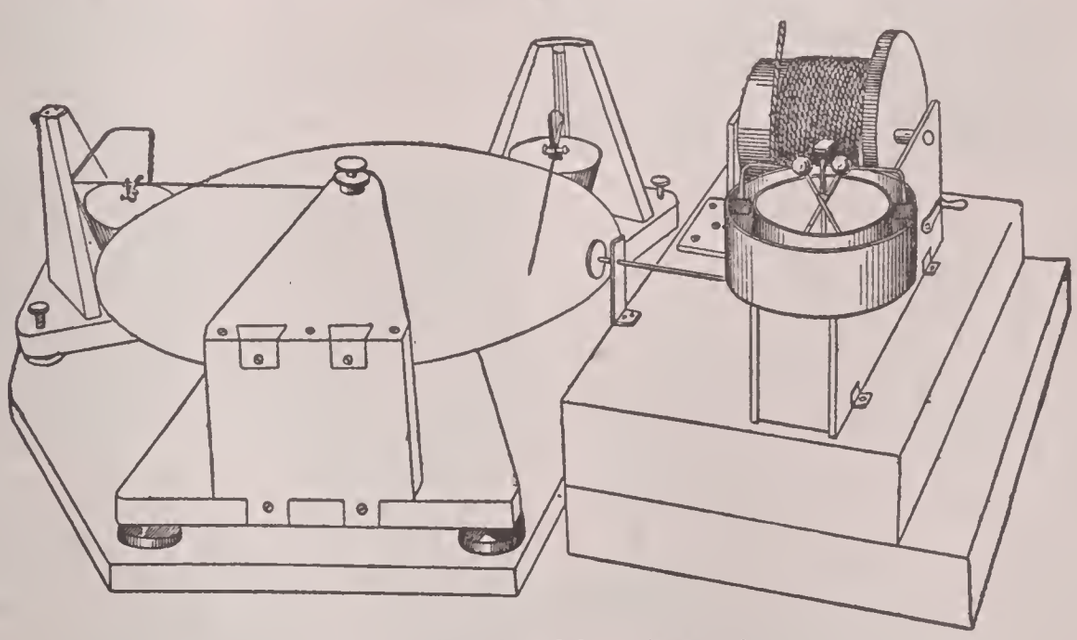


Fig. 5.—Horizontal pendulum seismograph.

[1] Ewing, "A Duplex Pendulum with a Single Bob," in *Trans. Seis. Soc. Jap.*, vol. vi., 1883, p. 19.
[2] *Report of Brit. Assoc.*, 1841, p. 47, or *Trans. R. S. E.*, xv. p. 219.
[3] Gray, *Phil. Mag.*, September, 1881.
[4] Stevenson, *Trans. Roy. Scot. Soc. of Arts*, February, 1882.
[5] Ewing, "On a New Seismograph," in *Proc. Roy. Soc.*, No. 210, 1881, or *Trans. Seis. Soc. of Japan*, December, 1880.

Two rectangular components of earthquake motion are recorded radially on a revolving plate of smoked glass, which receives its motion through a friction roller from a clock furnished with a fluid-friction centrifugal governor. The clock may either be kept going continuously, in expectation of an earthquake at any moment, or be started into motion by an electric seismoscope when the earliest indications of an earthquake are felt. The former plan is practicable only when the instrument can receive careful attendance and where earthquakes occur often. It has the drawback that the circle which is drawn by each pointer as the plate revolves below it gradually broadens, partly because of warping and temperature changes in the supports and partly because of actual tilting of the ground. As an earthquake generally begins with comparatively insignificant movements, there is not much to object to in having the plate at rest to begin with, provided a sufficiently sensitive starting seismoscope be used. A suitable arrangement for this purpose is one due to Palmieri: a short pendulum hangs over a cup of mercury, in the centre of which a depression is formed by an iron pin, whose top is a little lower than the surface of the mercury. The pendulum ends in a platinum point, which stands clear in the centre of this depression, but touches the edge whenever a horizontal movement of the ground takes place, thereby closing the circuit of an electro-magnet, which starts the clock. In the most recent form of the horizontal pendulum seismograph the bobs are fixed to the pivoted frames, and the pointers are arranged to trace their records side by side. Records with instruments of this class, besides giving much additional information, agree with those of the duplex pendulum in showing that earthquake motion is a tangle of waves in all azimuths. This will be seen by reference to Fig. 6, which shows a small portion of an

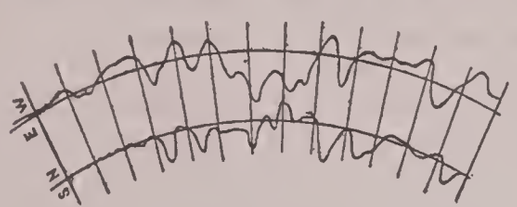


Fig. 6.—Record of earthquake by horizontal pendulum seismograph; one-third full size.

earthquake registered by a pair of horizontal pendulums. Contemporary parts of the two records are shown together, the straight radial lines marking seconds of time. The phases of the two components are continually changing, and when the two are compounded the result is a path having the same characteristics as those of the diagram in Fig. 3. Fig. 7 gives the result of compounding the records

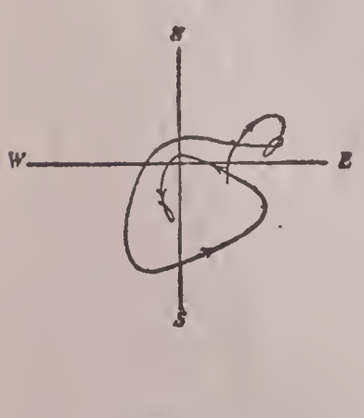


Fig. 7.

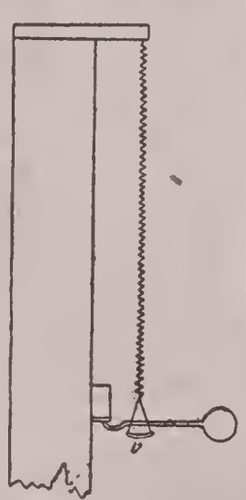


Fig. 8.

Fig. 7.—Result of compounding the record of Fig. 6.
Fig. 8.—Principle of vertical motion seismograph.

of Fig. 6 during three seconds, while the range of movement was a maximum.

To register the vertical component of earthquake motions we require to suspend a mass with vertical freedom. Most ways of doing this give too much stability, as, for instance, when a weight is hung from a spiral spring or carried by a horizontal bar that is fixed to a wall or table by a flexible spring joint. This last is the vertical motion seismometer which was used by the British Association Committee at Comrie in 1842. Another form, mechanically equivalent to this, is a weighted horizontal bar, pivoted on a fixed horizontal fulcrum, and held up by a spiral spring, stretched from a point near the fulcrum to a fixed support above. This mode of suspension is still too stable, though less so than if the spring were directly loaded. To make it nearly astatic Mr. T. Gray[1] proposed the use of a tube containing mercury, connected with the bar in such a manner that when the bar goes down the mercury, running towards one end of the tube, has the effect of increasing the weight, and when the bar goes up an opposite effect occurs. This plan is open to the objection that the mercury is disturbed by horizontal movements of the ground. A simpler plan is shown in Fig. 8.[2] There the pull of the spring is applied at a short distance v below the plane of the bar. Hence when the weight goes down the spring, which then pulls with more force, pulls with a smaller leverage, and it is easy to adjust the distance v so that the moment of the pull of the spring remains sensibly equal to the moment of the weight,—the condition necessary to make the bar astatic. This is secured when $v = \frac{h^2}{l}$, h being the horizontal distance from the fulcrum to the point at which the spring acts, and l the length by which the spring is stretched when the bar is undeflected. Stability is given by making v somewhat less than this. A vertical-motion seismograph, constructed on the principle which Fig. 8 illustrates diagrammatically, is arranged to trace its record on a revolving glass plate. This, along with a pair of horizontal pendulums recording on the same plate, completes a three-component seismograph.

An interesting mode of suspension, by which a mass is hung in neutral or nearly neutral equilibrium, with one degree of horizontal freedom, is shown in Fig. 9. It is based on the approximate straight line linkwork of Tchebicheff. When a bar is hung from fixed supports by crossed

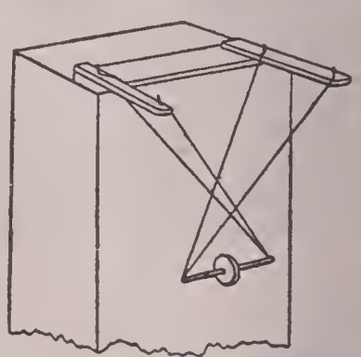


Fig. 9.—Astatic suspension.

ties, at a distance below the supports equal to the distance between the supports, the length of the bar being equal to half that distance, its middle point moves in very nearly a straight line. By fixing a weight at the centre of the bar and adding a suitable recording apparatus, we have a very frictionless form of one-component horizontal seismometer.[3] When a displacement of the ground occurs in the line of the bar, the bar is tilted through an angle which is proportional to the linear displacement, and the centre of the bar consequently shares, in a small and definite proportion, the motion of the ground,—a fact which is to be borne in mind in estimating the degree of multiplication given by the recording apparatus.

The instruments which have been described afford complete and satisfactory means of determining the motion which a point of the ground undergoes during any disturbance which would be recognized as an earthquake. For minute earth-tremors, however, a larger multiplication is necessary, and the absence of friction is of even more importance than in the measurement of earthquakes proper. Optical methods of magnifying the motion are accordingly resorted to. In the "normal tromometer" of Bertelli, used in Italy to detect earth-tremors, the bob of a pendulum, suspended by a fine wire from a fixed support, is viewed through a reflecting prism and its motion in any azimuth measured by a micrometer microscope. The great stability of the pendulum, which is only 1½ metres long, prevents it from behaving as a steady-point seismometer; and, if successive earth-movements were by chance to occur with a period equal, or nearly equal, to its own free period, its acquired swing would altogether mask the legitimate indica-

[1] Gray, *Trans. Seis. Soc. Jap.*, vol. iii. p. 137.
[2] Ewing, *Trans. Seis. Soc. Jap.*, vol. iii. p. 140.
[3] Ewing, "On certain Methods of Astatic Suspension," in *Trans. Seis. Soc. Jap.*, vol. vi. p. 25.

tions. This kind of action has, in fact, been turned to account as a means of detecting very minute earth-tremors by Rossi, who has devised a micro-seismoscope, consisting of a number of pendulums of various lengths, one or other of which is likely to be set swinging when the ground shakes to and fro repeatedly, through even the minutest range. To *measure* tremors, however, the instruments of Bertelli and Rossi are inappropriate; for that purpose, just as for the purpose of measuring larger motions, the suspended mass must be in nearly neutral equilibrium. To find a mode of suspension which is at once astatic and extremely frictionless is a matter of some difficulty; the crossed-link suspension, which has been already described, is probably the most satisfactory means hitherto suggested. It has been adopted in the micro-seismometer sketched in

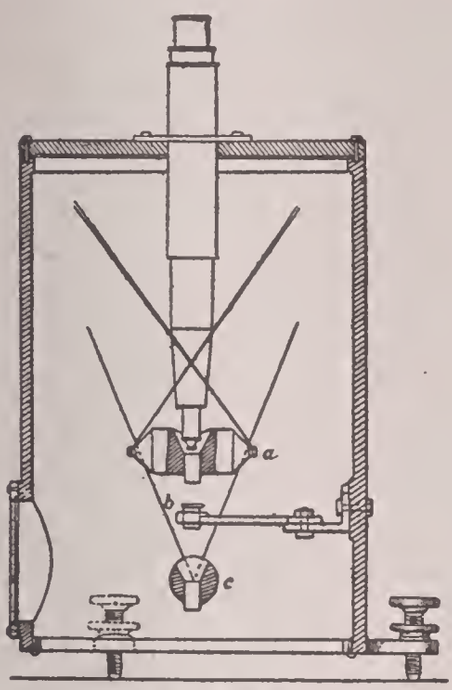


FIG. 10.—Microseismometer.

section in Fig. 10. Two bobs are separately suspended, in the manner shown by Fig. 9, at right angles to each other, one above the other, in a cast-iron case. A microscope, fixed to the top of the case and furnished with a micrometer eye-piece, is focused on a hair, which is stretched transversely across a vertical tube in the upper bob *a*. This serves to measure horizontal motion in the plane of the drawing. Motion at right angles to this is shown by the lower bob *c* (drawn in section), which carries a similar transverse hair. A fixed lens *b* between the bobs gives an image of the lower hair in the plane of the upper hair, so that both appear crossed in the field of the microscope, thereby allowing both components of horizontal motion to be observed together.

Equilibrium Method.—In observing slow earth-tiltings an entirely different process is followed. The problem then is, not to measure displacements by aid of the inertia of a body which tends to preserve its original position, but to compare the direction of a line or plane fixed to the earth with the direction of the vertical. The earliest observations of earth-tiltings were made by the aid of spirit-levels. If a level be set on a table fixed to the rock, its bubble, watched through a microscope, will be seen to move slowly now to one side and now to another. The movements are so slow that the inertia of the fluid is unimportant. Observations with pairs of levels, set at right angles to each other, have been carried on systematically for some years by M. P. Plantamour.[1] This is the simplest method of measuring earth-tiltings, but it is liable to errors which are not easily excluded. Another method of investigating changes in the direction of the vertical was initiated in 1868 by M. A. d'Abbadie,[2] who had before that observed the movements of level-bubbles. Light from a fixed source is made to fall on a reflecting basin of mercury about 10 metres below it. Above the basin is a large lens of long focus, which brings the rays into parallelism during their passage to the mercury, and causes them to converge after reflection, so that an image of the source is formed at a convenient distance from it, and in the same horizontal plane. The interval between the source and the image is measured (in amount and azimuth) at least twice a day by a micrometer microscope. The accuracy of the method depends on the fixity of the source of light relatively to the lens and to the surface of the ground, and to secure this M. d'Abbadie built a massive hollow cone of concrete for the support of his apparatus. His observations have shown that the earth's surface undergoes almost incessant slow tilting through angles which, in the course of a year, have been found to range over four seconds. He has also noticed the occurrence of earth-tremors by the occasional blurring of the image through agitation of the mercury. An improvement on his apparatus suggested by M. Wolf[3] is shown in Fig. 11. The light, instead of being all reflected from the free surface of mercury (*a*), is partly reflected from that and partly from a plane mirror (*b*) fixed to the rock. Two images are therefore formed, whose relative position measures the tilting of the surface. The advantage of this is that the position of the source of light need no longer be fixed, and the accuracy of the method depends only on the fixity of the mirror *b* with respect to the rock. Further, to avoid having the source and image at a great height above the surface, M. Wolf allows the light to reach and leave the apparatus horizontally, in the manner indicated in the sketch, by using a plane mirror inclined at 45° to the horizon. Still another mode of investigating slow changes of the vertical was followed (at the suggestion of Sir William Thompson) by Messrs. G. H. and H. Darwin, in observations made by them with the view of measuring the lunar disturbance of gravity. The *Reports* of the British Association for 1881 and 1882 contain a full account of their apparatus, as well as notices of the work of other observers and a discussion of the cause of earth-tiltings. Their instrument was a short pendulum hung in a viscous fluid, from a fixed support, by two wires arranged V-wise to leave the pendulum only one degree of freedom. Below the bob was a small mirror hung by two threads, one of which was attached to the pendulum bob and the other to a fixed support. The pendulum was free to swing at right angles to the plane of the threads, and any movement of this kind caused the mirror to rotate through an angle which was measured in the usual way by a telescope and scale. The method is susceptible of very great delicacy, but Messrs. Darwin found that when the instrument was adjusted to be specially sensitive its manipulation became extremely difficult. Wolf's modification of D'Abbadie's method appears to furnish, on the whole, the most promising apparatus for measurements of this type. The apparatus represented in Fig. 10 is also applicable. The method of measurement employed in the case of slow tiltings may be called the equilibrium method in contradistinction to the inertia method, which is used to measure comparatively sudden displacements. The two methods are applicable to two widely different classes of movements. It is at least possible that between these classes there may be other modes of motion, —displacements which are too slow for the inertia method, and which give rise to too little change of slope for the equilibrium method. How to measure them is, and must apparently remain, an unsolved problem in seismometry.

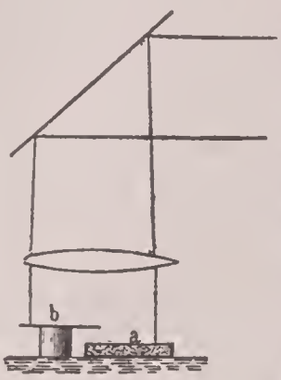


FIG. 11.

References.—The *Report* of the British Association for 1858 contains an account by Mallet of some of the older and now obsolete forms of seismometers (see also EARTHQUAKE). For accounts of modern instruments of the inertia class, see the *Transactions of the Seismological Society of Japan* from 1880, also Prof. Ewing's *Memoir on Earthquake Measurement*, published by the university of Tokio (1883). References to papers on the equilibrium method of measurement have been made in the text. (J. A. E.)

SEISTAN. See SISTAN.

SEJANUS, ÆLIUS (executed 31 A.D.), the famous minister of TIBERIUS (*q.v.*).

SELBY, a market town of the West Riding of Yorkshire, England, is situated on the navigable river Ouse and on the main line of the Great Northern Railway, 15 miles south of York and 20 east of Leeds. Of the ancient abbey for Benedictines, founded by William the Conqueror in 1069 and raised to the

[1] Plantamour, *Comptes Rendus*, 24th June, 1878, 1st December, 1879, etc.; and numerous papers in *Archives des Sciences*, Geneva, 1878–84.

[2] D'Abbadie, *Études sur la Verticale* (Association Française pour l'Avancement des Sciences), 1872, p. 159; also *Ann. de la Soc. Scient. de Bruxelles*, 1881.

[3] *Comptes Rendus*, xcvii. p. 228.

dignity of a mitred abbey by Pope Alexander II., there still remains the church of St. Mary and St. German, although it has been much changed by alterations and additions, the more ancient and notable features being the nave, transept, and west front. The church was made parochial in 1618. In the market-place there is a modern Gothic market cross. Among the public buildings are the drill hall and the mechanics' institute and public rooms. Flax-scutching, seed-crushing, brick and tile making, boat-building, tanning, and brewing are the principal industries. There is a large trade in potatoes, flax, and mustard, and a considerable cattle-market. The town receives its water-supply from artesian wells. A local board of health was established in 1851, consisting of nine members. The population of the urban sanitary district (6193 in 1871), extended in 1881 from 514 to 3760 acres, was in that year 6057.

Henry I. of England was born in the abbey, a fact which probably accounts for the special privileges conferred on it. In the early part of the Civil War it was held by the Parliament, and after being taken by the Royalists was recaptured by Fairfax.

SELDEN, JOHN (1584–1654), jurist, legal antiquary, and Oriental scholar, was born on the 16th December, 1584, at Salvington, in the parish of West Tarring, near Worthing, Sussex. His father, also named John Selden, held a small farm, and seems to have occasionally added to his livelihood by his labor as a wheelwright and his skill as a musician. It is said that his accomplishments as a violin-player gained him his wife, whose social position was somewhat superior to his own. She was Margaret, the only child of Thomas Baker, of Rustington, a village in the vicinity of West Tarring, and was more or less remotely descended from a knightly family of the same name in Kent. John Selden commenced his education at the free grammar-school at Chichester, whence he proceeded in his sixteenth year with an exhibition to Hart Hall at Oxford. In 1603 he was admitted a member of Clifford's Inn, London, and in 1604 migrated to the Inner Temple, and in due course he was called to the bar. While still a student he appears to have been on terms of friendship with Ben Jonson, Drayton, and Camden; and among his more intimate companions were Edward Littleton, afterwards lord keeper; Henry Rolle, afterwards lord chief-justice; Edward Herbert, afterwards solicitor-general; and Thomas Gardener, afterwards recorder of London. His earliest patron was Sir Robert Cotton, the antiquary, by whom he seems to have been employed in copying and abridging certain of the parliamentary records then preserved in the Tower. For some reason which has not been explained, Selden never went into court as an advocate, save on rare and exceptional occasions. But his practice in chambers as a conveyancer and consulting counsel is stated to have been large, and, if we may judge from the considerable fortune he accumulated, it must also have been lucrative.

It was, however, as a scholar and writer that Selden won his reputation both amongst his contemporaries and with posterity. His first work, an account of the civil administration of England before the Norman Conquest, is said to have been completed when he was only two or three-and-twenty years of age. But if this was the *Analecton Anglo-Britannicon*, as is generally supposed, he withheld it from the world until 1615. In 1610 appeared his *England's Epinomis* and *Janus Anglorum, Facies Altera*, which dealt with the progress of English law down to Henry II., and *The Duello, or Single Combat*, in which he traced the history of trial by battle in England from the Norman Conquest. In 1613 he supplied a series of notes, enriched by an immense number of quotations and references, to the first eighteen cantos of Drayton's *Polyolbion*. In 1614 he published *Titles of Honor*, which, in spite of some obvious defects and omissions, has remained to the present day the most comprehensive and trustworthy work of its kind that we possess; and in 1616 his notes on Forteseue's *De Laudibus Legum Angliæ* and Hengham's *Summæ Magna et Parva*. In 1617 his *De Diis Syriis* was issued from the press, and immediately established his fame as an Oriental scholar among the learned in all parts of Europe. After two centuries and a half, indeed, it is still not only the fundamental but also in many respects the best book which has been written on Semitic mythology. In 1618 his *History of Tithes*, although only published after it had been submitted to the censorship and duly licensed, nevertheless aroused the apprehension of the bishops and provoked the intervention of the king. The author was summoned before the privy council and compelled to retract his opinions, or at any rate what were held to be his opinions. Moreover, his work was suppressed and himself forbidden to reply to any of the controversialists who had come or might come forward to answer it.

This seems to have introduced Selden to the practical side of political affairs. The discontents which a few years later broke out into civil war were already forcing themselves on public attention, and it is pretty certain that, although he was not in parliament, he was the instigator and perhaps the draftsman of the memorable protestation on the rights and privileges of the House affirmed by the Commons on the 18th of December, 1621. He was with several of the members committed to prison, at first in the Tower and subsequently under the charge of Sir Robert Ducie, sheriff of London. During his detention, which only lasted a short time, he occupied himself in preparing an edition of Eadmer's *History* from a manuscript lent to him by his host or jailor, which he published two years afterwards. In 1623 he was returned to the House of Commons for the borough of Lancaster, and sat with Coke, Noy, and Pym on Sergeant Glanville's election committee. He was also nominated reader of Lyon's Inn, an office which he declined to undertake. For this the benchers of the Inner Temple, by whom he had been appointed, fined him £20 [$97.20] and disqualified him from being chosen one of their number. But he was relieved from this incapacity after a few years, and became a master of the bench. In the first parliament of Charles I. (1625), it appears from the "returns of members" printed in 1878 that, contrary to the assertion of all his biographers he had no seat. In Charles's second parliament (1626) he was elected for Great Bedwin in Wiltshire, and took a prominent part in the impeachment of George Villiers, duke of Buckingham. In the following year, in the "benevolence" case, he was counsel for Sir Edmund Hampden in the Court of King's Bench. In 1628 he was returned to the third parliament of Charles for Ludgershall in Wiltshire, and had a large and important share in drawing up and carrying the Petition of Right. In the session of 1629 he was one of the members mainly responsible for the tumultuous passage in the House of Commons of the resolution against the illegal levy of tonnage and poundage, and, along with Eliot, Holles, Long, Valentine, Strode, and the rest, he was sent once more to the Tower. There he remained for eight months, deprived for a part of the time of the use of books and writing materials. He was then removed, under less rigorous conditions, to the Marshalsea, until not long afterwards owing to the good offices of Archbishop Laud he was liberated. Some years before he had been appointed steward to the earl of Kent, to whose seat, Wrest in Bedfordshire, he now retired. In 1628 at the suggestion of Sir Robert Cotton he had compiled, with the assistance of two learned coadjutors, Patrick Young and Richard James, a catalogue of the Arundel marbles. He employed his leisure at Wrest in writing *De Successionibus in Bona Defuncti secundum Leges Ebræorum* and *De Successione in Pontificatum Ebræorum*, published in 1631. About

this period he seems to have inclined towards the court rather than the popular party, and even to have secured the personal favor of the king. To him in 1635 he dedicated his *Mare Clausum*, and under the royal patronage it was put forth as a kind of state paper. It had been written sixteen or seventeen years before; but James I. had prohibited its publication for political reasons; hence it appeared a quarter of a century after Grotius's *Mare Liberum*, to which it was intended to be a rejoinder, and the pretensions advanced in which on behalf of the Dutch fishermen to poach in the waters off the British coasts it was its purpose to explode. The fact that Selden was not retained in the great case of ship money in 1637 by John Hampden, the cousin of his former client, may be accepted as additional evidence that his zeal in the popular cause was not so warm and unsuspected as it had once been. During the progress of this momentous constitutional conflict, indeed, he seems to have been absorbed in his Oriental researches, publishing *De Jure Naturali et Gentium juxta Disciplinam Ebræorum* in 1640. He was not elected to the Short Parliament of 1640; but to the Long Parliament, summoned in the autumn, he was returned without opposition for the university of Oxford. Immediately after the opening of the session he was nominated a member of the committee of twenty-four to draw up a remonstrance on the state of the nation. He was also a member of the committees entrusted with the preliminary arrangements for the impeachment of Strafford. But he was not one of the managers at the trial, and he voted against the Bill for his attainder. He was, moreover, a member of the committees nominated to search for precedents and frame the articles of impeachment against Archbishop Laud, although it does not appear that he was implicated in the later stages of the prosecution against him. He opposed the resolution against Episcopacy which led to the exclusion of the bishops from the House of Lords, and printed an answer to the arguments used by Sir Harbottle Grimston on that occasion. He joined in the protestation of the Commons for the maintenance of the Protestant religion according to the doctrines of the Church of England, the authority of the crown, and the liberty of the subject. He was equally opposed to the court on the question of the commissions of lieutenancy of array and to the parliament on the question of the militia ordinance. In 1643, however, he became a member and participated in the discussions of the assembly of divines at Westminster, and was appointed shortly afterwards keeper of the rolls and records in the Tower. In 1645 he was named one of the parliamentary commissioners of the admiralty, and was elected master of Trinity Hall in Cambridge,—an office he declined to accept. In 1646 he subscribed the Solemn League and Covenant, and in 1647 was voted £5000 [$24,300] by the parliament as compensation for his sufferings in the evil days of the monarchy. He had not, however, relaxed his literary exertions during these years. He published in 1642 *Privileges of the Baronage of England when they sit in Parliament* and *Discourse concerning the Rights and Privileges of the Subject;* in 1644 *Dissertatio de Anno Civili et Calendario Reipublicæ Judaicæ;* in 1646 his treatise on marriage and divorce among the Jews entitled *Uxor Ebraica;* and in 1647 the earliest printed edition of the old and curious English law-book *Fleta*. What course he adopted with regard to the trial and execution of the king is unknown; but it is said that he refused to answer the *Eikon Basilike*, although Cromwell was anxious he should do so, the task which he declined being afterwards performed by Milton in his *Iconoclastes*. In 1650 Selden passed the first part of *De Synedriis et Prefecturis Juridicis Veterum Ebræorum* through the press, the second and third parts being severally published in 1653 and 1655, and in 1652 he wrote a preface and collated some of the manuscripts for Sir Roger Twysden's *Historiæ Anglicæ Scriptores Decem*. His last publication was a vindication of himself from certain charges advanced against him and his *Mare Clausum* in 1653 by Theodore Graswinckel, a Dutch jurist.

After the death of the earl of Kent in 1639 Selden lived permanently under the same roof with his widow. It is believed that he was married to her, although their marriage does not seem to have ever been publicly acknowledged. He died at Friary House in Whitefriars on 30th November, 1654, and was buried in the Temple Church, London. Within the last few years a brass tablet has been erected to his memory by the benchers of the Inner Temple in the parish church of West Tarring.

Several of Selden's minor productions were printed for the first time after his death, and a collective edition of his writings was published by Archdeacon Wilkins in 3 vols. folio in 1725, and again in 1726. His *Table Talk*, by which he is perhaps best known, did not appear until 1689. It was edited by his amanuensis, Richard Milward, who affirms that "the sense and notion is wholly Selden's," and that "most of the words" are his also. Its genuineness has sometimes been questioned, although on insufficient grounds. In Hallam's opinion it "gives perhaps a more exalted notion of Selden's natural talents than any of his learned writings," and in Coleridge's it contains "more weighty bullion sense" than he had "ever found in the same number of pages of any uninspired writer."

See Bliss, Wood's *Athenæ Oxonienses* (London, 1817, vol. iv.); Aikin, *Lives of John Selden and Archbishop Usher* (London, 1812); Johnson, *Memoirs of John Selden*, etc. (London, 1835); Singer, *Table Talk of John Selden* (London, 1847); and Wilkins, *Johannis Seldeni Opera Omnia*, etc. (London, 1725). (F. DR.)

SELECTION AND VARIATION. See VARIATION AND SELECTION.

SELENIUM AND TELLURIUM[1] are two rather rare chemical elements discovered, the latter by Müller von Reichenstein in 1782, the former by Berzelius in 1817. Both occur only in the mineral kingdom as components of very rare minerals, most of which are compounds of one or the other or of both and sulphur with silver, lead, bismuth, antimony, gold, and other metals.

Elementary Selenium.—This, like elementary sulphur, exists in a variety of forms, which are conveniently considered as modifications of the genera now to be described. (1) *Non-metallic selenium* includes the flocculent scarlet precipitate produced by the reduction of solution of selenium by sulphurous acid in the cold. The scarlet flocks when dried without the aid of heat assume the form of a brown-red powder of sp. gr. 4.26, which dissolves in 1000 times its weight of boiling bisulphide of carbon (at 46°.6 C.). The solution on cooling deposits most of its selenium in the form of minute monoclinic crystals of sp. gr. 4.5 (isomorphous with monoclinic sulphur), which retain their solubility in bisulphide of carbon up to 100° C. At 110° C. or higher temperatures they pass into the metallic modification (see below) with evolution of heat. With the amorphous kind a similar change sets in at or above 80° C. and attains its maximum of rapidity at a point between 125° and 180° C. Fused selenium when cooled down suddenly hardens into a very dark-colored glass of 4.28 sp. gr., soluble in bisulphide of carbon; on gradual cooling it becomes more or less completely "metallic." (2) *Metallic selenium* is a dark gray or black solid of 4.8 sp. gr.; it exhibits metallic lustre, stretches perceptibly under the hammer, and its fracture is similar to that of gray cast iron. It is insoluble in bisulphide of carbon. Its fusing point is sharply defined and lies at 217° C. At the ordinary temperature it conducts electricity, while the non-metallic modification does not; at higher temperatures, or after temporary exposure to higher temperatures, the conductivity on either side becomes an eminently variable quantity. According to Draper and Moss, glassy selenium begins to conduct electricity at 165° to 175° C., and the conductivity increases regu-

[1] Comp. CHEMISTRY, vol. v. pp. 431-34, 435-36, 438-39.

larly as the temperature rises to near the boiling-point. With metallic selenium, which behaves similarly, the increase of conductivity is proportional to the increase of temperature to near the fusing point (217° C.); but from this point upwards it decreases rapidly and attains its minimum at 250° C. According to W. Siemens, however, selenium by long exposure to 200° C. becomes what one may call electrically metallic; the conductivity then decreases when the temperature rises, just as it does with ordinary metals. But this electrical metallicity is not permanent; on continued exposure to a lower temperature it vanishes gradually, until the proportion of quasi-metal has fallen to a limit-value depending on that temperature. Very surprising is the observation of Sale that the electric conductivity of metallic selenium increases on exposure to the light; the red and ultra-red rays, as he found, act most powerfully. The effect of insolation is almost instantaneous, but on re-exposure to darkness the original condition is re-established only very gradually. W. Siemens found that his electro-metallic selenium (as produced at 200° C.) is more sensitive to light than any other kind. The conductivity of such selenium starting from darkness is raised twofold by diffuse and tenfold by direct sunlight. The specific heat of selenium, according to Regnault, is 0.0746 both in the glassy and in the metallic modification. Selenium (of any kind) boils at 700° C. (Mitscherlich). The vapor has an intense color intermediate between that of chlorine and that of sulphur. According to Deville and Troost, at 880° C. it is 7.67 times, and at 1420° is 5.68 times, as heavy as air; theory, for $Se_2 = 1$ molecule, demands 5.47.

Elementary Tellurium.—This, the compact form, is a silver-white resplendent metal of markedly crystalline structure; the crystals are rhombohedra, and the ingot consequently is very brittle. Specific gravity 6.2. The metal fuses at about 500° C., and is distillable at very high temperatures. Its vapor is golden yellow and has a very brilliant absorption-spectrum. The vapor density, according to Deville and Troost, is 9.08 at 1439° C. (air = 1), corresponding to $Te_2 = 1$ molecule. A bar of tellurium becomes feebly electrical when rubbed with a woollen cloth. The electric conductivity, like that of selenium, is largely influenced by the temperature and previous exposure to heat, and it increases after exposure to light, though not to the same extent as selenium does. Starting from the ordinary temperature the conductivity decreases up to some point between 90° and 145° C.; it then increases up to 200° C. (the highest temperature tried); on cooling it decreases steadily, and finally is only one-fifth or one-sixth of what it was at 200°. The numerical value at 200° (silver = 100) was found equal to 0.0035 to 0.0031 (F. Exner).

Extraction of the Elementary Substances.—If seleniferous sulphur or pyrites is used for the manufacture of oil of vitriol by the chamber process, most of the selenium accumulates as such in the "chamber mud," from which it may be extracted by the following method of Wöhler's. The mud, after having been thoroughly washed and dried, is fused with alkaline nitrate and carbonate, to convert the selenium into selenate (SeO_4K_2 or Na_2), which is extracted by means of water. The filtered solution is boiled with hydrochloric acid to convert the selenic into selenium acid ($SeO_3 + 2HCl = Cl_2 + H_2O + SeO_2$), and this last is then reduced by addition of sulphurous acid and heating, when the selenium comes down as a red precipitate ($SeO_2 + 2SO_2 = 2SO_3 + Se$). A richer material than chamber mud is seleniferous ore-smoke as produced in Mansfield, which likewise contains free selenium. Its extraction, according to O. Pettersen and F. Nilson, is best effected by digestion with concentrated solution of cyanide of potassium at 80° C., which converts the selenium into selenocyanide (SeNCK), easily extractable by water. The filtered solution is acidified with hydrochloric acid and allowed to stand, when the selenium (through the spontaneous decomposition of the SeNC.H into NCH and Se) comes down as a precipitate.

Tellurium is generally prepared from Transylvanian gold ore. The powdered ore is oxidized by means of hot nitric acid and the least sufficiency of hydrochloric acid, the excess of nitric acid being chased away by evaporation, and the residue mixed with sulphuric acid (to convert the lead into insoluble sulphate), and with some tartaric acid to prevent precipitation of tellurious acid (TeO_2) in the subsequent treatment with water. From the filtered aqueous solution the gold is removed by addition of ferrous sulphate and by filtration. The filtrate is treated with sulphurous acid to reduce the tellurious acid to tellurium, which separates out as a black precipitate. The precipitated metal is fused down and then sublimed at a very high temperature, in a porcelain tube, in a current of hydrogen, to remove non-volatile impurities and eliminate the last trace of selenium (SeH_2).

Chemical Relations.—Selenium and tellurium are similar in their chemical character to sulphur; the gradation of properties within the triad is in the order of the atomic weights, which are S = 32.06, Se = 79.07, Te = 128 (O = 16). In oxygen or air the elementary substances burn readily into (solid) dioxides (SeO_2, TeO_2), in the case of selenium with production of a characteristic stench of putrid radish, owing probably to the formation of a trace of hydride, SeH_2. Nitric acid, in the heat, converts sulphur directly into sulphuric acid. In the case of the two rare elements the oxidation stops at the stage corresponding to sulphurous acid. The acids SeO_3H_2 and TeO_3H_2 are not liable to further oxidation by any of the wet-way reagents (HNO_3, H_2O and Cl_2, Br_2, I_2, etc.) which convert sulphurous into sulphuric acid.

By fusion with nitre and alkaline carbonate the three elements, in their elementary or less oxygenated forms, are readily converted into salts, $R_2\Sigma O_4$ (sulphates, etc., Σ = S, Se, or Te). Selenic and Telluric acids ($H_2\Sigma O_4$), unlike sulphuric, when boiled with aqueous hydrochloric acid, are gradually reduced to the lower acids (Se or $Te)O_3H_2$, with evolution of chlorine; and the lower acids are readily reduced to (precipitates of) elementary seleuium and tellurium respectively by the action of sulphurous acid in the heat. Chlorine combines readily with elementary selenium and tellurium into dichlorides (Se or $Te)Cl_2$, which, however, on continued chloriuation are at last completely converted into the tetrachlorides (Se or $Te)Cl_4$. These last, unlike the corresponding sulphur compound, are distillable without decomposition. Metals capable of uniting directly with sulphur as a rule unite also with selenium and tellurium into corresponding compounds. Hydrogen unites with elementary selenium and tellurium in the heat into gaseous hydrides (Se or $Te)H_2$ closely similar to sulphuretted hydrogen. But, as these hydrides are liable to dissociation, the pure compounds must be prepared by the decomposition of the zinc compounds $Zn\Sigma$ with hydrochloric acid. For the description of individual compounds reference must be made to the handbooks of chemistry.

(W. D.)

SELEUCIA, or SELEUCEIA (Σελεύκεια). Of the numerous ancient towns of this name the most famous are: (1) the great city on the Tigris founded by Seleucus I. Nicator (see vol. xviii. p. 612), of the greatness and decay of which an account has been given in vol. xviii. p. 615; (2) a city on the northern frontier of Syria towards Cilicia, some miles north of the mouth of the Orontes, also founded by Seleucus I., and forming with Antioch, Apamea, and Laodicea the Syrian Tetrapolis. It served as the port of Antioch (Acts xiii. 4). Considerable ruins are still visible, especially a great cutting through solid rock, about two-thirds of a mile long, which Polybius speaks of as the road from the city to the sea.

SELEUCIDS. See MACEDONIAN EMPIRE, vol. xv. p. 143, and PERSIA, vol. xviii. p. 596 *sq.*

SELIM or SALIM, the title borne by three emperors of the Ottoman Turks. For SELIM I., emperor from 1512 to 1520, see PERSIA, vol. xviii. pp. 646–7, and TURKEY. SELIM II., grandson of the preceding, was sultan from 1566 to 1574. See TURKEY. SELIM III., son of Sultan Mustapha III., succeeded his father in 1789 and was deposed in 1807. See TURKEY.

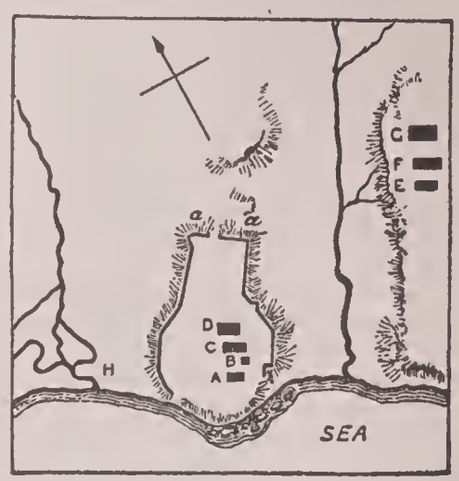
SELIMNIA. See SLIVEN.

SELINUS (Σελινοῦς), one of the most important of the Greek colonies in Sicily, near the rivers Hypsas and Selinus on the southwest coast, was founded, probably about 628 B. C., by colonists from Megara Hyblæa in the east of Sicily and others from the parent city of Megara on the Saronic Gulf of Greece

(see Thuc., vi. 4, vii. 57, and Strabo, vi. p. 272). The name of the city and the little river (see H in Fig.) on which it stands was derived from the wild parsley (σέλινον) which grew there in abundance (comp. vol. xvii. p. 656). Many autonomous coins of Selinus exist, dating from the 5th and 4th centuries B. C. The tetradrachms have on the obverse a youth, representing the river Selinus, sacrificing at an altar,[1] and, in the field, a parsley leaf,—legend, **ΣΕΛΙΝΟΣ**; on the reverse, Apollo and Artemis in a biga,—legend, **ΣΕΛΙΝΟΝΤΙΟΝ** (retrograde). Didrachms have a similar obverse with the river Hypsas,—legend, **ΗΥΨΑΣ**; reverse, Heracles slaying a bull,—legend, **ΣΕΛΙΝΟΝΤΙΟΝ**. As early as 580 B. C. the citizens of Selinus were at war with the adjoining people of Segesta, a non-Hellenic race who occupied the province north of Selinus; the success of the Segestans on this occasion was mainly owing to aid given them by colonists from Rhodes and Cnidus. Little is known about the early history of Selinus; but the city evidently grew rapidly in wealth and importance, and soon extended its borders 15 miles westwards to the river Mazarus and eastwards as far as the Halycus (Diod., xiii. 54; Herod., v. 46). Thucydides (vi. 20) mentions its power and wealth and especially the rich treasures in its temples. From its early oligarchical form of government Selinus passed to a short-lived despotism under the tyrant Pythagoras, who was deposed soon after 510 B. C. In 480 B. C., when the Carthaginian Hamilcar invaded Sicily, the city took his side against their fellow Hellenes. In 416 B. C. a new dispute between Selinus and Segesta was eventually the cause of the fatal Athenian expedition against Sicily, the Athenians acting as allies of Segesta and the Syracusans as allies of Selinus. The conclusion of this expedition (see SYRACUSE) left Segesta at the mercy of the Selinuntines, whose rapacity and cruelty soon brought about their own destruction, through the aid which the Segestans obtained from Carthage. In 409 B. C. Hannibal, with an overwhelming force, took and destroyed the city, the walls of which were razed to the ground. He killed about 16,000 of the inhabitants, took 5000 prisoners, and only a remnant of 2600 escaped to Agrigentum (Diod., xiii. 54–59). The survivors were afterwards allowed to return and to rebuild Selinus as a city subject to the Carthaginians, under whose yoke, in spite of their attempts to regain freedom, the Selinuntines remained till *c.* 250, the close of the First Punic War; after this the Carthaginians transferred the inhabitants of Selinus to Lilybæum, and completely destroyed the city (Diod. xxiv.). It was never rebuilt, and is mentioned by Strabo (vi. p. 272) as being one of the extinct cities of Sicily.[2]

The ancient city occupied two elevated plateaus at the edge of the sea and also part of the surrounding plain. The western of these elevations formed the acropolis; on the other was the agora. The walls of the acropolis can still be traced round the whole circuit; the only entrance was on the northeast. Remains also exist of long walls connecting the city and its port. The chief glory of Selinus was its double group of great temples,—three on the acropolis and three in the agora, one of which was the largest peripteral temple in the world. All are completely ruined, but the materials of each still remain almost perfect, though scattered in confused heaps of stone; the extraordinary completeness of these fragments is owing to the fact that the site has never been occupied since the final transference of the inhabitants in 250 B. C., and thus the scattered blocks have never been taken as materials for later structures. Of all the six temples[3] none are later than the 5th century B.C., and those on the acropolis probably date from about 628 B.C., soon after the first settlement. The sculptured metopes from three of the temples are among the most important examples of early Hellenic art (see ARCHÆOLOGY, vol. ii. p. 305, and Benndorf, *Die Metopen von Selinunt*). The buildings themselves are of the highest interest, being the earliest known examples of the Doric style, and differing in many important details from all other examples, even such early ones as the temples at Corinth and Syracuse.

The three temples on the acropolis (A, C, D in Fig.) stand side by side, with their axes northwest to southeast; all are hexastyle and peripteral, with either thirteen or fourteen columns on the sides. Their stylobates have four high



Selinus.

A, C, D, Temples on acropolis. B, Small prostyle tetrastyle ædicula. E, F, G, Temples on eastern hill. *a*, *a*, Remains of buildings outside acropolis walls. H, River Selinus.

steps along the sides, with an easier approach of more steps at the northwest fronts. To the middle one of the three belong the very archaic metopes described in vol. ii. p. 305. All have a rather narrow cella with pronaos and opisthodomus. Their archaic peculiarities are the rapid diminution of the columns, the absence of entasis, the narrow mutules over the metopes, and especially a curious cavetto or necking under the usual hypotrachelia. No other example of this feature was known till 1884, when Dr. Schliemann and Dr. Dörpfeld discovered a similar Doric capital among the ruins of the citadel of Tiryns. The Tiryns capital dates probably from a little before 600 B. C. and appears to be nearly contemporary with that at Selinus. Between temples A and C are remains of a small prostyle tetrastyle ædicula (B) of the Doric order.[4] The second group of three Doric temples (E, F, G) belongs to a rather later date,—probably 500 to 440 B. C. The first two (E and F) have very narrow cellæ, so that they are pseudo-dipteral. They also are hexastyle, with fourteen columns on the sides. Though still early in detail, they are without the curious necking of the acropolis temples. The sculptured metopes of temple E are of extraordinary beauty and interest, and appear to date from the finest period of Greek art—the age of Phidias or perhaps that of Myron. The chief subjects are Zeus and Hera on Mount Olympus, Artemis and Actæon, and Heracles defeating an Amazon. They are of the noblest style, simple and highly sculpturesque in treatment, and full of grace and expression. One remarkable peculiarity in their technique is that the nude parts of the female figures (heads, feet, and hands) are executed in white marble, while the rest of the reliefs are in the native gray tufa, which originally was covered with marble-dust stucco and then painted. The whole of the stonework of all the temples was treated in a similar way, and gives most valuable examples of early Greek colored decoration. Recent excavations at Selinus have shown that in many cases the cornices and other architectural features were covered with moulded slabs of terra cotta, all richly colored (see Dörpfeld, *Die Verwendung von Terracotten*, Berlin, 1881, and TERRACOTTA). The great temple of Zeus[5] (G in Fig.) was the largest peripteral temple of the whole Hellenic world, being almost exactly the same size as the enormous

[1] Sculptured on the altar is a cock, in allusion to the aid given by Æsculapius against the fever which was caused by the marshy site. Drainage works directed by Empedocles are said to have rendered the site healthy (Diog. Laer., viii. 2, 11).

[2] Roman sulphur baths existed under the name Thermæ Selinuntiæ, but these were about 20 miles east of the site of the ancient Selinus.

[3] The stone of which all these temples were built came from a quarry a few miles northwest of Selinus (mod. Campobello). The ancient workings are very visible, and unfinished drums of columns and other blocks still exist in the quarry. It is a brown tufa-like stone.

[4] Strange to say, Hittorff and Zanth (*Architecture Antique de Sicile*, Paris, 1870), in their elaborate work on this subject, restore this ædicula with a Doric entablature on Ionic columns; a good many other similar absurdities occur in this richly illustrated work. More judgment is shown in Serradifalco's *Antica Selinunto* (Palermo, 1831-42), though it is not always accurate in measurements.

[5] The dedication of the five smaller temples is unknown; some were probably consecrated to Poseidon, Apollo, and Artemis. The existing metope reliefs are preserved in the museum at Palermo.

pseudo-peripteral Olympeæum at the neighboring Agrigentum. It was octastyle, pseudo-dipteral, with seventeen columns on the sides, and measures 360 by 162 feet; the columns are 10 feet 7½ inches at the base and were 48 feet 7 inches high. This gigantic building was never quite completed, though the whole of the main structure was built. Most of the columns still remain unfluted. In spite of the proportional narrowness of its cella, it had an internal range of columns, probably two orders high, like those within the cella at Pæstum. The axes of these last three temples have exactly the same inclination as those on the acropolis. The great temple of Zeus possesses some of the curious archaisms of the acropolis temples, and, though never completed, it was probably designed and begun at an earlier date than the two adjacent buildings. These peculiarities are the ungracefully rapid diminution of the shaft and the cavetto under the necking of the capitals. The whole of these six massive buildings now lie in a complete state of ruin, a work of evidently wilful destruction on the part of the Carthaginians, as the temple at Segesta, not many miles distant, has still every column and its whole entablature quite perfect; so it is impossible to suppose that an earthquake was the cause of the utter ruin at Selinus. Few or no marks of fire are visible on the stone blocks. (J. H. M.)

SELJÚḲS is the name of several Turkish dynasties, issued from one family, which reigned over large parts of Asia in the 11th, 12th, and 13th centuries of our era. The history of the Seljúḳs forms the first part of the history of the Turkish empire. Proceeding from the deserts of Turkestan, the Seljúḳs reached the Hellespont; but this barrier was crossed and a European power founded by the Ottomans (Osmanli). The Seljúḳs inherited the traditions and at the same time the power of the previous Arabian empire, of which, when they made their appearance, only the shadow remained in the person of the 'Abbásid caliph of Baghdád. It is their merit from a Mohammedan point of view to have reëstablished the power of orthodox Islam and delivered the Moslem world from the supremacy of the caliph's Shí'ite competitors, the Fáṭimites of Egypt, and from the subversive influence of ultra-Shí'ite tenets, which constituted a serious danger to the duration of Islam itself. Neither had civilization anything to fear from them, since they represented a strong neutral power, which made the intimate union of Persian and Arabian elements possible, almost at the expense of the national Turkish, —literary monuments in that language being during the whole period of the Seljúḳ rule exceedingly rare.

The first Seljúḳ rulers were Toghrul Beg, Chaḳir Beg, and Ibrahím Niyál, the sons of Mikail, the son of Seljúḳ, the son of Tuḳáḳ (also styled Timúryáliḳ, "iron bow"). They belonged to the Turkish tribe of the Ghuzz (Οὔζοι of Const. Porphyr. and the Byzantine writers), which traced its lineage to Oghuz, the famous eponymic hero not only of this but of all Turkish tribes. There arose, however, at some undefined epoch a strife on the part of this tribe and some others with the rest of the Turks, because, as the latter allege, Ghuzz, the son (or grandson) of Yafeth (Japhet), the son of Núḥ (Noah), had stolen the genuine *rain-stone*, which Turk, also a son of Yafeth, had inherited from his father. By this party, as appears from this tradition, the Ghuzz were not considered to be genuine Turks, but to be Turkmans (that is, according to a popular etymology, resembling Turks). But the native tradition of the Ghuzz was unquestionably right, as they spoke a pure Turkish dialect. The fact, however, remains that there existed a certain animosity between the Ghuzz and their allies and the rest of the Turks, which increased as the former became converted to Islam (in the course of the 4th century of the Flight). The Ghuzz were settled at that time in Transoxiana, especially at Jand, a well-known city on the banks of the Jaxartes, not far from its mouth. Some of them served in the armies of the Ghaznavids Sebuktegín and Maḥmúd (997–1030); but the Seljúḳs, a royal family among them, had various relations with the reigning princes of Transoxiana and Kházrizm, which cannot be narrated here.[1] But, friends or foes, the Ghuzz became a serious danger to the adjoining Mohammedan provinces from their predatory habits and continual raids, and the more so as they were very numerous. It may suffice to mention that, under the leadership of Israil or Pígu Arslán, they crossed the Oxus and spread over the eastern provinces of Persia, everywhere plundering and destroying. The imprisonment of this chieftain by Mas'úd, the son and successor of Maḥmud, was of no avail: it only furnished his nephews with a ready pretext to cross the Oxus likewise in arms against the Ghaznavids. We pass over their first conflicts and the unsuccessful agreements that were attempted, to mention the decisive battle near Merv (1040), in which Mas'úd was totally defeated and driven back to Ghazna (Ghazni). Persia now lay open to the victors, who proclaimed themselves independent at Merv (which became from that time the official capital of the principal branch of the Seljúḳs), and acknowledged Toghrul Beg as chief of the whole family. After this victory the three princes Toghrul Beg, Chaḳir Beg, and Ibrahím Niyál separated in different directions and conquered the Mohammedan provinces east of the Tigris; the last-named, after conquering Hamadán and the province of Jebel, penetrated as early as 1048, with fresh Ghuzz troops, into Armenia and reached Melazkerd, Erzerúm (Erzeroum), and Trebizond. This excited the jealousy of Toghrul Beg, who summoned him to give up Hamadán and the fortresses of Jebel; but Ibrahím refused, and the progress of the Seljúḳian arms was for some time checked by internal discord,—an ever-recurring event in their history. Ibrahím was, however, compelled to submit.

At this time the power of the 'Abbásid caliph of Baghdád (Al-Ḳáim bi-amr illáh) was reduced to a mere shadow, as the Shí'ite dynasty of the Búyids and afterwards his more formidable Fáṭimite rivals had left him almost wholly destitute of authority. The real ruler at Baghdád was a Turk named Basásírí, lieutenant of the last Búyid, Al-Malik ar-Raḥím. Nothing could, therefore, be more acceptable to the caliph than the protection of the orthodox Toghrul Beg, whose name was read in the official prayer (khotba) as early as 1050. At the end of the same year the Seljúḳ entered the city and after a tumult seized the person of Malik ar-Raḥím. Basásírí had the good fortune to be out of his reach; after acknowledging the right of the Fáṭimites, he gathered fresh troops and incited Ibrahím Niyál to rebel again, and he succeeded so far that he reëntered Baghdád at the close of 1058. The next year, however, Toghrul Beg got rid of both his antagonists, Ibrahím being taken prisoner and strangled with the bowstring, while Basásírí fell in battle. Toghrul Beg now reentered Baghdád, reëstablished the caliph, and was betrothed to his daughter, but died before the consummation of the nuptials (September, 1063). Alp Arslán, the son of Chaḳir Beg, succeeded his uncle and extended the rule of his family beyond the former frontiers. He made himself master, *e. g.*, of the important city of Aleppo; and during his reign a Turkish emir, Atsiz, wrested Palestine and Syria from the hands of the Fáṭimites. Nothing, however, added more to his fame than his successful expeditions against the Greeks, especially that of 1071, in which the Greek emperor Romanus Diogenes was taken prisoner and forced to ransom himself for a large sum. The foundation of the Seljúḳ empire of Rúm (Asia Minor, see below) was the immediate result of this great victory. Alp Arslán afterwards undertook an expedition against Turkestan, and met with his death at the hands of a captured chief, Jusof Barzami, whom he had intended to shoot with his own hand.

Malik Sháh, the son and successor of Alp Arslán, had to encounter his uncle Ḳáwurd, founder of the

[1] Comp. Sachau, "Zur Geschichte und Chronologie von Khwárizm," in *Sitzungsberichte* of the Vienna Acad., lxxiv. 304 *sq.*

Seljúḳian empire of Kermán (see below), who claimed to succeed Alp Arslán in accordance with the Turkish laws, and led his troops towards Hamadán. However, he lost the battle that ensued, and the bowstring put an end to his life (1073). Malik Sháh regulated also the affairs of Asia Minor and Syria, conceding the latter province as an hereditary fief to his brother Tutush, who established himself at Damascus and killed Atsiz. He, however, like his father Alp Arslán, was indebted for his greatest fame to the wise and salutary measures of their vizier, Nizám al-Mulk. This extraordinary man, associated by tradition with 'Omar Khayyám (*q.v.*), the well-known mathematician and free-thinking poet, and with Hasan b. Ṣabbáḥ, afterwards the founder of the Ismaelites or Assassins, was a renowned author and statesman of the first rank, and immortalized his name by the foundation of several universities (the Nizámiyah at Baghdád), observatories, mosques, hospitals, and other institutions of public utility. At his instigation the calendar was revised and a new area, dating from the reign of Malik Sháh and known as the Jelalian, was introduced. Not quite forty days before the death of his master this great man was murdered by the Ismaelites.

He had fallen into disfavor shortly before because of his unwillingness to join in the intrigues of the princess Turkán Khátún, who wished to secure the succession to the throne for her infant son Maḥmúd at the expense of the elder sons of Malik Sháh.

Constitution and Government of the Seljúḳ Empire.—It has been already observed that the Seljúḳs considered themselves the defenders of the orthodox faith and of the 'Abbásid caliphate, while they on their side represented the temporal power which received its titles and sanction from the successor of the Prophet. All the members of the Seljúḳ house had the same obligations in this respect, but they had not the same rights, as one of them occupied relatively to the others a place almost analogous to that of the great khán of the Mongols in later times. This position was inherited from father to son, though the old Turkish idea of the rights of the elder brothers often caused rebellions and violent family disputes. After the death of Malik Sháh the head of the family was not strong enough to enforce obedience, and consequently the central government broke up into several independent dynasties. Within the limits of these minor dynasties the same rules were observed, and the same may be said of the hereditary fiefs of Turkish emirs not belonging to the royal family, who bore ordinarily the title of *atabek* (properly "father bey"), *e.g.*, the atabeks of Fars, of Adharbaiján (Azerbijan), of Syria, etc. The title was first given to Nizám al-Mulk and expressed the relation in which he stood to the prince,—as *lala*, "tutor." The affairs of state were managed by the diván under the presidency of the vizier; but in the empire of Rúm its authority was inferior to that of the *pervánch*, whom we may name "lord chancellor." In Rúm the feudal system was extended to Christian princes, who were acknowledged by the sultan on condition of paying tribute and serving in the armies. The court dignitaries and their titles were manifold; not less manifold were the royal prerogatives, in which the sultans followed the example set by their predecessors, the Búyids.

Notwithstanding the intrigues of Turkán Khátún, Malik Sháh was succeeded by his elder son Barkiyároḳ (1092–1104), whose short reign was a series of rebellions and strange adventures such as one may imagine in the story of a youth who is by turns a powerful prince and a miserable fugitive.[1] Like his brother Mohammed (1104–1118), who successfully rebelled against him, his most dangerous enemies were the Ismaelites, who had succeeded in taking the fortress of Alamut (north of Kazvín) and become a formidable political power by the organization of bands of *fidáwís*, who were always ready, even at the sacrifice of their own lives, to murder any one whom they were commanded to slay (see Assassins).

Mohammed had been successful by the aid of his brother Sinjar, who from the year 1097 held the province of Khorásan with the capital Merv. After the death of Mohammed Sinjar became the real head of the family, though 'Iráḳ acknowledged Maḥmúd, the son of Mohammed. Thus there originated a separate dynasty of 'Iráḳ with its capital at Hamadán; but Sinjar during his long reign often interfered in the affairs of the new dynasty, and every occupant of the throne had to acknowledge his supremacy. In 1117 he led an expedition against Ghazna and bestowed the throne upon Behrám Sháh, who was also obliged to mention Sinjar's name first in the official prayer at the Ghaznavid capital,—a prerogative that neither Alp Arslán nor Malik Sháh had attained. In 1134 Behrám Sháh failed in this obligation and brought on himself a fresh invasion by Sinjar in the midst of winter; a third one took place in 1152, caused by the doings of the Ghurids (Hosain Jihánsúz, or "world-burner"). Other expeditions were undertaken by him against Khárizm and Turkestan; the government of the former had been given by Barkiyároḳ to Mohammed b. Anushtegín, who was succeeded in 1128 by his son Atsiz, and against him Sinjar marched in 1138. Though victorious in this war, Sinjar could not hinder Atsiz from afterwards joining the gurkhán (great khán) of the then rapidly rising empire of the Karachitai, at whose hands the Seljúḳ suffered a terrible defeat at Samarkand in 1141. By the invasion of these hordes several Turkish tribes, the Ghuzz and others, were driven beyond the Oxus, where they killed the Seljúḳ governor of Balkh, though they professed to be loyal to Sinjar. Sinjar resolved to punish this crime; but his troops deserted and he himself was taken prisoner by the Ghuzz, who kept him in strict confinement during two years (1153–55), though treating him with all outward marks of respect. In the meantime they plundered and destroyed the flourishing cities of Merv and Nishápúr; and when Sinjar, after his escape from captivity, revisited the site of his capital he fell sick of sorrow and grief and died soon afterwards (1157). His empire fell to the Karachitai and afterwards to the sháh of Khárizm. Of the successors of Mohammed in 'Iráḳ we give only the names with the date of the death of each: Maḥmúd (1131); Toghrul, son of Mohammed, proclaimed by Sinjar (1134); Mas'úd (1152); Malik Sháh and Mohammed (1159), sons of Maḥmúd; Sulaimán Sháh, their brother (1161); Arslán, son of Toghrul (1175); and Toghrul, son of Arslán, killed in 1194 by Inánej, son of his atabek, Mohammed, who was in confederation with the Khárizm sháh of the epoch, Takash. This chief inherited his possessions; Toghrul was the last representative of the Seljúḳs of 'Iráḳ.

The province of Kermán was one of the first conquests of the Seljúḳs, and became the hereditary fief of Ḳáwurd, the son of Chaḳir Beg. Mention has been made of his war with Malik Sháh and of his ensuing death (1073). Nevertheless his descendants were left in possession of their ancestor's domains; and till 1170 Kermán, to which belonged also the opposite coast of 'Omán, enjoyed a well-ordered government, except for a short interruption caused by the deposition of Irán Sháh, who had embraced the tents of the Ismaelites, and was put to death (1101) in accordance with a fatwa of the ulema. But after the death of Toghrul Sháh (1170) his three sons disputed with each other for the possession of the throne, and implored foreign assistance, till the country became utterly devastated and fell an easy prey to some bands of Ghuzz, who, under the leadership of Malik Dinár (1185), marched into Kermán after harassing Sinjar's dominions. Afterwards the sháhs of Khárizm took this province.[2]

The Seljúḳian dynasty of Syria came to an end after three generations, and its later history is interwoven with that of the crusaders. The first prince was Tutush, mentioned above, who perished, after a reign of continuous fighting, in battle against Barkiyároḳ

[1] A sketch of his reign has been given by Defrémery, *Journ. Asiatique*, 1853, i. 425 *sq.*, ii. 217 *sq.*

[2] An outline of the history of this branch of the Seljúḳs is given in *Z.D.M.G.*, 1885, pp. 362-401.

near Rai (1095). Of his two sons, the elder, Ridhwán, established himself at Aleppo (died 1113); the younger, Duḳaḳ, took possession of Damascus, and died in 1103. The sons of the former, Alp Arslán and Sultán Sháh, reigned a short time nominally, though the real power was exercised by Lúlú till 1117. We cannot, however, enter here into the very complicated history of these two cities, which changed their masters almost every year till the time of Zengi and Núr ed-dín.

After the great victory of Alp Arslán in which the Greek emperor was taken prisoner (1071), Asia Minor lay open to the inroads of the Turks. Hence it was easy for Sulaimán, the son of Kutulmish,[1] the son of Arslán Pígu (Israil), to penetrate as far as the Hellespont, the more so as after the captivity of Romanus, two rivals, Nicephorus Brycennius in Asia and another Nicephorus named Botoniates in Europe, disputed the throne with one another. The former appealed to Sulaimán for assistance, and was by his aid brought to Constantinople and seated on the imperial throne. But the possession of Asia Minor was insecure to the Seljúḳs as long as the important city of Antioch belonged to the Greeks, so that we may date the real foundation of this Seljúḳ empire from the taking of that city by the treason of its commander Philaretus in 1084, who afterwards became a vassal of the Seljúḳs. The conquest involved Sulaimán in war with the neighboring Mohammedan princes, and he met his death soon afterwards (1086), near Shaizar, in a battle against Tutush. Owing to these family discords the decision of Malik Sháh was necessary to settle the affairs of Asia Minor and Syria; he kept the sons of Sulaimán in captivity, and committed the war against the unbelieving Greeks to his generals Bursuḳ (Προζουχ) and Buzán (Πουζανος). Barkiyároḳ, however, on his accession (1092), allowed Kilig Arslán, the son of Sulaimán, to return to the dominions of his father. Acknowledged by the Turkish emirs of Asia Minor, he took up his residence in Nicæa, and defeated the first band of crusaders under Walter the Penniless and others (1096); but, on the arrival of Godfrey of Bouillon and his companions, he was prudent enough to leave his capital in order to attack them as they were besieging Nicæa. He suffered, however, two defeats in the vicinity, and Nicæa surrendered on 23d June, 1097. As the crusaders marched by way of Dorylæum and Iconium towards Antioch, the Greeks subdued the Turkish emirs residing at Smyrna, Ephesus, Sardis, Philadelphia, Laodicea, Lampes, and Polybotus;[2] and Kilig Arslán, with his Turks, retired to the northeastern parts of Asia Minor, to act with the Turkish emirs of Sivás (Sebaste), known under the name of the Danishmand.

The history of the dynasty of the Danishmand is still very obscure, notwithstanding the efforts of Mordtmann, Schlumberger, Karabaçek, Sallet, and others to fix some chronological details, and it is almost impossible to harmonize the different statements of the Armenian, Syriac, Greek, and Western chronicles with those of the Arabic, Persian, and Turkish. The coins are few in number, very difficult to decipher, and often without date. The founder of the dynasty was a certain Tailu, who is said to have been a schoolmaster (danishmand), probably because he understood Arabic and Persian. His descendants, therefore, took the style of "Ibn Danishmand," often without their own name. They took possession of Sivás, Tokát, Nicsár, Ablastán, Malatieh, probably after the death of Sulaimán, though they may have established themselves in one or more of these cities much earlier, perhaps in 1071, after the defeat of Romanus Diogenes. During the first crusade the reigning prince was Kumushtegín (Ahmed Gházi), who defeated the Franks and took prisoner the prince of Antioch, Bohemond, afterwards ransomed. He died probably in 1106, and was succeeded by his son Mohammed (d. 1143), after whom reigned Jaghi Basán; but it is very probable that other members of the same dynasty reigned at the same time in the cities already named, and in some others, *e. g.*, Kastamuni.

Afterwards there arose a natural rivalry between the Seljúḳs and the Danishmand, which ended with the extinction of the latter about 1175. Kilig Arslán took possession of Mosul in 1107, and declared himself independent of the Seljúḳs of 'Iráḳ; but in same year he was drowned in the Chaboras through the treachery of his own emirs, and the dynasty seemed again destined to decay, as his sons were in the power of his enemies. The sultan Mohammed, however, set at liberty his eldest son Malik Sháh, who reigned for some time, until he was treacherously murdered (it is not quite certain by whom), being succeeded by his brother Mas'úd, who established himself at Konieh (Iconium), from that time the residence of the Seljúḳs of Rúm. During his reign—he died in 1155—the Greek emperors undertook various expeditions in Asia Minor and Armenia; but the Seljúḳ was cunning enough to profess himself their ally and to direct them against his own enemies. Nevertheless the Seljúḳian dominion was petty and unimportant and did not rise to significance till his son and successor, Kilig Arslán II., had subdued the Danishmands and appropriated their possessions, though he thereby risked the wrath of the powerful atebek of Syria, Nur ed-dín, and afterwards that of the still more powerful Saladin. But as the sultan grew old his numerous sons, who held each the command of a city of the empire, embittered his old age by their mutual rivalry, and the eldest, Ḳotb ed-dín, tyrannized over his father in his own capital, exactly at the time that Frederick I. (Barbarossa) entered his dominions on his way to the Holy Sepulchre (1190). Konieh itself was taken and the sultan forced to provide guides and provisions for the crusaders. Kilig Arslán lived two years longer, finally under the protection of his youngest son, Kaikhosrau, who held the capital after him (till 1199) until his elder brother, Rokn ed-dín Sulaimán, after having vanquished his other brothers, ascended the throne and obliged Kaikhosrau to seek refuge at the Greek emperor's court. This valiant prince saved the empire from destruction and conquered Erzerúm, which had been ruled during a considerable time by a separate dynasty, and was now given in fief to his brother, Mughít ed-dín Toghrul Sháh. But, marching thence against the Georgians, Sulaimán's troops suffered a terrible defeat; after this Sulaimán set out to subdue his brother Ma'súd Sháh, at Angora, who was finally taken prisoner and treacherously murdered. This crime is regarded by Oriental authors as the reason of the premature death of the sultan in (1204); but it is more probable that he was murdered because he displeased the Mohammedan clergy, who accused him of atheism. His son, Kilig Arslán III., was soon deposed by Kaikhosrau (who returned), assisted by the Greek Maurozomes, whose daughter he had married in exile. He ascended the throne the same year in which the Latin empire was established in Constantinople, a circumstance highly favorable to the Turks, who were the natural allies of the Greeks (Theodore Lascaris) and the enemies of the crusaders and their allies, the Armenians. Kaikhosrau, therefore, took in 1207 from the Italian Aldobrandini the important harbor of Attalia (Adalia); but his conquests in this direction were put an end to by his attack upon Lascaris, for in the battle that ensued he perished in single combat with his royal antagonist (1211). His son and successor, Kaikávús, made peace with Lascaris and extended his frontiers to the Black Sea by the conquest of Sinope (1214). On this occasion he was fortunate enough to take prisoner the Comnenian prince (Alexis) who ruled the independent empire of Trebizond, and he compelled him to purchase his liberty by acknowledging the supremacy of the Seljúḳs, by paying tribute, and by serving in the armies of the sultan. Elated by this great success and by his victories over the Armenians, Kaikávús was induced to

[1] This prince rebelled against Alp Arslán in 1064, and was found dead after a battle.

[2] The Turkmans who dwelt in these western parts of Asia Minor, which were never regained by the Seljúḳs, were called Utch (Outsiders).

attempt the capture of the important city of Aleppo, at this time governed by the descendants of Saladin; but the affair miscarried. Soon afterwards the sultan died (1219) and was succeeded by his brother, Alá ed-dín Kaikobád, the most powerful and illustrious prince of this branch of the Seljúks, renowned not only for his successful wars but also for his magnificent structures at Konieh, Alaja, Sivás, and elsewhere, which belong to the best specimens of Saracenic architecture. The town of Alaja was the creation of this sultan, as previously there existed on that site only the fortress of Candelor, at that epoch in the possession of an Armenian chief, who was expelled by Kaikobád, and shared the fate of the Armenian and Frankish knights who possessed the fortresses along the coast of the Mediterranean as far as Sclefke (Seleucia). Kaikobád extended his rule as far as this city, and desisted from further conquest only on condition that the Armenian princes would enter into the same kind of relation to the Seljúks as had been imposed on the Comnenians of Trebizond. But his greatest military fame was won by a war which, however glorious, was to prove fatal to the Seljúk empire in the future: in conjunction with his ally, the Eyyúbid prince Al-Ashraf, he defeated the Kházrizm sháh Jelál ed-dín near Arzengán (1230). This victory removed the only barrier that checked the progress of the Mongols. During this war Kaikobád put an end to the collateral dynasty of the Seljúks of Erzerúm and annexed its possessions. He also gained the city of Khelát with dependencies that in former times had belonged to the Sháh-i-Armen, but shortly before had been taken by Jelál ed-dín; this aggression was the cause of the war just mentioned. The acquisition of Khelát led, however, to a new war, as Kaikobád's ally, the Eyyúbid prince, envied him this conquest. Sixteen Mohammedan princes, mostly Eyyúbids, of Syria and Mesopotamia, under the leadership of Al-Malik al-Kámil, prince of Egypt, marched with considerable forces into Asia Minor against him. Happily for Kaikobád, the princes mistrusted the power of the Egyptian, and it proved a difficult task to penetrate through the mountainous well-fortified accesses to the interior of Asia Minor, so that the advantage rested with Kaikobád, who took Kharput, and for some time even held Ḥarrán, Ar-Roha, and Rakḳa (1232). The latter conquests were, however, soon lost, and Kaikobád himself died in 1234 of poison administered to him by his son and successor, Ghiyáts ed-dín Kaikhosrau II. This unworthy son inherited from his father an empire embracing almost the whole of Asia Minor, with the exception of the countries governed by Vatatzes (Vataces) and the Christian princes of Trebizond and Lesser Armenia, who, however, were bound to pay tribute and to serve in the armies,—an empire celebrated by contemporary reports for its wealth.[1] But the Turkish soldiers were of little use in a regular battle, and the sultan relied mainly on his Christian troops, so much so that an insurrection of dervishes which occurred at this period could only be put down by their assistance. It was at this epoch also that there flourished at Konieh the greatest mystical poet of Islam, and the founder of the order of the Mawlawis, Jelál ed-dín Rúmí (d. 1273; see RÚMÍ), and that the dervish fraternities spread throughout the whole country and became powerful bodies, often discontented with the liberal principles of the sultans, who granted privileges to the Christian merchants and held frequent intercourse with them. Notwithstanding all this, the strength and reputation of the empire were so great that the Mongols hesitated to invade it, although standing at its frontiers. But, as they crossed the border, Kaikhosrau marched against them, and suffered a formidable defeat at Kuzadág (between Arzengán and Sivás) in 1243, which forced him to purchase peace by the promise of a heavy tribute. The independence of the Seljúks was now forever lost. The Mongols retired for some years; but, Kaikhosrau dying in 1245, the joint government of his three sons gave occasion to fresh inroads, till one of them died and Hulagu divided the empire between the other two, 'Izz ed-dín ruling the districts west of the Halys and Rokn ed-dín the eastern provinces (1259). But the former, intriguing with the Mameluke sultans of Egypt to expel his brother and gain his independence, was defeated by a Mongol army and obliged to flee to the imperial court. Here he was imprisoned, but afterwards released by the Tatars of the Crimea, who took him with them to Sarai, where he died. Rokn ed-dín was only a nominal ruler, the real power being in the hands of his pervánch, Muín ed-dín Sulaimán, who in 1267 procured an order of the Mongol Khán Abaka for his execution. The minister raised his infant son, Ghiyáts ed-dín Kaikhosrau III., to the throne, and governed the country for ten years longer, till he was entangled in a conspiracy of several emirs, who proposed to expel the Mongols with the aid of the Mameluke sultan of Egypt (Beybars or Bibars). The latter marched into Asia Minor and defeated the Mongols in the bloody battle of Ablastán (1277); but, when he advanced farther to Cæsarea, the pervánch retired, hesitating to join him at the very moment of action. Beybars, therefore, in his turn fell back, leaving the pervánch to the vengeance of the khán, who soon discovered his treason and ordered a barbarous execution. Ghiyáts ed-dín continued to reign in name till 1284, though the country was in reality governed by a Mongol viceroy. Mas'úd, the son of 'Izz ed-dín, who on the death of his father had fled from the Crimea to the Mongol khán and had received from him the government of Sivás, Arzengán, and Erzerúm during the lifetime of Ghiyáts ed-dín, ascended the Seljúk throne on the death of Ghiyáts. But his authority was scarcely respected in his own residence, for several Turkish emirs assumed independence and could only be subdued by Mongol aid, when they retired to the mountains, to reappear as soon as the Mongols were gone. Mas'úd fell, probably about 1295, a victim to the vengeance of one of the emirs, whose father he had ordered to be put to death. After him Kaikobád, son of his brother Farámarz, entered Konieh as sultan in 1298, but his reign is so obscure that nothing can be said of it; some authors assert that he governed only till 1300, others till 1315. With him ended the dynasty of the Seljúks; but the Turkish empire founded by them continued to exist under the rising dynasty of the Ottomans. (See TURKEY.)

[1] See the details in Vincent of Beauvais, *Speculum Historiale*, bk. xxx. chaps. 143, 144.

Bibliography.—The best, though insufficient, account of the Seljúks is still De Guignes, *Histoire Générale des Huns*, bks. x.–xii., from whom Gibbon borrowed his dates. Among translations from original sources (of which the most trustworthy are yet unedited), comp. Mirkhond's *Geschichte der Seldschuken* (ed. Vullers), Giessen, 1838; *Tarikh-i-Guzideh*, French translation by Defrémery in the *Journal Asiatique*, 1848, i. 417 *sq.*, ii. 259 *sq.*, 334 *sq.*; *Seid Locmani ex Libro Turcico qui Oghuzname inscribitur Excerpta* (ed. J. H. W. Lagus), Helsingfors, 1854 (on the Seljúks of Asia Minor exclusively, but of little value). Information respecting certain periods is given incidentally in the well-known works of Von Hammer and D'Ohsson. (M. T. H.)

SELKIRK, a lowland county of Scotland, of tortuous outline, is bounded by Midlothian on the N., by Peebles on the N. and W., by Dumfries on the S., and by Roxburgh on the E. Its extreme length from southwest to northeast is 28 miles, its greatest breadth from east to west 17, and its total area 260 square miles or 166,524 acres, of which 1997 are water. This includes two detached portions, one to the northwest, surrounded by Peebles, and another on the east, the estate and barony of Sinton, separated from Roxburgh in the reign of William the Lion on the appointment of Andrew de Synton to the sheriffship of Selkirk.

From its lowest altitude (300 feet) at the junction of the Gala and the Tweed the surface rises to 2433 feet at Dun Rig, a wild and desolate summit on the western boundary. Level haughs, beds of ancient lakes, occur in the courses of the rivers; but the county is otherwise wholly mountainous and only a small proportion of it arable. Of its principal summits, Ettrick Pen (2269), Capel Fell (2223), Deer Law (2064), Herman Law (2014), are in the south, and Windlestrae Law (2161) in the north, about a mile from the borders of Midlothian. Broadly speaking, Selkirk may be said to consist of the two entire valleys of Ettrick and Yarrow and a section of the valley of Tweed, the first two sloping from the south until they merge in the last, which forms the northern portion of the county. Besides St. Mary's Loch and its adjunct the Loch of the Lowes, together about 4½ miles long, there are several others of considerable size, mostly in the eastern uplands between Ettrick and Teviotdale—the two lochs of Shaws, Clearburn Loch, Kingside Loch, Hellmuir Loch, Alemuir Loch, and Akermuir Loch. These, with the larger rivers and the mountain "burns," attract anglers to Selkirk from all parts of the kingdom.

Geologically, the Selkirk rocks are a portion of that great Silurian mass which occupies the south of Scotland from Wigtown to the northeast coast of Berwick. At no part are they known to be covered by rocks of later formation; but here and there (at Windlestrae Law and Priesthope, for example) igneous rocks protrude in massive outcrops, almost granitic, one measuring over 100 feet in thickness. The hillsides yield inexhaustible supplies of blue-gray whinstone, suitable for building; but repeated efforts to establish slate-quarries and lead-mines have ended in failure. According to records of the 16th century, gold was found at Mount Benger, Douglas Craig, and Linglie Burn, —"an ingenious gentleman" named Bevis Bulmer having been "most successful upon Henderland Moor in Ettrick Forest, where he got the greatest gold—the like to it in no other place before of Scotland."

Corresponding with the high average altitude, the prevailing climate is cold and wet, and, as the soil is mostly thin, over a close subsoil of clayey "till," agriculture is carried on at a disadvantage. About the middle of the 19th century large areas of virgin soil were brought under tillage; but the prudence of the "improvement" is now greatly doubted, in regard to a large proportion at least,—its restoration to permanent pasture being now found almost impracticable.

In 1884 23,263 acres, or nearly a seventh of the whole, were under cultivation and 3228 under wood. The rotation of crops most commonly followed is a six-course shift of (1) turnips, (2) barley or oats, (3), (4), (5) grass or pasture, and (6) oats. Horses in 1884 numbered 580, cattle 2657, sheep 165,061. Till about a century ago the upper farms of the county were stocked exclusively with sheep of the black-faced breed, and in high heathery tracts these still predominate. But as altitude diminishes sheep improve in quality, from pure Cheviot to half-bred and three-quarters-bred Leicester-Cheviot. Upwards of 60,000 acres, more than a third of the county, belong to the duke of Buccleuch, whose title is derived from an ancient possession of his family in the vale of Rankleburn. Other principal landowners are Mr. Maxwell-Stuart of Traquair (9765 acres) and Lord Napier and Ettrick (6988 acres).

Manufacturers.—So early as the beginning of the 17th century the village of Galashiels did a considerable local trade in woollen cloth, then or shortly afterwards known as "Galashiels gray," and towards the end of the 18th century this industry was greatly stimulated by judicious grants from "the equivalent" paid by England at the Union. About the end of the first quarter of the 19th century a few novelties in pattern (mostly accidental) led to the opening up of what has now become a vast industry —the Tweed trade, which still has its acknowledged centre in Selkirk.

Administration and Population.—Selkirkshire with Peeblesshire forms one parliamentary constituency. Of entire civil parishes it contains only two, with parts of nine others; there are also, taken from these, three *quoad sacra* parishes and part of a fourth. The population, 4937 in 1755 and 9809 in 1851, was in 1881 returned at 25,564,—an increase partly due to the annexation of a portion of Galashiels formerly reckoned in Roxburgh. Outside the two towns of Galashiels (population 9140 in 1881) and Selkirk population has been almost stationary for more than a century, that of the landward parishes in 1755 and 1881 being respectively as follows: Ashkirk, 200 and 138; Innerleithen, 60 and 61; Ettrick, 397 and 397; Stow, 260 and 441; Yarrow, 1180 and 611; Roberton, 250 and 250.

Antiquities and History.—The shire is not rich in antiquities, although its hillsides here and there reveal earthen enclosures known as "British camps," as well as tumuli yielding human remains and the usual fragments of rude pottery. A mysterious ditch, known as "the Catrail," beginning at the north end of the county, traverses its entire extent before entering Roxburgh on its way to the English border. Besides smaller redoubts, there is on its line, at Rink in Galashiels parish, a well-preserved circular fort of formidable strength and dimensions. Near Minchmoor the Catrail is crossed by "Wallace's trench," where, according to an historical document recently published, the Scottish patriot defied for a while the generals of Edward I. Close by is the hill-track by which Montrose escaped from the disastrous field of Philiphaugh in 1645. Newark Castle, built by James II., still stands in fair preservation, notable enough historically, but more familiar as the recital-hall of the "last minstrel's" immortal lay. The county is dotted over with other towers of smaller size, in various stages of decay. Around them cluster those traditions which, sung in ballads full of simple force and tenderness, have made Selkirk the poet's chosen haunt. Yarrow, "garlanded with rhyme," has, without hyperbole, been termed "the Tempe of the West." Selkirk was long known officially as the "shire of the Forest," an appellation its famous sheriff Sir Walter Scott loved to recall. Except the burgh of Selkirk, its lands, and a large tract in upper Ettrick belonging to Melrose Abbey, the county remained long under the jurisdiction of a forest court, and its forest-steadings were held by tack from the crown till the time of Queen Mary. It was a favorite hunting-ground of Scottish monarchs and formed the dowry-land of at least two foreign princesses who became queens of Scotland.

See T. Craig-Brown *Hist. of Selkirkshire.*

SELKIRK, the county town of Selkirkshire, is on the river Ettrick, between its absorption of the Yarrow and its junction with the Tweed, and is connected by a branch railway with the Waverley line from Scotland to England. Although almost entirely a manufacturing town, having several large mills for woollen cloth and yarn, it is not without importance as the centre of an extensive pastoral area. The county offices and prison excepted, the public buildings of Selkirk are not striking. The population of the burgh was 1053 in 1735, 1800 in 1831, and 6090 in 1881.

From the charter by which David I., while prince of Northumbria, established in Selkirk the Benedictine abbey afterwards removed to Kelso, it appears that even at that remote period (1119–24) it was an old town and the prince's residence. David's castle continued to be a frequent resort of his successors on the throne, particularly of William the Lion, many of whose charters were signed "in plena curia apud Scelchircham." Enlarged and strengthened by Edward I., the fortress was captured by the patriotic party soon after Wallace's return from France. Nothing now remains of it but green mounds and the name "Peel Hill." It is significant of the destruction wrought by repeated conquests and reconquests that Selkirk, notwithstanding its antiquity and early importance, boasts not one building a century and a half old. As its early name (Schelleschyrche) implies, it was originally a collection of forest "shiels" beside which an early church was planted, probably by the Culdees of Old Melrose. Clear light is thrown upon the manners and customs of old border towns by the ancient records of this burgh, still extant (with gaps) from 1503. A minute of 1513 mentions the steps taken to comply with the king's letter ordering the levy before Flodden, where, according to tradition, the burgesses of Selkirk fought with stubborn valor. James V. granted the community right to enclose 1000 acres from the common and gave them leave to elect a provost, the first to fill that office being slain in defence of the burgh lands. From an early period shoemakers were a numerous craft in Selkirk, and in 1715 and 1745 they were forced to furnish several thousand pairs of shoes to the Jacobite armies. "Souters of Selkirk" is still a synonym for the inhabitants.

SELKIRK, or SELCRAIG, ALEXANDER (1676–1723), a sailor who is supposed to have been the proto-

type of Defoe's "Robinson Crusoe," was the son of a shoemaker and tanner in Largo, Fifeshire, and was born in 1676. In his youth he displayed a quarrelsome and unruly disposition, and, having been summoned on 27th August, 1695, before the kirk-session for his indecent behavior in church, "did not compear, being gone away to the seas." At an early period he was engaged in buccaneer expeditions to the South Seas, and in 1703 joined the "Cinque Ports" galley as sailing master. The following year he had a dispute with the captain, and at his own request was in October put ashore on the island of Juan Fernandez, where, after a solitary residence of four years and four months, he was taken off by Captain Woodes Rogers, commander of a privateer, who made him his mate and afterwards gave him the independent command of one of his prizes. He returned home in 1712; but in 1717 he eloped with a country girl and again went to sea. He died in 1723 while lieutenant on board the royal ship "Weymouth."

See Howell, *Life and Adventures of Alexander Selkirk*, 1829.

SELMA, a city of the United States, in Dallas county, Alabama, at the head of steamboat navigation of the Alabama river, occupies a plateau on the bluff of the right bank, 95 miles below Montgomery. It has cotton warehouses, railroad machine shops, and various factories. The population was 6484 (3660 colored) in 1870 and 7529 (4184 colored) in 1880. Selma, which was strongly fortified during the Civil War and the seat of a Confederate arsenal (where 1800 men were employed), was captured by the Federal major-general J. H. Wilson on 2d April, 1865.

SEMIPALATINSK, an extensive province (*oblast*) of the Russian dominions in Central Asia; administratively it forms a part of the general-governorship of the Steppes, although its northern portions really belong to the Irtish plains of West Siberia. It has an area of 188,300 square miles, and is bounded on the N. by Tobolsk and Tomsk, on the S.E. by China, on the S. by Semiryetchensk, and on the W. by Akmolinsk. As regards configuration, it differs widely in its northern and southern parts. The snowclad ridges (9000 to 10,000 feet) of the great Altai and Narym enter its southeastern portion, stretching southwards to Lake Zaisan. Another complex of mountains, Kandygatai and Kalbinsk, rising to 5000 and 6000 feet above the sea, continues then towards the west; a broad valley intervenes, through which the Irtish finds its way from the Zaisan terrace to the lowlands of Siberia. Many extensions of these mountains and subordinate ridges stretch towards the north. The still lower but wild Jinghiz-tau mountains fill the southwestern part of Semipalatinsk, sending out their rocky spurs into the steppe region. In the south, the Tarbagatai (Marmots') range (9000 to 10,000 feet) separates Semipalatinsk from Semiryetchensk and the Chinese province of Jugutchak. Wide steppes fill up the spaces between the mountains: such are the Zaisan steppe (1200 to 1500 feet), between the Tarbagatai and the Altai ranges; the plains of Lake Balkash, some 300 feet lower, to the south of the Jinghiz-tau; and the plains of the Irtish, which hardly rise 600 feet above the sea. All kinds of crystalline rocks—granites, syenites, diorites, and porphyries, as also crystalline slates of all descriptions—are met with in the mountain tracts, which contain also rich gold-bearing sands, silver and lead mines, graphite, coal, and the less valuable precious stones. The geology of the region and even its topography are still but imperfectly known. Numerous boulders widely scattered around the mountains testify to a much wider extension of glaciers in former times. The chief river of the province, the Irtish, which issues from Lake Zaisan, flows north and northwest and waters Semipalatinsk for more than 760 miles. Between Bukhtarma and Ust-Kamenogorsk it crosses the Altai by a wild gorge, with dangerous rapids, through which, however, boats are floated. Lake Zaisan, 80 miles long and from 10 to 20 wide, has depth sufficient for steamboat navigation; steamers traverse also for some 100 miles the lower course of the Black Irtish, which flows from Kuldja to Lake Zaisan. The Kurtchum, the Narym, and the Bukhtarma are the chief right-hand tributaries of the Irtish, while the Bukoñ, the Kizil-su, and many smaller ones join it from the left; none are navigable, neither are the Kokbekty and Bugaz, which enter Lake Zaisan on the west. Lake Balkash, which borders Semipalatinsk in the southwest, formerly received several tributaries from the Jinghiz-tau. Many smaller lakes (some of them merely temporary) occur on the Irtish plain, and yield salt. The whole of the country is rapidly drying up. The climate is severe. The average yearly temperature reaches 43° in the south and 34° in the north; the winter is very cold, and frosts of —44° Fahr. are not uncommon, while heats raising the thermometer to 122° in the shade are experienced in the summer. The yearly amount of rain and snow is trifling, although snowstorms are very common; strong winds prevail. Forests are plentiful in the hilly districts and on the Irtish plain, the flora being Siberian in the north and more Central Asiatic towards Lakes Balkash and Zaisan.

The chief inhabitants are Kirghiz-kazaks, who acknowledged the supremacy of Russia in 1732 and may number now (1886) nearly half a million (479,750 in 1876, of whom 10,950 were settled in towns). The Russian population, which in the same year amounted to nearly 50,000 Cossacks and peasants, has slowly increased since. The aggregate population was in 1882 estimated at 538,400, of whom 34,550 lived in towns. The Russians are chiefly agriculturists, and have wealthy settlements on the right bank of the Irtish, as well as a few patches in the south, at the foot of the mountains. The Kirghizes are almost exclusively cattle-breeders and keep large flocks of sheep, horses, and horned cattle, as also camels. Hunting and fishing (in Lake Zaisan) are favorite and profitable occupations with the Cossacks and Kirghizes. Industries are of course insignificant, except that of mining,—gold being obtained within the province to the amount of from 300 to 400 lb every year; the extraction of silver and lead is very limited. Trade is of some importance, and is increasing,—Russian manufactured articles being exchanged for the raw produce (hides, tallow, cattle) of the region. The province is divided into four districts, the chief towns of which are Semipalatinsk (17,820 inhabitants in 1881), Pavlodar (2260), Kokbekty (3680), and Karkaralinsk (2030). All these towns, lost amidst the sandy steppes, are mere administrative centres. Bukhtarma and Ust-Kamenogorsk (3400), among the mountains, are also worthy of mention.

SEMIPALATINSK, capital of the above province, is situated on the right bank of the Irtish, on the highway from Central Asia to northern Europe. At the end of the 18th century it began to be a centre for trade, reaching its greatest development in 1850–60. Kazan and Turkestan Tatars formed the bulk of its population. The town still remains, however, a collection of old wooden houses scattered among unfenced spaces of sand. The Tatar town has a somewhat better aspect than the Russian. The inhabitants (17,820 in 1881) consist of officials, merchants, and agriculturists.

SEMIRAMIS. According to the legend which the Greeks received from Ctesias, and which is most fully preserved by Diodorus (book ii.) in a form that, according to the researches of C. Jacoby (*Rhein. Museum*, 1875, p. 555 *sq.*), is not taken direct from Ctesias but comes through Clitarchus, and has been modified by traits borrowed from the history of Alexander the Great, the Assyrian empire over all Asia as far as the borders of India was created by Ninus, the founder of Nineveh, and his greater spouse Semiramis, who was first the wife of his captain, Onnes, but won the king's love by an heroic exploit, the capture of Bactra, which had defied the royal forces. Ninus died, and Semiramis, succeeding to his power, traversed all parts of the empire, erecting great cities (especially Babylon) and stupendous monuments or opening roads through sav-

age mountains. She was unsuccessful only in an attack on India. At length, after a reign of forty-two years, she delivered up the kingdom to her son Ninyas and disappeared, or, according to what seems to be the original form of the story, was turned into a dove and was thenceforth worshipped as a deity. This legend is certainly not Assyrian or Babylonian; Ctesias must have had it from Persians or Medes, and the fulness of detail, the multitude of proper names, favor the conjecture that Ninus and Semiramis were celebrated in some Median epic tale which went on to tell of the fall of Assyria before the Medes (Duncker, *Gesch. d. Alt.*, 5th ed., ii. 18 *sq.*). In this legend all the conquests of Assyria were crowded together into one lifetime, and King Ninus and his son Ninyas are mere eponyms of Nineveh, personifications of the Assyrian monarchy. But it is round the figure of Semiramis that all the real interest of the legend gathers; nor can she be the arbitrary creation of a poet, for it is certain that her name was popularly connected with many famous places and monuments. "The works of Semiramis," says Strabo (xvi. 1, 2), "are pointed out through almost the whole continent, earthworks bearing her name, walls and strongholds, aqueducts, and stair-like roads over mountains, canals, roads, and bridges." Ultimately every stupendous work of antiquity by the Euphrates or in Iran seems to have been ascribed to her,—even the Behistun inscriptions of Darius (Diod., ii. 13). Of this we already have evidence in Herodotus, who, though he does not know the legend afterwards told by Ctesias, ascribes to her the banks that confined the Euphrates (i. 184), and knows her name as borne by a gate of Babylon (iii. 155). Various places in Media bore the name of Semiramis, but slightly changed, even in the Middle Ages (Hoffman, *Syrische Akten*, p. 137), and the old name of Van was Shamiramagerd, Armenian tradition regarding her as its founder (St. Martin, *Mém. sur l'Arménie*, i. 138). These facts are to be explained by observing that in her birth, as well as in her disappearance from earth, Semiramis clearly appears not as a mere woman, but as a great goddess. In Diodorus's account she is the daughter of Derceto of Ascalon, and miraculously brought up by doves, and again she is finally transformed into a dove, and therefore the Assyrians pay divine honors to this bird. Semiramis, therefore, is a dove-goddess associated with Derceto, the fish-goddess. The same association of the fish- and dove-goddesses appears at Hierapolis (Bambyce, Mabbug), the great temple at which, according to one legend, was founded by Semiramis (*De Dea Syria*, 14), and where her statue was shown with a golden dove on her head (*ibid.*, 33, comp. 39).[1] But the Semitic dove-goddess is Ishtar or Astarte, the great goddess of Assyria and Babylon, and the irresistible charms of Semiramis, her sexual excesses (see especially Dinon in Ælian, *V. H.*, vii. 1), and other features of the legend all bear out the view that she is primarily a form of Astarte, and so fittingly conceived as the great queen of Assyria. The word Semiramis in Semitic form, as the Syrians write it, is Shĕmīrām (Hoffmann, *ut supra*), an epithet rather than a proper name, which may be rendered "the highly celebrated," or perhaps rather "name [manifestation] of [the god] Rām."[2] The historical inference from all this is that Semitic worship was carried by the Assyrians far into Media and Armenia.

On an Assyrian inscription the name Sammuramat appears as borne by the "lady of the palace" of Rammannivar (812–783 B.C.); see Schrader, *K. A. T.*, 2d ed., p. 366. E. Meyer (*Gesch. des Alterth.*, p. 409) combines this with the statement of Herodotus that Semiramis lived five generations before Nitocris, which would make her date 766 B.C. Possibly Herodotus identified the two names, but it is very doubtful whether they are really connected. Shemiramoth (1 Chron. xv. 18) perhaps means "statues of Semiramis," and, if so, was originally a place-name (Ewald, *a. l.*).

[1] It is noteworthy in this connection that Mabbug is the *Ninus vetus* of Ammianus and Philostratus.

[2] Cp. the Phœnician "Astarte שסכעל" (*C.I.S.*, i. 1, No. 3, l. 18).

SEMIRYETCHENSK, a province of Russian Turkestan, including the steppes south of Lake Balkash and parts of the Tian-Shan Mountains around Lake Issik-kul. It has an area of 155,300 square miles, and is bounded by Semipalatinsk on the N., by China (Jugutchak, Kuldja, Aksu, and Kashgaria) on the E. and S., and by the Russian provinces of Ferganah, Syr-Daria, and Akmolinsk on the W. It owes its name (*Jity-su*, *Semi-ryetchie*, *i.e.*, "Seven Rivers") to the rivers which flow from the southeast into Lake Balkash. The Jungarian Ala-tau, which separates it from northwestern Kuldja, penetrates into its central portions, extending southwest towards the river Ili, with an average height of 6000 feet above the sea, several isolated snow-clad peaks reaching about 12,000 feet. In the south Semiryetchensk embraces the intricate systems of the Trans-Ili Ala-tau and the Tian-Shan (see TURKESTAN). Two ranges of the former, connected about their middle by a single mountain-mass, extend east-northeastwards along the northern shore of Lake Issik-kul, both ranging from 10,000 to about 15,000 feet and both partially snow-clad. To the south of the lake two immense ranges of the Tian-Shan, separated by the valley of the Naryn, stretch in the same direction, raising their icy peaks to above 15,000 and 16,000 feet, while westwards from the lake the vast walls of the Alexandrovskiy ridge, 9000 to 10,000 feet high, with peaks rising some 2000 feet higher, extend to the province of Syr-Daria. Another mountain complex of much lower elevation runs northwestwards from the Trans-Ilian Ala-Tau towards the southern extremity of Lake Balkash. In the north, where the province borders Semipalatinsk, it includes the western parts of the Tarbagatai range, the summits of which (10,000 feet) do not reach the limit of perpetual snow. The remainder of the province consists of a rich steppe in the northeast (Serghiopol), and vast uninhabitable sand-steppes on the southeast of Lake Balkash. Southwards from the last-named, however, at the foot of the mountains and at the entrance to the valleys, there are rich areas of fertile land, which are rapidly being colonized by Russian immigrants, who have also spread into the Tian-Shan, to the east of Lake Issik-kul. The climate is relatively temperate (average yearly temperature 44° Fahr. at Vyernyi, 2500 feet above the sea) and the vegetation rich.

The chief river is the Ili, which enters the province from Kuldja, makes its way through the spurs of the Trans-Ilian Ala-tau, flows northwest in a bed varying from 200 to 1000 yards in width, and waters the province for 250 miles before it enters Lake Balkash by several mouths forming a wide delta. Its tributaries from the left are the Naryn, the Tchilik, and the Kurtu; several others become lost in the sands. The Karatal, the Aksu, and the Lepsa likewise fall into Lake Balkash. The Tchu rises in the Tian-Shan Mountains, and flows northwestward to Lake Saumal-kul; and the Naryn flows southwestwards along a longitudinal valley of the Tian-Shan, and enters Ferganah to join the Syr-Daria. The province contains several important lakes. Lake Balkash, or Denghiz, in the north (8880 square miles), is crescent-shaped, 400 miles long and 55 wide in its broader part; but its area is much less than it formerly was, and it is rapidly drying up,—notably since 1853. Lake Ala-kul, which was connected with Balkash in the Post-Pliocene period, now stands some hundred feet higher, and is connected by a chain of smaller lakes with Sisik-kul. Lake Issik-kul (2260 square miles) is a deep mountain-lake, 120 miles long and 37 wide, 5300 feet above the sea. The alpine lakes Son-kul (9400 feet) and Tchatyr-kul (11,100) lie southwest of Issik-kul.

The population, which was estimated at 748,800 by M. Kostenko in 1880 (139,660 being in the Kuldja region), has since increased, the latest official figures (1882) giving 685,950 for the province, exclusive of the Kuldja region. Of these Russians numbered, according to Kosteuko, 44,585, 20,640 being Cossacks, who are very poor as compared with the free Russian emigrants. The majority of the population are Kirghiz (595,237); next come Tarantchis (36,265), Kalmucks (about 25,000), Mongols and Manchurians (22,000), and Dungans (19,657), these last two mostly in Kuldja; while Tatars and Sarts are each represented by

some 3000 or 3500 (all the foregoing figures include those for Kuldja). The province is subdivided into five districts; Vyernyi (18,423 inhabitants in 1879, of whom 3586 were military), the chief town of the province, formerly Almaty, is situated at the foot of the Trans-Ilian Ala-tau, and has a mixed population of Russians, Tatars, Sarts, Kirghiz, Kalmucks, and Jews; its trade with Kuldja and Kashgar is increasing rapidly, and it has now two lyceums, for boys and girls, and several other schools. The other towns—Kopal (5450 inhabitants), Serghiopol (1045), Tokmak (1770), and Karakol (2780)—are merely administrative centres.

SEMITIC LANGUAGES.

THE name "Semitic languages" is used to designate a group of Asiatic and African languages, some living and some dead, namely, Hebrew and Phœnician, Aramaic, Assyrian, Arabic, Ethiopic (Geez and Amharic). The name, which was introduced by Eichhorn,[1] is derived from the fact that most nations which speak or spoke these languages are descended, according to Genesis, from Shem, son of Noah. But the classification of nations in Genesis x. is founded neither upon linguistic nor upon ethnographical principles; it is determined rather by geographical and political considerations. For this reason Elam and Lud are also included among the children of Shem; but neither the Elamites (in Susiana) nor the Lydians appear to have spoken a language connected with Hebrew. On the other hand, the Phœnicians (Canaanites), whose dialect closely resembled that of Israel, are not counted as children of Shem. Moreover, the compiler of the list in Genesis x. had no clear conceptions about the peoples of south Arabia and Ethiopia. Nevertheless it would be undesirable to give up the universally received terms "Semites" and "Semitic." There exist large groups of languages and peoples which bear no natural collective appellations, because the peoples grew up unconscious of their mutual relationship; so science must needs give them artificial designations, and it would be well if all such terms were as short and precise as "Semitic."

Mutual connection.

The connection of the Semitic languages with one another is somewhat close, in any case closer than that of the Indo-European languages. The more ancient Semitic tongues differ from one another scarcely more than do the various Teutonic dialects. Hence even in the 17th century such learned Orientalists as Hottinger, Bochart, Castell, and Ludolf had a tolerably clear notion of the relationship between the different Semitic languages with which they were acquainted; indeed the same may be said of some Jewish scholars who lived many centuries earlier, as, for instance, Jehuda ben Koraish. It is not difficult to point out a series of characteristic marks common to these languages,—the predominance of triconsonantal roots, or of roots formed after the analogy of such, similarity in the formation of nominal and verbal stems, a great resemblance in the forms of the personal pronouns and in their use for the purpose of verbal inflection, the two principal tenses, the importance attached to the change of vowels in the interior of words, and lastly considerable agreement with regard to order and the construction of sentences. Yet even so ancient a Semitic language as the Assyrian appears to lack some of these features, and in certain modern dialects, such as New Syriac, Mahri, and more particularly Amharic, many of the characteristics of older Semitic speech have disappeared. But the resemblance in vocabulary generally diminishes in proportion to the modernness of the dialects. Still we can trace the connection between the modern and the ancient dialects, and show, at least approximately, how the former were developed out of the latter. Where a development of this kind can be proved to have taken place, there a relationship must exist, however much the individual features may have been effaced. The question here is not of logical categories but of organic groups.

[1] *Einleitung in das A. T.*, 2d ed., i. 45 (Leipsic, 1787).

Primitive Semitic language.

All these languages are descendants of a primitive Semitic stock which has long been extinct. Many of its most important features may be reconstructed with at least tolerable certainty, but we must beware of attempting too much in this respect. When the various cognate languages of a group diverge in essential points, it is by no means always possible to determine which of them has retained the more primitive form. The history of the development of these tongues during the period anterior to the documents which we possess is often extremely obscure in its details. Even when several Semitic languages agree in important points of grammar we cannot always be sure that in these particulars we have what is primitive, since in many cases analogous changes have taken place independently. To one who should assert the complete reconstruction of the primitive Semitic language to be possible, we might put the question, Would the man who is best acquainted with all the Romance languages be in a position to reconstruct their common mother, Latin, if the knowledge of it were lost? And yet there are but few Semitic languages which we can know as accurately as the Romance languages are known. As far as the vocabulary is concerned, we may indeed maintain with certainty that a considerable number of words which have in various Semitic languages the form proper to each were a part of primitive Semitic speech. Nevertheless even then we are apt to be misled by independent but analogous formations and by words borrowed at a very remote period.[2] Each Semitic language or group of languages has, however, many words which we cannot point out in the others. Of such words a great number no doubt belonged to primitive Semitic speech, and either disappeared in some of these languages or else remained in use, but not so as to be recognizable by us. Yet many isolated words and roots may in very early times have been borrowed by the Hebrew, the Aramaic, the Ethiopic, etc., perhaps from wholly different languages, of which no trace is left.

The question which of the known Semitic dialects most resembles the primitive Semitic language is less important than one might at first suppose, since the question is not one of absolute but only of relative priority. After scholars had given up the notion (which, however, was not the fruit of scientific research) that all Semitic languages, and indeed all the languages in the world, were descendants of Hebrew or of Aramaic, it was long the fashion to maintain that Arabic bore a close resemblance to the primitive Semitic language.[3] But, just as it is now recognized with ever-increasing clearness that Sanskrit is far from having retained in such a degree as was even lately supposed the characteristics of primitive Indo-European speech, so in the domain of the Semitic tongues we can assign to Arabic only a relative antiquity. It is true that in Arabic very many features are preserved more faithfully than in the cognate languages,—for instance, nearly all the original abundance of consonants, the short vowels in open syllables, particularly in the interior of words, and many grammatical distinctions which in the other

[2] The more alike two languages are the more difficult it usually is to detect, as borrowed elements, those words which have passed from one language into the other.

[3] This theory is carried to its extreme limit in Olshausen's very valuable *Hebrew Grammar* (Brunswick, 1861).

languages are more or less obscured. But on the other hand, Arabic has coined, simply from analogy, a great number of forms which, owing to their extreme simplicity, seem at the first glance to be primitive, but which nevertheless are only modifications of the primitive forms; whilst perhaps the other Semitic languages exhibit modifications of a different kind. In spite of its great wealth, Arabic is characterized by a certain monotony, which can scarcely have existed from the beginning. Both Hebrew and Aramaic are in many respects more ancient than Arabic. This would no doubt be far more apparent if we knew Hebrew more completely, and according to the original pronunciation of its vowels, and if we could discover how Aramaic was pronounced about the 13th century before our era. It must always be borne in mind that we are far more fully and accurately acquainted with Arabic than with the other Semitic languages of antiquity. The opinion sometimes maintained by certain over-zealous Assyriologists, that Assyrian is the "Sanskrit of the Semitic world," has not met with the approval even of the Assyriologists themselves, and is unworthy of a serious refutation.

A comparative grammar of the Semitic languages must of course be based upon Arabic, but must in every matter of detail take into consideration all the cognate languages, as far as they are known to us. In the reconstruction of the primitive Semitic tongue Hebrew might perhaps afford more assistance than Ethiopic; but Aramaic, Assyrian, and even the less known and the more modern dialects might furnish valuable materials.

Character of Semitic mind.

It is not a formidable undertaking to describe in general terms the character of the Semitic mind, as has been done, for example, by Lassen (*Indische Alterthumskunde*, i. 414 *sq.*) and by Renan in the introduction to his *Histoire des Langues Sémitiques*. But still there is a danger of assuming that the most important characteristics of particular Semitic peoples, especially of the Israelites and of the Arabs, are common to all Semites, and of ascribing to the influence of race certain striking features which are the result of the external conditions of life, and which, under similar circumstances, are also developed among non-Semitic races. And, though it is said, not without reason, that the Semites possess but little talent for political and military organization on a large scale, yet we have in the Phœnicians, especially the Carthaginians, in Hamilcar and in Hannibal, a proof that under altered conditions the Semites are not incapable of distinguishing themselves in these domains. It is a poor evasion to deny that the Phœnicians are genuine Semites, since even our scanty sources of information suffice to show that in the matter of religion, which among Semites is of such supreme importance, they bore a close resemblance to the ancient Hebrews and Aramæans. In general descriptions of this kind it is easy to go too far. But to give in general terms a correct idea of the Semitic languages is a task of very much greater difficulty. Renan's brilliant and most interesting sketch is in many respects open to serious criticism. He cites, for example, as characteristic of the Semitic tongues, that they still retain the practice of expressing psychological processes by means of distinct imagery. In saying this he is taking scarcely any language but Hebrew into account. But the feature to which he here alludes is owing to the particular stage of intellectual development that had been reached by the Israelites, is in part peculiar to the poetical style, and is to be found in like manner among wholly different races. That the Semitic languages are far from possessing the fixity which Renan attributes to them we shall see below. But, however this may be, certain grammatical peculiarities of the Semitic languages—above all, the predominance of triliteral roots—are so marked that it is scarcely possible to doubt whether any language with which we are tolerably well acquainted is or is not Semitic. Only when a Semitic language has been strongly influenced not only in vocabulary but also in grammar by some non-Semitic speech, as is the case with Amharic, can such a doubt be for a moment entertained.

Relations with other families of speech.

Many attempts have been made, sometimes in a very superficial fashion and sometimes by the use of scientific methods, to establish a relationship between the Semitic languages and the Indo-European. It was very natural to suppose that the tongues of the two races which, with the single exceptions of the Egyptians and the Chinese, have formed and moulded human civilization, who have been near neighbors from the earliest times, and who, moreover, seem to bear a great physical resemblance to one another, can be nothing else than two descendants of the same parent speech. But all these endeavors have wholly failed. It is indeed probable that the languages, not only of the Semites and of the Indo-Europeans, but also those of other races, are derived from the same stock, but the separation must have taken place at so remote a period that the changes which these languages underwent in prehistoric times have completely effaced what features they possessed in common; if such features have sometimes been preserved, they are no longer recognizable. It must be remembered that it is only in exceptionally favorable circumstances that cognate languages are so preserved during long periods as to render it possible for scientific analysis to prove their relationship with one another.[1]

On the other hand, the Semitic languages bear so striking a resemblance in some respects to certain languages of northern Africa that we are forced to assume the existence of a tolerably close relationship between the two groups. We allude to the family of languages known in modern times as the "Hamitic," and composed of the Egyptian, Berber, Beja (Bishárí, etc.), and a number of tongues spoken in Abyssinia and the neighboring countries (Agaw, Galla, Dankali, etc.). It is remarkable that some of the most indispensable words in the Semitic vocabulary (as, for instance, "water," "mouth," and certain numerals) are found in Hamitic also, and that these words happen to be such as cannot well be derived from triliteral Semitic roots, and are more or less independent of the ordinary grammatical rules. We notice, too, important resemblances in grammar,—for example, the formation of the feminine by means of a *t* prefixed or affixed, that of the causative by means of *s*, similarity in the suffixes and prefixes of the verbal tenses, and, generally, similarity in the personal pronouns, etc. It must be admitted that there is also much disagreement,—for instance, the widest divergence in the mass of the vocabulary; and this applies to the Semitic languages as compared not only with those Hamitic languages that are gradually becoming known to us at the present day, but with the Egyptian, of which we possess documents dating from the fourth millennium before the Christian era. The question is here involved in great difficulties. Some isolated resemblances may, improbable as it appears, have been produced by the borrowing of words. Uncivilized races, as has been proved with certainty, sometimes borrow from others elements of speech in cases where we should deem such a thing impossible,—for example, numerals and even personal suffixes. But the great resemblances in grammatical formation cannot be reasonably explained as due to borrowing on the part of the Hamites, more especially as these points of agreement are also found in the language of the Berbers, who are scattered over an enormous territory, and whose speech must have acquired its character long before they came into contact with the Semites. We are even now but imperfectly ac-

[1] The following is an instance of the manner in which we may be deceived by isolated cases. "Six" is in Hebrew *shesh*, almost exactly like the Sanskrit and modern Persian *shash*, the Latin *sex*, etc. But the Indo-European root is *sweks*, or perhaps even *ksweks*, whereas the Semitic root is *shidth*, so that the resemblance is a purely accidental one, produced by phonetic change.

quainted with the Hamitic languages; it is not yet certain into what groups they fall; and the relation in which Egyptian stands to Berber on the one hand and to the south Hamitic languages on the other requies further elucidation. The attempt to write a comparative grammar of the Semitic and Hamitic languages would be, to say the least, very premature.[1]

Original seat of Semites.

The connection between the Semitic languages and the Hamitic appears to indicate that the primitive seat of the Semites is to be sought in Africa; for it can scarcely be supposed that the Hamites, amongst whom there are gradual transitions from an almost purely European type to that of the Negroes, are the children of any other land than "the dark continent." There seems, moreover, to be a considerable physical resemblance between the Hamites and the Semites, especially in the case of the southern Arabs; we need mention only the slight development of the calf of the leg, and the sporadic appearance amongst Semites of woolly hair and prominent jaws.[2] But both Semites and Hamites have been mingled to a large extent with foreign races, which process must have diminished their mutual similarity. All this, however, is offered not as a definite theory but as a modest hypothesis.

It was once the custom to maintain that the Semites came originally from certain districts in Armenia. This supposition was founded on the book of Genesis, according to which several of the Semitic nations are descended from Arphachsad, *i.e.*, the eponym of the district of Arrapachitis, now called Albak, on the borders of Armenia and Kurdistan. It was also thought that this region was inhabited by the primitive race from which both the Semites and the Indo-Europeans derived their origin. But, as we saw above, this ancient relationship is a matter of some doubt; in any case, the separation does not date from a period so recent that the Semites can be supposed to have possessed any historical tradition concerning it. There cannot be a greater mistake than to imagine that nations have been able to preserve during long ages their recollection of the country whence their supposed ancestors are said to have emigrated. The fantastic notion once in vogue as to the permanence of historical memories among uncivilized races must be wholly abandoned. The period in which the Hebrews, the Arabs, and the other Semitic nations together formed a single people is so distant that none of them can possibly have retained any tradition of it. The opinion that the Hebrews and the tribes most closely related to them were descendants of Arphachsad is apparently due to the legend that Noah's ark landed near this district. The notion has therefore a purely mythical origin. Moreover, in Genesis itself we find a totally different account of the matter, derived from another source, which represents all nations, and therefore the Semites among them, as having come from Babylon. Scarcely any man of science now believes in the northern origin of the Semites.

Others, as Sprenger and Schrader,[3] consider the birthplace of the Semitic race to have been in Arabia. There is much that appears to support this theory. History proves that from a very early period tribes from the deserts of Arabia settled on the cultivable lands which border them and adopted a purely agricultural mode of life. Various traces in the language seem to indicate that the Hebrews and the Aramæans were originally nomads, and Arabia with its northern prolongation (the Syrian desert) is the true home of nomadic peoples. The Arabs are also supposed to display the Semitic character in its purest form, and their language is, on the whole, nearer the original Semitic than are the languages of the cognate races. To this last circumstance we should, however, attach little importance. It is by no means always the case that a language is most faithfully preserved in the country where it originated. The Lithuanians speak the most ancient of all living Indo-European languages, and they are certainly not autochthones of Lithuania; the Romance dialect spoken in the south of Sardinia is far more primitive than that spoken at Rome; and of all living Teutonic languages the most ancient is the Icelandic. It is even doubtful whether the ordinary assumption be correct, that the most primitive of modern Arabic dialects are those spoken in Arabia. Besides, we cannot unreservedly admit that the Arabs display the Semitic character in its purest form; it would be more correct to say that, under the influence of a country indescribably monotonous and of a life ever changing yet ever the same, the inhabitants of the Arabian deserts have developed most exclusively certain of the principal traits of the Semitic race. All these considerations are indecisive; but we willingly admit that the theory which regards Arabia as the primitive seat of all Semites is by no means untenable.

Finally, one of the most eminent of contemporary Orientalists, Ignazio Guidi,[4] has attempted to prove that the home of the Semites is on the lower Euphrates. He contends that the geographical, botanical, and zoological conceptions which are expressed in the various Semitic languages by the same words, preserved from the time of the dispersion, correspond to the natural characteristics of no country but the above-mentioned. Great as are the ingenuity and the caution which he displays, it is difficult to accept his conclusions. Several terms might be mentioned which are part of the common heritage of the northern and the southern Semites, but which can scarcely have been formed in the region of the Euphrates. Moreover, the vocabulary of most Semitic languages is but very imperfectly known, and each dialect has lost many primitive words in the course of time. It is therefore very unsafe to draw conclusions from the fact that the various Semitic tongues have no one common designation for many important local conceptions, such as "mountain." The ordinary words for "man," "old man," "boy," "tent," are quite different in the various Semitic languages, and yet all these are ideas for which the primitive Semites must have had names.

We must therefore for the present confess our inability to make any positive statement with regard to the primitive seat of the original Semitic race.

Connections between the Semitic languages.

It is not very easy to settle what is the precise connection between the various Semitic languages, considered individually. In this matter one may easily be led to hasty conclusions by isolated peculiarities in vocabulary or grammar. Each of the older Semitic languages occasionally agrees in grammatical points with some other to which in most respects it bears no very close resemblance, while dialects much more nearly related to it are found to exhibit different formations. Each Semitic tongue also possesses features peculiar to itself. For instance, the Hebrew-Phœnician group and the Arabic have a prefixed definite article (the etymological identity of which is, however, not quite certain); the dialect nearest to Arabic, the Sabæan, expresses the article by means of a suffixed *n*; the Aramaic, which in general more closely resembles Hebrew than does the Arabic group, expresses it by means of a suffixed *á*; whereas the Assyrian in the north and the Ethiopic in the south have no article at all. Of this termination *n* for the definite article there is no trace in either Arabic or Hebrew; the Sabæan, the Ethiopic, and the Aramaic employ it to give em-

[1] This of course applies yet more strongly to Benfey's work *Ueber das Verhältniss der ägyptischen Sprache zum semitischen Sprachstamm* (Leipsic, 1844); but his book has the permanent merit of having for the first time examined this relationship in a scientific manner.

[2] Comp. G. Gerland, *Atlas der Ethnographie* (Leipsic, 1876), p. 40 of the text.

[3] The former has maintained this view in several of his works, the latter in *Z.D.M.G.*, xxvii., 417 *sq.*

[4] "Della Sede Primitiva dei Popoli Semitici," in the *Proceedings* of the Accademia dei Lincei, 1878-79.

phasis to demonstrative pronouns; and the very same usage has been detected in a single Phœnician inscription.[1] In this case, therefore, Hebrew and Arabic have, independently of one another, lost something which the languages most nearly related to them have preserved. In like manner, the strengthening of the pronoun of the third person by means of *t* (or *tú*) is only found in Ethiopic, Sabæan, and Phœnician. Aramaic alone has no certain trace of the reflective conjugation formed with prefixed *n;* Hebrew alone has no certain trace of the causative with *sha*.[2] In several of the Semitic languages we can see how the formation of the passive by means of internal vocal change (as *kullima*, "he was addressed," as distinguished from *kallama*, "he addressed") gradually dropped out of use; in Ethiopic this process was already complete when the language first became literary; but in Aramaic it was not wholly so. In a few cases phonetic resemblances have been the result of later growth. For example, the termination of the plural masculine of nouns is in Hebrew *ím*, in Aramaic *ín*, as in Arabic. But we know that Aramaic also originally had *m*, whereas the ancient Arabic forms have after the *n* an *a*, which appears to have been originally a long *á* (*úna*, *ína*); in this latter position (that is, between two vowels) the change of *m* into *n* is very improbable. These two similar terminations were therefore originally distinct. We must indeed be very cautious in drawing conclusions from points of agreement between the vocabularies of the various Semitic tongues. The Ethiopians and the Hebrews have the same word for many objects which the other Semites call by other names,—for instance, "stone," "tree," "enemy," "enter," "go out;" and the same may be said of Hebrew as compared with Sabæan. But to build theories upon such facts would be unsafe, since the words cited are either found, though with some change of meaning, in at least one of the cognate languages, or actually occur, perhaps quite exceptionally and in archaic writings, with the same signification. The sedentary habits of the Ethiopians and the Sabæans may possibly have rendered it easier for them to retain in their vocabulary certain words which were used by the civilized Semites of the north, but which became obsolete amongst the Arabian nomads. To the same cause we may attribute the fact that in religion the Sabæans resemble the northern Semites more closely than do the tribes of central Arabia; but these considerations prove nothing in favor of a nearer linguistic affinity.

Northern and southern groups.

One thing at least is certain, that Arabic (with Sabæan) and Ethiopic stand in a comparatively close relationship to one another, and compose a group by themselves, as contrasted with the other Semitic languages, Hebræo-Phœnician, Aramaic, and Assyrian, which constitute the northern group. Only in these southern dialects do we find, and that under forms substantially identical, the important innovation known as the "broken plurals." They agree, moreover, in employing a peculiar development of the verbal root, formed by inserting an *á* between the first and second radicals (*ḳátala*, *takátala*), in using the vowel *a* before the third radical in all active perfects—for example, (*h*) *aḳtala*, *ḳattala*, instead of the *haḳtil*, *ḳattil* of the northern dialects—and in many other grammatical phenomena. This is not at all contradicted by the fact that certain aspirated dentals of Arabic (*th*, *dh*, *ṭh*) are replaced in Ethiopic, as in Hebrew and Assyrian, by pure sibilants—that is, *s* (Hebrew and Assyrian *sh*), *z*, *ç*—whereas in Aramaic they are replaced by simple dentals (*t d ṭ*), which seem to come closer to the Arabic sounds. After the separation of the northern and the southern groups, the Semitic languages possessed all these sounds, as the Arabic does, but afterwards simplified them, for the most part, in one direction or the other. Hence there resulted, as it were by chance, occasional similarities. Even in modern Arabic dialects *th*, *dh* have become sometimes *t*, *d*, and sometimes *s*, *z*. Ethiopic, moreover, has kept *ḍ*, the most peculiar of Arabic sounds, distinct from *ç*, whereas Aramaic has confounded it with the guttural *'ain*, and Hebrew and Assyrian with *ç*. It is therefore evident that all these languages once possessed the consonant in question as a distinct one. One sound, *sîn*, appears only in Hebrew, in Phœnician, and in the older Aramaic. It must originally have been pronounced very like *sh*, since it is represented in writing by the same character; in later times it was changed into an ordinary *s*. Assyrian does not distinguish it from *sh*.[3] The division of the Semitic languages into the northern group and the southern is therefore justified by facts. Even if we were to discover really important grammatical phenomena in which one of the southern dialects agreed with the northern, or *vice versa*, and that in cases where such phenomena could not be regarded either as remnants of primitive Semitic usage or as instances of parallel but independent development, we ought to remember that the division of the two groups was not necessarily a sudden and instantaneous occurrence, that even after the separation intercourse may have been carried on between the various tribes who spoke kindred dialects and were therefore still able to understand one another, and that intermediate dialects may once have existed, perhaps such as were in use amongst tribes who came into contact sometimes with the agricultural population of the north and sometimes with the nomads of the south (see below). All this is purely hypothetical, whereas the division between the northern and the southern Semitic languages is a recognized fact.

Lost Semitic languages.

Although we cannot deny that there may formerly have existed Semitic languages quite distinct from those with which we are acquainted, yet that such was actually the case cannot be proved. Nor is there any reason to think that the domain of the Semitic languages ever extended very far beyond its present limits. Some time ago many scholars believed that they were once spoken in Asia Minor and even in Europe, but, except in the Phœnician colonies, this notion rested on no solid proof. It cannot be argued with any great degree of plausibility that even the Cilicians, who from a very early period held constant intercourse with the Syrians and the Phœnicians, spoke a Semitic language.

Hebrew.

Hebrew.—Hebrew and Phœnician are but dialects of one and the same language. It is only as the language of the people of Israel that Hebrew can be known with any precision. Since in the Old Testament a few of the neighboring peoples are represented as being descended from Eber, the eponym of the Hebrews, that is, are regarded as nearly related to the latter, it was natural to suppose that they likewise spoke Hebrew,—a supposition which, at least in the case of the Moabites, has been fully confirmed by the discovery of the Mesha inscription (date soon after 900 B.C.). The language of this inscription scarcely differs from that of the Old Testament; the only important distinction is the occurrence of a reflective form (with *t* after the first radical), which appears nowhere else but in Arabic. We may remark in passing that the style of this inscription is quite that of the Old Testament, and enables us to maintain with certainty that a similar historical literature existed amongst the Moabites. But it must be

[1] Viz., the great inscription of Byblus, *C.I.S.*, fasc. i. No. 1.
[2] *Shalhebeth*, "flame," is borrowed from Aramaic.

[3] It is not quite certain whether all the Semitic languages originally had the hardest of the gutturals *gh* and *kh* in exactly the same places that they occupy in Arabic. In the case of *kh*—where Ethiopic agrees with Arabic—this is at least probable, since there seem to be traces of it in Assyrian. But it would appear that in Hebrew and Aramaic the distinction between *gh* and *'ayin*, between *kh* and *ḥ*, was often different from what it is in Arabic.

remembered that ancient Semitic inscriptions exhibit, in a sense, nothing but the skeleton of the language, since they do not express the vowels at all, or do so only in certain cases; still less do they indicate other phonetic modifications, such as the doubling of consonants, etc. It is therefore very possible that *to the ear* the language of Moab seemed to differ considerably from that of the Judæans.

Ancient language.

The Mesha inscription is the only non-Israelite source from which any knowledge of ancient Hebrew can be obtained. (See HEBREW LANGUAGE AND LITERATURE.) Some fragments in the Old Testament belong to the second millennium before our era,—particularly the song of Deborah (Judges v.), a document which, in spite of its many obscurities in matters of detail, throws much light on the condition of the Israelites at the time when the Canaanites were still contending with them for the possession of the country. The first rise of an historical literature may very probably date from before the establishment of the monarchy. Various portions of the Old Testament belong to the time of the earlier kings; but it was under the later kings that a great part of extant Hebrew literature came into shape. To this age also belong the Siloam inscription and a few seals and gems bearing the names of Israelites.

Pronunciation.

The Hebrew language is thus known to us from a very ancient period. But we are far from being acquainted with its real phonetic condition in the time of David or Isaiah. For, much as we owe to the labors of the later Jewish schools, which with infinite care fixed the pronunciation of the sacred text by adding vowels and other signs, it is evident that even at the best they could only represent the pronunciation of the language in its latest stage, not that of very early ages. Besides, their object was not to exhibit Hebrew simply as it was, but to show how it should be read in the solemn chant of the synagogue. Accordingly, the pronunciation of the older period may have differed considerably from that represented by the punctuation. Such differences are now and then indicated by the customary spelling of the ancient texts,[1] and sometimes the orthography is directly at variance with the punctuation.[2] In a few rare cases we may derive help from the somewhat older tradition contained in the representation of Hebrew words and proper names by Greek letters, especially in the ancient Alexandrine translation of the Bible (the so-called Septuagint). It is of particular importance to remark that this older tradition still retains an original *a* in many cases where the punctuation has the later *i* or *e*. We have examined this point somewhat in detail, in order to contradict the false but ever-recurring notion that the ordinary text of the Bible represents without any essential modification the pronunciation of ancient Hebrew, whereas in reality it expresses (in a very instructive and careful manner, it is true) only its latest development, and that for the purpose of solemn public recitation. A clear trace of dialectical differences within Israel is found in Judges xii. 6, which shows that the ancient Ephraimites pronounced *s* instead of *sh*.

Period of exile in Babylon.

The destruction of the Judæan kingdom dealt a heavy blow to the Hebrew language. But it is going too far to suppose that it was altogether banished from ordinary life at the time of the exile, and that Aramaic came into use among all the Jews. In the East even small communities, especially if they form a religious body, often cling persistently to their mother-tongue, though they may be surrounded by a population of alien speech; and such was probably the case with the Jews in Babylonia. See HEBREW LANGUAGE, vol. xi. p. 533. Even so late as the time of Ezra Hebrew was in all probability the ordinary language of the new community. In Neh. xiii. 24 we find a complaint that the children of Jews by wives from Ashdod and other places spoke half in the "Jewish" language and half in the language of Ashdod, or whatever else may have been the tongue of their mothers. No one can suppose that Nehemiah would have been particularly zealous that the children of Jews should speak an Aramaic dialect with correctness. He no doubt refers to Hebrew as it was then spoken,—a stage in its development of which Nehemiah's own work gives a very fair idea. And, moreover, the inhabitants of Ashdod spoke Hebrew. G. Hoffmann[3] has deciphered inscriptions (written in Greek letters, but, after the Hebrew fashion, from right to left) on two coins struck about 150 years after Nehemiah, which are in pure Hebrew;[4] nor does the language seem to diverge at all from that of the Old Testament. It is therefore probable that Nehemiah alludes only to a slightly different local dialect. If the Philistines of Ashdod still continued to speak Hebrew about the year 300 B.C., it cannot be supposed that the Jews had given up this their own language nearly three centuries earlier. We may also conclude that the Philistines from the earliest period spoke the same language as their eastern neighbors, with whom they had so often been at war, but had also lived in close pacific intercourse.

Hebrew supplanted by Aramaic.

After the time of Alexander large bodies of the Jewish population were settled in Alexandria and other western cities, and were very rapidly Hellenized. Meanwhile the principal language of Syria and the neighboring countries, Aramaic, the influence of which may be perceived even in some pre-exilic writings, began to spread more and more among the Jews. Hebrew gradually ceased to be the language of the people and became that of religion and the schools. The book of Daniel, written in 167 or 166 B.C., begins in Hebrew, then suddenly passes into Aramaic, and ends again in Hebrew. Similarly the redactor of Ezra (or more correctly of the Chronicles, of which Ezra and Nehemiah form the conclusion) borrows large portions from an Aramaic work, in most cases without translating them into Hebrew. No reason can be assigned for the use of Aramaic in Jewish works intended primarily for Jerusalem, unless it were already the dominent speech, whilst, on the other hand, it was very natural for a pious Jew to write in the ancient "holy" language even after it had ceased to be spoken. Esther, Ecclesiastes, and a few Psalms, which belong to the 3d and 2d centuries before our era, are indeed written in Hebrew, but are so strongly tinctured by the Aramaic influence as to prove that the writers usually spoke Aramaic. We are not likely to be far wrong in saying that in the Maccabæan age Hebrew had died out among the Jews, and there is nothing to show that it survived longer amongst any of the neighboring peoples.

Hebrew of the schools.

But in the last period of the history of Jerusalem, and still more after the destruction of the city by Titus, the Jewish schools played so important a part that the life of the Hebrew language was in a manner prolonged. The lectures and discussions of the learned were carried on in that tongue. We have very extensive specimens of this more modern Hebrew in the Mishnah and other works, and scattered pieces throughout both Talmuds. But, just as the "classical" Sanskrit, which has been spoken and written by the Brahmans during the last

[1] For example, we may conclude with tolerable certainty, from the presence and absence of the vowel-letters *y* and *w*, that in older times the accented *e* and *o* were not pronounced long, and that, on the other hand, the diphthongs *au* and *ai* were used for the later *ó* and *é*.

[2] The very first word of the Bible contains an Aleph (*spiritus lenis*), which is required by etymology and was once audible, but which the pronunciation represented by the point-system ignores.

[3] See Sallet's *Zeitschrift für Numismatik*, 1882 (Berlin).

[4] The inscriptions, short as they are, exhibit the exclusively Hebrew word *ir* (*'ir*), "town," and the feminine *asina* (*hasinah*), "the strong," with the termination *ah* (not *at*, as in Phœnician). Had the Ashdodites been accustomed to use a dead language on their coins they would certainly have employed the native Semitic writing.

twenty-five centuries, differs considerably from the language which was once in use among the people, so this "language of the learned" diverges in many respects from the "holy language;" and this distinction is one of which the rabbis were perfectly conscious. The "language of the learned" borrows a great part of its vocabulary from Aramaic,[1] and this exercises a strong influence upon the grammatical forms. The grammar is perceptibly modified by the peculiar style of these writings, which for the most part treat of legal and ritual questions in a strangely laconic and pointed manner. But, large as is the proportion of foreign words and artificial as this language is, it contains a considerable number of purely Hebrew elements which do not appear in the Old Testament. Although we may generally assume, in the case of a word occurring in the Mishnah but not found in the Old Testament, that it is borrowed from Aramaic, there are several words of this class which, by their radical consonants, prove themselves to be genuine Hebrew. And even some grammatical phenomena of this language are to be regarded as a genuine development of Hebrew, though they are unknown to earlier Hebrew speech.

Mediæval Hebrew.

From the beginning of the Middle Ages down to our own times the Jews have produced an enormous mass of writings in Hebrew, sometimes closely following the language of the Bible, sometimes that of the Mishnah, sometimes introducing in a perfectly inorganic manner a great quantity of Aramaic forms, and occasionally imitating the Arabic style. The study of these variations has but little interest for the linguist, since they are nothing but a purely artificial imitation, dependent upon the greater or less skill of the individual. The language of the Mishnah stands in much closer connection with real life, and has a definite *raison d'être;* all later Hebrew is to be classed with mediæval and modern Latin. Much Hebrew also was written in the Middle Ages by the hostile brethren of the Jews, the Samaritans; but for the student of language these productions have, at the most, the charm attaching to curiosities.

Character of ancient Hebrew.

The ancient Hebrew language, especially in the matter of syntax, has an essentially primitive character. Parataxis of sentences prevails over hypotaxis to a greater extent than in any other literary Semitic language with which we are well acquainted. The favorite method is to link sentences together by means of a simple "and" There is a great lack of particles to express with clearness the more subtle connection of ideas. The use of the verbal tenses is in a great measure determined by the imagination, which regards things unaccomplished as accomplished and the past as still present. There are but few words or inflections to indicate slight modifications of meaning, though in ancient times the language may perhaps have distinguished certain moods of the verb somewhat more plainly than the present punctuation does. But in any case this language was far less suited for the definite expression of studied thought, and less suited still for the treatment of abstract subjects, than for poetry. We must remember, however, that as long as Hebrew was a living language it never had to be used for the expression of the abstract. Had it lived somewhat longer it might very possibly have learnt to adapt itself better to the formulating of systematic conceptions. The only book in the Old Testament which attempts to grapple with an abstract subject in plain prose—namely, Ecclesiastes—dates from a time when Hebrew was dying out or was already dead. That the gifted author does not always succeed in giving clear expression to his ideas is partly due to the fact that the language had never been employed for any scientific purposes whatsoever. With regard to grammatical forms, Hebrew has lost much that is still preserved in Arabic; but the greater richness of Arabic is in part the result of later development,

Vocabulary.

The vocabulary of the Hebrew language is, as we have said, known but imperfectly. The Old Testament is no very large work; it contains, moreover, many repetitions, and a great number of pieces which are of little use to the lexicographer. On the other hand, much may be derived from certain poetical books, such as Job. The numerous *ἅπαξ λεγόμενα* are a sufficient proof that many more words existed than appear in the Old Testament, the writers of which never had occasion to use them. Were we in possession of the whole Hebrew vocabulary in the time of Jeremiah, for example, we should be far better able to determine the relation in which Hebrew stands to the other Semitic languages, the Old Testament would be far more intelligible to us, and it would be very much easier to detect the numerous corrupt passages in our text.

Phœnician.

Phœnician.—This dialect closely resembles Hebrew, and is known to us from only one authentic source, namely, inscriptions, some of which date from about 600 B.C. or earlier; but the great mass of them begin with the 4th century before our era. These inscriptions[2] we owe to the Phœnicians of the mother-country and the neighboring regions (Cyprus, Egypt, and Greece), as well as to the Phœnicians of Africa, especially Carthage. Inscriptions are, however, a very insufficient means for obtaining the knowledge of a language. The number of subjects treated in them is not large; many of the most important grammatical forms and many of the words most used in ordinary life do not occur. Moreover, the "lapidary style" is often very hard to understand. The repetition of obscure phrases, in the same connection, in several inscriptions does not help to make them more intelligible. Of what use is it to us that, for instance, thousands of Carthaginian inscriptions begin with the very same incomprehensible dedication to two divinities? The difficulty of interpretation is greatly increased by the fact that single words are very seldom separated from one another, and that vowel-letters are used extremely sparingly. We therefore come but too often upon very ambiguous groups of letters. In spite of this, our knowledge of Phœnician has made considerable progress of late. Some assistance is also got from Greek and Latin writers, who cite not only many Phœnician proper names but single Phœnician words: Plautus in particular inserts in the *Pœnulus* whole passages in Punic, some of which are accompanied by a Latin translation. This source of information must, however, be used with great caution, It was not the object of Plautus to exhibit the Punic language with precision, a task for which the Latin alphabet is but ill adapted, but only to make the populace laugh at the jargon of the hated Carthaginians. Moreover, he had to force the Punic words into Latin *senarii;* and finally the text, being unintelligible to copyists, is terribly corrupt. Much ingenuity has been wasted on the Punic of Plautus; but the passage yields valuable results to cautious investigation which does not try to explain too much.[3] In its grammar Phœnician closely resembles Hebrew. In both dialects the consonants are the same, often in contrast to Aramaic and other cognate languages.[4] As to vowels, Phœnician seems to

[1] It is a characteristic feature that "my father" and "my mother" are here expressed by purely Aramaic forms. Even the learned did not wish to call their "papas" and "mammas" by any other names than those to which they had been accustomed in infancy.

[2] The scattered materials are being collected in the *Corpus Inscriptionum Semiticarum* of the Paris Academy.

[3] See Gildemeister, in Ritschl's *Plautus* (vol. ii. fasc. v., Leipsic, 1884).

[4] At an early period the Phœnician pronunciation may have distinguished a greater number of original consonants than are distinguished in writing. It is at least remarkable that the Greeks render the name of the city of Çur (Hebrew Çór), which must originally have been pronounced Thurr, with a *τ* (Τύρος), and the name of Çidón, where the ç runs through all the Semitic languages, with a *σ* (Σιδών). Distinctions of this kind, justified by etymology, have perhaps been obscured in Hebrew by the imper-

diverge rather more from Hebrew. The connecting of clauses is scarcely carried further in the former language than in the latter. A slight attempt to define the tenses more sharply appears once at least in the joining of *kán* (fuit) with a perfect, to express complete accomplishment (or the pluperfect).[1] One important difference is that the use of *wáw* conversive with the imperfect—so common in Hebrew and in the inscription of Mesha—is wanting in Phœnician. The vocabulary of the language is very like that of Hebrew, but words rare in Hebrew are often common in Phœnician. For instance, "to do" is in Phœnician not *'asá* but *pa'al* (the Arabic *fa'ala*), which in Hebrew occurs only in poetry and elevated language. "Gold" is not *zahab* (as in most Semitic languages) but *kharúç* (Assyrian *khuráç*), which is used occasionally in Hebrew poetry. Traces of dialectical distinctions have been found in the great inscription of Byblus, the inhabitants of which seem to be distinguished from the rest of the Phœnicians in Josh. xiii. 5 (and 1 Kings v. 32? [A.V. v. 18]). It is probable that various differences between the language of the mother country and that of the African colonies arose at an early date, but our materials do not enable us to come to any definite conclusion on this point. In the later African inscriptions there appear certain phonetic changes, especially in consequence of the softening of the gutturals,—changes which show themselves yet more plainly in the so-called Neo-Punic inscriptions (beginning with the 1st, if not the 2d, century before our era). In these the gutturals, which had lost their real sound, are frequently interchanged in writing; and other modifications may also be perceived. Unfortunately the Neo-Punic inscriptions are written in such a debased indistinct character that it is often impossible to discover with certainty the real form of the words. This dialect was still spoken about 400, and perhaps long afterwards, in those districts of North Africa which had once belonged to Carthage. It would seem that in the mother-country the Phœnician language withstood the encroachment of Greek on the one hand and of Aramaic on the other somewhat longer than Hebrew did.

Aramaic.—Aramaic is nearly related to Hebræo-Phœnician; but there is nevertheless a sharp line of demarcation between the two groups. Of its original home nothing certain is known. In the Old Testament "Aram" appears at an early period as a designation of certain districts in Syria ("Aram of Damascus," etc.) and in Mesopotamia ("Aram of the Two Rivers"). The language of the Aramæans gradually spread far and wide, and occupied all Syria, both those regions which were before in the possession of the Kheta, probably a non-Semitic people, and those which were most likely inhabited by Canaanite tribes; last of all, Palestine became Aramaized. Towards the east this language was spoken on the Euphrates, and throughout the districts of the Tigris south and west of the Armenian and Kurdish mountains; the province in which the capitals of the Arsacides and the Sásánians were situated was called "the country of the Aramæans." In Babylonia and Assyria a large, or perhaps the larger, portion of the population were most probably Aramæans, even at a very early date, whilst Assyrian was the language of the Government.

Geographical extent of Aramaic.

The oldest extant Aramaic documents consist of inscriptions on monuments and on seals and gems. In the Persian period Aramaic was the official language of the provinces west of the Euphrates; and this explains the fact that coins which were struck by governors and vassal princes in Asia Minor, and of which the stamp was in some cases the work of skilled Greek artists, bear Aramaic inscriptions, whilst those of other coins are Greek. This, of course, does not prove that Aramaic was ever spoken in Asia Minor and as far north as Sinope and the Hellespont. In Egypt Aramaic inscriptions have been found of the Persian period, one bearing the date of the fourth year of Xerxes (482 B.C.);[2] we have also official documents on papyrus, unfortunately in a very tattered condition for the most part, which prove that the Persians preferred using this convenient language to mastering the difficulties of the Egyptian systems of writing. It is, further, very possible that at that time there were considerable numbers of Aramæans in Egypt, just as there were of Phœnicians, Greeks, and Jews. But probably this preference for Aramaic originated under the Assyrian empire, in which a very large proportion of the population spoke Aramaic, and in which this language would naturally occupy a more important position than it did under the Persians. We therefore understand why it was taken for granted that a great Assyrian official could speak Aramaic (2 Kings xviii. 26; Isa. xxxvi. 11), and for the same reason the dignitaries of Judah appear to have learned the language (*ibid.*), namely, in order to communicate with the Assyrians.[3] The short dominion of the Chaldæans very probably strengthened this preponderance of Aramaic. A few ancient Aramaic inscriptions have lately been discovered far within the limits of Arabia, in the palm oasis of Teimá (in the north of the Ḥijáz); the oldest and by far the most important of these was very likely made before the Persian period. We may presume that Aramaic was introduced into the district by a mercantile colony, which settled in this ancient seat of commerce, and in consequence of which Aramaic may have remained for some time the literary language of the neighboring Arabs. All these older Aramaic monuments exhibit a language which is almost absolutely identical. One peculiarity which distinguishes it from later Aramaic is that in the relative and demonstrative pronoun the sound originally pronounced *dh* is changed into *z*, as in Hebrew, not into *d*, as is required by a rule universal in the Aramaic dialects.[4] The Egyptian monuments at least bear marks of Hebrew, or more correctly Phœnician, influence.

The Aramaic portions of the Old Testament show us the form of the language which was in use among the Jews of Palestine. Isolated passages in Ezra perhaps belong to the Persian period, but have certainly been remodelled by a later writer.[5] Yet in Ezra we find a few antique forms which do not occur in Daniel. The Aramaic pieces contained in the Bible have the great advantage of being furnished with vowels and other orthographical signs, though these were not inserted until long after the composition of the books, and are sometimes at variance with the text itself. But, since Aramaic was still a living language when the punctuation came into existence, and since the lapse of time was not so very great, the tradition ran less risk of corruption than in the case of Hebrew. Its general correctness is further attested by the innumerable points of resemblance between this language and Syriac, with which we are accurately acquainted. The Aramaic of the Bible exhibits various antique features which afterwards disappeared,—for example, the formation of the passive by means of internal vowel-change, and the causative with *ha* instead of with *a*,—phenomena which have been falsely explained as Hebraisms. Biblical Aramaic agrees in all essential points with the language used in the numerous inscriptions of Palmyra (beginning soon before the Christian era and extending to about the end of the 3d century) and on the Naba-

Biblical Aramaic.

fection of the alphabet. In the case of *sin* and *shin* this can be positively proved.

[1] *Kán nadar*, "had vowed," Idal. 5 (*C. I. S.*, Phœn., No. 93).

[2] See the Palæographical Society's *Oriental Series*, plate lxiii.

[3] We possess certain small documents in Semitic writing which date from the Assyrian period, but of which the linguistic character is still very obscure; they contain Aramaic, Phœnician, and probably Assyrian forms. See *Z. D. M. G.*, xxxiii. 321.

[4] Some traces of this phenomenon are found later.

[5] The decree which is said to have been sent by Ezra is in its present form a comparatively late production.

tæan coins and stone monuments (concluding about the year 100). Aramaic was the language of Palmyra, the aristocracy of which were to a great extent of Arabian extraction. In the northern portion of the Nabatæan kingdom (not far from Damascus) there was probably a large Aramaic population, but farther south Arabic was spoken. At that time, however, Aramaic was highly esteemed as a cultivated language, for which reason the Arabs in question made use of it, as their own language was not reduced to writing, just as in those ages Greek inscriptions were set up in many district where no one spoke Greek. That the Nabatæans were Arabs is sufficiently proved by the fact that, with the exception of a few Greek names, almost all the numerous names which occur in the Nabatæan inscriptions are Arabic, in many cases with distinctly Arabic terminations. A further proof of this is that in the great inscriptions over the tombs of Hejr (not far from Teimá) the native Arabic continually shows through the foreign disguise,—for instance, in the use of Arabic words whenever the writer does not happen to remember the corresponding Aramaic terms, in the use of the Arabic particle *fa*, of the Arabic *ghair*, "other than," and in several syntactic features. The great inscriptions cease with the overthrow of the Nabatæan kingdom by Trajan (105); but the Arabian nomads in those countries, especially in the Sinaitic peninsula, often scratched their names on the rocks down to a later period, adding some benedictory formula in Aramaic. The fact that several centuries afterwards the name of "Nabatæan" was used by the Arabs as synonymous with "Aramæan" was probably due to the gradual spread of Aramaic over a great part of what had once been the country of the Nabatæans. In any case Aramaic then exercised an immense influence. This is also proved by the place which it occupies in the strange Pahlaví writing, various branches of which date from the time of the Parthian empire (see PAHLAVÍ). Biblical Aramaic, as also the language of the Palmyrene and Nabatæan inscriptions, may be described as an older form of Western Aramaic. The opinion that the Palestinian Jews brought their Aramaic dialect direct from Babylon—whence the incorrect name "Chaldee"—is altogether untenable.

Aramaic of Targums, etc.

We may now trace somewhat further the development of Western Aramaic in Palestine; but unhappily few of the sources from which we derive our information can be thoroughly trusted. In the synagogues it was necessary that the reading of the Bible should be followed by an oral "targúm" or translation into Aramaic, the language of the people. The Targum was at a later period fixed in writing, but the officially sanctioned form of the Targum to the Pentateuch (the so-called Targum of Onkelos) and of that to the prophets (the so-called Jonathan) was not finally settled till the 4th or 5th century, and not in Palestine but in Babylonia. The redactors of the Targum preserved on the whole the older Palestinian dialect; yet that of Babylon, which differed considerable from the former, exercised a vitiating influence. The punctuation, which was added later, first in Babylonia, is far less trustworthy than that of the Aramaic pieces in the Bible. The language of Onkelos and Jonathan differs but little from Biblical Aramaic. The language spoken some time afterwards by the Palestinian Jews, especially in Galilee, is exhibited in a series of rabbinical works, the so-called Jerusalem Targums (of which, however, those on the Hagiographa are in some cases of later date), a few Midrashic works and the Jerusalem Talmud. Unfortunately all these books, of which the Midrashím and the Talmud contain much Hebrew as well as Aramaic, have not been handed down with care, and require to be used with great caution for linguistic purposes. Moreover, the influence of the older language and orthography has in part obscured the characteristics of these popular dialects; for example, various gutturals are still written, although they are no longer pronounced. The adaptation of the spelling to the real pronunciation is carried furthest in the Jerusalem Talmud, but not in a consistent manner. Besides, all these books are without vowel-points; but the frequent use of vowel-letters in the later Jewish works renders this defect less sensible.

Not only the Jews but also the Christians of Palestine retained their native dialect for some time as an ecclesiastical and literary language. We possess translations of the Gospels and fragments of other works in this dialect by the Palestinian Christians dating from about the 5th century, accompanied by a punctuation which was not added till some time later. This dialect closely resembles that of the Palestinian Jews, as was to be expected from the fact that those who spoke it were of Jewish origin.

Samaritan dialect.

Finally, the Samaritans, among the inhabitants of Palestine, translated their only sacred book, the Pentateuch, into their own dialect. The critical study of this translation proves that the language which lies at its base was very much the same as that of the neighboring Jews. Perhaps, indeed, the Samaritans may have carried the softening of the gutturals a little further than the Jews of Galilee. Their absurd attempt to embellish the language of the translation by arbitrarily introducing forms borrowed from the Hebrew original has given rise to the false notion that Samaritan is a mixture of Hebrew and Aramaic. The introduction of Hebrew and even of Arabic words and forms was practised in Samaria on a still larger scale by copyists who lived after Aramaic had become extinct. The later works written in Samaritan dialect are, from a linguistic point of view, as worthless as the compositions of Samaritans in Hebrew; the writers, who spoke Arabic, endeavored to write in languages with which they were but half acquainted.

All these Western Aramaic dialects, including that of the oldest inscriptions, have this feature among others in common, that they form the third person singular masculine and the third person plural masculine and feminine in the imperfect by prefixing *y*, as do the other Semitic languages. And in these dialects the termination *á* (the so-called "status emphaticus") still retained the meaning of a definite article down to a tolerably late period.

As early as the 7th century the conquests of the Moslems greatly circumscribed the domain of Aramaic and a few centuries later it was almost completely supplanted in the west by Arabic. For the Christians of those countries who, like every one else, spoke Arabic, the Palestinian dialect was no longer of importance, and they adopted as their ecclesiastical language the dialect of the other Aramæan Christians, the Syriac (or Edessene). The only localities where a Western Aramaic dialect still survives are a few villiages in Anti-Libanus. Our information upon this subject is but slight and fragmentary; but it is hoped that Professors Prym and Socin will soon be able to furnish more ample details.

Babylonian and Mandæa dialect.

The popular Aramaic dialect of Babylonia from the 4th to the 6th century of our era is exhibited in the Babylonian Talmud, in which, however, as in the Jerusalem Talmud, there is a constant mingling of Aramaic and Hebrew passages. To a somewhat later period, and probably not to exactly the same district of Babylonia, belong the writings of the MANDÆANS (*q.v.*), a strange sect, half Christian and half heathen, who from a linguistic point of view possess the peculiar advantage of having remained almost entirely free from the influence of Hebrew, which is so perceptible in the Aramaic writings of Jews as well as of Christians. The orthography of the Mandæans comes nearer than that of the Talmud to the real pronunciation, and in it the softening of the gutturals is most

clearly seen. In other respects there is a close resemblance between Mandæan and the language of the Babylonian Talmud. The forms of the imperfect which we have enumerated above take in these dialects *n* or *l*.[1] In Babylonia, as in Syria, the language of the Arabic conquerors rapidly drove out that of the country. The latter has long been totally extinct, unless possibly a few surviving Mandæans still speak among themselves a more modern form of their dialect.

Syriac or Edessan Aramaic.

At Edessa, in the west of Mesopotamia, the native dialect had already been used for some time as a literary language, and had been reduced to rule through the influence of the schools (as is proved by the fixity of the grammar and orthography) even before Christianity acquired power in the country in the 2d century. At an early period the Old and New Testaments where here translated, with the help of Jewish tradition. This version (the so-called Peshítta or Peshito) became the Bible of Aramæan Christendom, and Edessa became its capital. Thus the Aramæan Christians of the neighboring countries, even those who were subjects of the Persian empire, adopted the Edessan dialect as the language of the church, of literature, and of cultivated intercourse. Since the ancient name of the inhabitants, "Aramæans," just like that of Ἕλληνες, had acquired in the minds of Jews and Christians the unpleasant signification of "heathens," it was generally avoided, and in its place the Greek terms "Syrians" and "Syriac" were used. But "Syriac" was also the name given by the Jews and Christians of Palestine to their own language, and both Greek and Persians designated the Aramæans of Babylonia as "Syrians." It is therefore, properly speaking, incorrect to employ the word "Syriac" as meaning the language of Edessa alone; but, since it was the most important of these dialects, it has the best claim to this generally received appellation. It has, as we have said, a shape very definitely fixed; and in it the above-mentioned forms of the imperfect take an *n*. As in the Babylonian dialects, the termination *á* has become so completely a part of the substantive to which it is added that it has wholly lost the meaning of the definite article, whereby the clearness of the language is perceptibly impaired. The influence exercised by Greek is very apparent in Syriac. From the 3d to the 7th century an extensive literature was produced in this language, consisting chiefly, but not entirely of ecclesiastical works. In the development of this literature the Syrians of the Persian empire took an eager part. In the Eastern Roman empire Syriac was, after Greek, by far the most important language; and under the Persian kings it virtually occupied a more prominent position as an organ of culture than the Persian language itself. The conquests of the Arabs totally changed this state of things. But meanwhile, even in Edessa, a considerable difference had arisen between the written language and the popular speech, in which the process of modification was still going on. About the year 700 it became a matter of absolute necessity to systematize the grammar of the language and to introduce some means of clearly expressing the vowels. The principal object aimed at was that the text of the Syriac Bible should be recited in a correct manner. But, as it happened, the eastern pronunciation differed in many respects from that of the west. The local dialects had to some extent exercised an influence over the pronunciation of the literary tongue; and, on the other hand, the political separation between Rome and Persia, and yet more the ecclesiastical schism—since the Syrians of the east were mostly Nestorians, those of the west Monophysites and Catholics—had produced divergencies between the traditions of the various schools. Starting, therefore, from a common source, two distinct systems of punctuation were formed, of which the western is the more convenient, but the eastern the more exact and generally the more in accordance with the ancient pronunciation; it has, for example, *á* in place of the western *ó*, and *ó* in many cases where the western Syrians pronounce *ú*. In later times the two systems have been intermingled in various ways.

Arabic everywhere put a speedy end to the predominance of Aramaic—a predominence which had lasted for more than a thousand years—and soon began to drive Syriac out of use. At the beginning of the 11th century the learned metropolitan of Nisibis, Elias bar Shinnáyá, wrote his books intended for Christians either entirely in Arabic or in Arabic and Syriac arranged in parallel columns,—that is in the spoken and in the learned language. Thus, too, it became necessary to have Syriac-Arabic glossaries. Up to the present day Syriac has remained in use for literary and ecclesiastical purposes, and may perhaps be even spoken in some monasteries and schools; but it has long been a dead language. When Syriac became extinct in Edessa and its neighborhood is not known with certainty.

Neo-Syriac dialects.

This language, called Syriac *par excellence*, is not the immediate source whence are derived the Aramaic dialects still surviving in the northern districts. In the mountains known as the Ṭúr 'Abdín in Mesopotamia, in certain districts east and north of Mosul, in the neighboring mountains of Kurdistan, and again beyond them on the western coast of Lake Urmia, Aramaic dialects are spoken by Christians and occasionally by Jews, and some of these dialects we know with tolerable precision. The dialect of Ṭúr 'Abdín seems to differ considerably from all the rest; the country beyond the Tigris is, however, divided, as regards language, amongst a multitude of local dialects. Among these, that of Urmia has become the most important, since American missionaries have formed a new literary language out of it. Moreover, the Roman Propaganda has printed books in two of the Neo-Syriac dialects. All these dialects exhibit a complete transformation of the ancient type, to a degree incomparably greater than is the case, for example, with Mandæan. In particular, the ancient verbal tenses have almost entirely disappeared, but have been successfully replaced by new forms derived from participles. There are also other praiseworthy innovations. The dialect of Ṭúr 'Abdín has, for instance, again coined a definite article. By means of violent contractions and phonetic changes some of these dialects, particularly that of Urmia, have acquired a euphony scarcely known in any other of the Semitic languages, with their "stridentia anhelantiaque verba" (Jerome). These Aramæans have all adopted a motley crowd of foreign words, from the Arabs, Kurds, and Turks, on whose borders they live and of whose languages they can often speak at least one.

Characteristics of Aramaic.

Aramaic is frequently described as a *poor* language. This is an opinion which we are unable to share. It is quite possible, even now, to extract a very large vocabulary from the more ancient Aramaic writings, and yet in this predominantly theological literature a part only of the words that existed in the language have been preserved. It is true that Aramaic, having from the earliest times come into close contact with foreign languages, has borrowed many words from them, in particular from Persian and Greek; but, if we leave out of consideration the fact that many Syrian authors are in the habit of using, as ornaments or for convenience (especially in translations), a great number of Greek words, some of which were unintelligible to their readers, we shall find that the proportion of really foreign words in older Aramaic books is not larger, perhaps even smaller, than the proportion of Romance words in German or Dutch. The influence of Greek upon the syntax and phraseology of Syriac is not so great as that which it has exercised, through the medium of Latin, upon the literary languages of mod-

[1] See Nöldeke, *Mandäische Grammatik* (Halle, 1875).

ern Europe. With regard to sounds, the most characteristic feature of Aramaic (besides its peculiar treatment of the dentals) is that it is poorer in vowels than Hebrew, not to speak of Arabic, since nearly all short vowels in open syllables either wholly disappear or leave but a slight trace behind them (the so-called shĕwâ). In this respect the punctuation of Biblical Aramaic agrees with Syriac, in which we are able to observe from very early times the number of vowels by examining the metrical pieces constructed according to the number of syllables, and with the Mandæan, which expresses every vowel by means of a vowel-letter. When several distinct dialects so agree, the phenomenon in question must be of great antiquity. There are nevertheless traces which prove that the language once possessed more vowels, and the Aramæans, for instance, with whom David fought, may have pronounced many vowels which afterwards disappeared. Another peculiarity of Aramaic is that it lends itself far more readily to the linking together of sentences than Hebrew and Arabic. It possesses many conjunctions and adverbs to express slight modifications of meaning. It is also very free as regards the order of words. That this quality, which renders it suitable for a clear and limpid prose style, is not the result of Greek influence may be seen by the Mandæan, on which Greek has left no mark. In its attempts to express everything clearly Aramaic often becomes prolix,—for example, by using additional personal and demonstrative pronouns. The contrast between Aramaic as the language of prose and Hebrew as the language of poetry is one which naturally strikes us, but we must beware of carrying it too far. Even the Aramæans were not wholly destitute of poetical talent. Although the religious poetry of the Syrians has but little charm for us, yet real poetry occurs in the few extant fragments of Gnostic hymns. Moreover, in the modern dialects popular songs have been discovered which, though very simple, are fresh and full of feeling.[1] It is therefore by no means improbable that in ancient times Aramaic was used in poems which, being contrary to the theological tendency of Syrian civilization, were doomed to total oblivion.

Assyrian.—Long before Aramaic another Semitic language flourished in the regions of the Tigris and on the lower Euphrates which has been preserved to us in the cuneiform inscriptions. It is usually called the Assyrian, after the name of the country where the first and most important excavations were made; but the term "Babylonian" would be more correct, as Babylon was the birthplace of this language and of the civilization to which it belonged. Certain Babylonian inscriptions appear to go back to the fourth millennium before our era; but the great mass of these cuneiform inscriptions date from between 1000 and 500 B.C. Assyrian seems to be more nearly related to Hebrew than to Aramaic; we may cite, for example, the relative particle *sha*, which is also used as a sign of the genitive, and is identical with the Phœnician *ash* and the Hebrew *asher* (*she, sha*),[2] also the similarity between Assyrian and Hebrew in the treatment of the aspirated dentals. On the other hand, Assyrian differs in many respects from all the cognate languages. The ancient perfect has wholly disappeared, or left but few traces, and the gutturals, with the exception of the hard *kh*, have been smoothed down to a degree which is only paralleled in the modern Aramaic dialects. So at least it would appear from the writing, or rather from the manner in which Assyriologists transcribe it. The Babylonian form *bél* (occurring in Isa. xlvi. 1; Jer. l. 2 and li. 44,—passages all belonging to the 6th century B.C.), the name of the god who was originally called *ba'l*, is a confirmation of this; but, on the other hand, the name of the country where Babylon was situated, viz., Shin'ar, and that of a Babylonian god, 'Anammelekh (2 Kings xvii. 31), as well as those of the tribes Shó'a and Kó'a (Ezek. xxiii. 23) who inhabited the Assyrio-Babylonian territory, seem to militate against this theory, as they are spelt in the Old Testament with *'ain*. The Assyrian system of writing is so complicated, and, in spite of its vast apparatus, is so imperfect an instrument for the accurate representation of sounds, that we are hardly yet bound to regard the transcriptions of contemporary Assyriologists as being in all points of detail the final dictum of science. It is, for example, very doubtful whether the vowels at the end of words and the appended *m* were really pronounced in all cases, as this would presuppose a complete confusion in the grammar of the language. However this may be, the present writer does not feel able to speak at greater length upon Assyrian, not being an Assyriologist himself nor yet capable of satisfactorily distinguishing the certain from the uncertain results of Assyriological inquiry.

Assyrian.

The native cuneiform writing was used in Babylonia not only under the Persian empire but also in the Greek period, as the discovery of isolated specimens proves. It does not of course necessarily follow from this that Assyrian was still spoken at that time. Indeed, this language may possibly have been banished from ordinary life long before the destruction of Nineveh,[3] surviving only as the official and sacerdotal tongue. These inscriptions, in any case, were intended for none but a narrow circle of learned persons.

Arabic.—The southern group of Semitic languages consists of Arabic and Ethiopic. Arabic, again, is subdivided into the dialects of the larger portion of Arabia and those of the extreme south (the Sabæan, etc.). At a very much earlier time than we were but lately justified in supposing, some of the northern Arabs reduced their language to writing. For travellers have quite recently discovered in the northern parts of the Ḥijáz inscriptions in a strange character, which seem to have been written long before our era. The character resembles the Sabæan, but perhaps represents an earlier stage of graphical development. These inscriptions have been called "Thamudic," because they were found in the country of the Thamúd; but this designation is scarcely a suitable one, because during the period when the power of the Thamúd was at its height, and when the buildings mentioned in the Koran were hewn in the rocks, the language of this country was Nabatæan (see above). Unfortunately the inscriptions hitherto discovered are all short[4] and for the most part fragmentary, and consequently furnish but little material to the student of languages. But there can be no doubt that they are written in an Arabic dialect. The treatment of the dentals, among other things, is a sufficient proof of this. At least in one point they bear a striking resemblance to Hebrew: they have the article *ha* (not *hal*, as we might expect). It is possible that the tribes living on Arabian soil which are regarded in the Old Testament as nearly related to Israel, that is, the Ishmaelites, the Midianites, and even the Edomites, may have spoken dialects occupying a middle position

Thamudic inscriptions.

[1] See Socin, *Die neu-aramäischen Dialekte von Urmia bis Mosul*, Tübingen, 1882; comp. *Z.D.M.G.*, xxxvi. 679 *sq.*

[2] [The view still maintained by Theodor Nöldeke concerning the identity of Assyrian *sha* with the Phœnician *ash* and the Hebrew *asher* (*she, sha*) is rendered more than doubtful from the fact that Assyrian has in use all three words simultaneously. To an Assyriologist it is certain that these words must be differentiated from each other as follows: Hebrew *she, sha* corresponds with Assyrian *shá, sha*. Phœnician *ashshe, ash* is identical with Assyr. *ashshu, ashsha*, while Hebrew asher is to be compared with Assyr. asher. See Friedrich Delitzsch, *Prolegomena eines neuen hebraeisch-aramaeischen Wörterbuchs zum Alten Testament*, Leipzig, 1886, p. 44 note 1. For the probable derivation of Assyr. *ashshu, ashsha* from *ana*-shú (shâ) see Schrader *ABK.*, 1872, p. 296, and Pomel Haupt in Schrader, *KAT.*, 2d ed., Giessen 1883, p. 498.—AM. ED.]

[3] [The other more reasonable view, that "the domestic tongue was spoken till far into the Hellenistic time," will be found in Edward Meyer, *Geschichte der Alterthums*, Stuttgart 1884, p 149, *sq.*—AM. ED.]

[4] The decipherment of these inscriptions was begun by Halévy, who followed the drawings of Doughty. The subject is now being further investigated by D. H. Müller of Vienna from Euting's copies.

between Arabic and Hebrew. They are perhaps traces of some such intermediate link that have been preserved to us in these inscriptions.

Ancient Arabic inscriptions.

The numerous inscriptions scattered over the northwest of Arabia, especially over the wild and rocky district of Safá, near Damascus, probably date from a later period. They are written in peculiar characters, which, it would seem, are likewise related to those used by the Sabæans. They are all of them short and indistinct, scratched hurriedly and irregularly upon unhewn stone. What we at present understand of them—they consist almost entirely of proper names—is owing in nearly every case to the ingenuity of Halévy.[1] In matters of detail, however, much still remains uncertain. To decipher them with absolute certainty will no doubt always be impossible on account of their careless execution. These inscriptions are probably the work of Arab emigrants from the south.

The Arabs who inhabited the Nabatæan kingdom wrote in Aramaic, but, as has been remarked above, their native language, Arabic, often shows through the foreign disguise. We are thus able to satisfy ourselves that these Arabs, who lived a little before and a little after Christ, spoke a dialect closely resembling the later classical Arabic. The nominative of the so-called "triptote" nouns has, as in classical Arabic, the termination *u;* the genitive has *i* (the accusative therefore probably ended in *a*), but without the addition of *n*. Generally speaking, those proper names which in classical Arabic are "diptotes" are here devoid of any inflectional termination. The *u* of the nominative appears also in Arabic proper names belonging to more northern districts, as, for example, Palmyra and Edessa. All these Arabs were probably of the same race. It is possible that the two oldest known specimens of distinctively Arabic writing—namely, the Arabic portion of the trilingual inscription of Zabad, southeast of Haleb (Aleppo), written in Syriac, Greek, and Arabic, and dating from 512 or 513 A. D.,[2] and that of the bilingual inscription of Harran, south of Damascus,[3] written in Greek and Arabic, of 568—represent nothing but a somewhat more modern form of this dialect. In both these inscriptions proper names take in the genitive the termination *u*, which shows that the meaning of such inflections was no longer felt. These two inscriptions, especially that of Zabad, which is badly written, have not yet been satisfactorily interpreted in all their details.

During the whole period of the preponderance of Aramaic this language exercised a great influence upon the vocabulary of the Arabs. The more carefully we investigate the more clearly does it appear that numerous Arabic words, used for ideas or objects which presuppose a certain degree of civilization, are borrowed from the Aramæans. Hence the civilizing influence of their northern neighbors must have been very strongly felt by the Arabs, and contributed in no small measure to prepare them for playing so important a part in the history of the world.

Classical Arabic.

In the 6th century the inhabitants of the greater part of Arabia proper spoke everywhere essentially the same language, which, as being by far the most important of all Arabic dialects, is known simply as the Arabic language. Arabic poetry, at that time cultivated throughout the whole of central and northern Arabia as far as the lower Euphrates and even beyond it, employed one language only. The extant Arabic poems belonging to the heathen period were not indeed written down till much later, and meanwhile underwent considerable alterations[4]; but the absolute regularity of the metre and rhyme is a sufficient proof that on the whole these poems all obeyed the same laws of language. It is indeed highly probable that the rhapsodists and the grammarians have effaced many slight dialectical peculiarities; in a great number of passages, for example, the poets may have used, in accordance with the fashion of their respective tribes, some other case than that prescribed by the grammarians, and a thing of this kind may afterwards have been altered, unless it happened to occur in rhyme; but such alterations cannot have extended very far. A dialect that diverged in any great measure from the Arabic of the grammarians could not possibly have been made to fit into the metres. Moreover, the Arabic philologists recognize the existence of various small distinctions between the dialects of individual tribes and of their poets, and the traditions of the more ancient schools of Koran readers exhibit very many dialectical *nuances*. It might indeed be conjectured that for the majority of the Arabs the language of poetry was an artificial one,—the speech of certain tribes having been adopted by all the rest as a *dialectus poetica*. And this might be possible in the case of wandering minstrels whose art gained them their livelihood, such as Nábigha and A'shá. But, when we find that the Bedouin goatherds, for instance, in the mountainous district near Mecca composed poems in this very same language upon their insignificant feuds and personal quarrels, that in it the proud chiefs of the Taghlibites and the Bekrites addressed defiant verses to the king of Híra (on the Euphrates), that a Christian inhabitant of Híra, Adí b. Zaid, used this language in his serious poems,—when we reflect that, as far as the Arabic poetry of the heathen period extends, there is nowhere a trace of any important linguistic difference, it would surely be a paradox to assume that all these Arabs, who for the most part were quite illiterate and yet extremely jealous of the honor of their tribes, could have taken the trouble to clothe their ideas and feelings in a foreign, or even a perfectly artificial, language. The Arabic philologists also invariably regarded the language of the poets as being that of the Arabs in general. Even at the end of the 2d century after Mohammed the Bedouins of Arabia proper, with the exception of a few outlying districts, were considered as being in possession of this pure Arabic. The most learned grammarians were in the habit of appealing to any uneducated man who happened to have just arrived with his camels from the desert, though he did not know by heart twenty verses of the Koran, and had no conception of theoretical grammar, in order that he might decide whether in Arabic it were allowable or necessary to express oneself in this or that manner. It is evident that these profound scholars knew of only one classical language, which was still spoken by the Bedouins. The tribes which produced the principal poets of the earlier period belonged for the most part to portions of the Ḥijáz, to Nejd and its neighborhood, and to the region which stretches thence towards the Euphrates. A great part of the Ḥijáz, on the other hand, plays a very unimportant part in this poetry, and the Arabs of the northwest, who were under the Roman dominion, have no share whatever in it. The dialects of these latter tribes probably diverged further from the ordinary language. The fact that they were Christians does not explain this, since the Taghlibites and other tribes who produced eminent poets also professed Christianity. Moreover, poets from the interior were gladly welcomed at the court of the Ghassanian princes, who were Christian vassals of the emperor residing near Damascus; in this district, therefore, their language was at least *understood*. It may be added that most of the tribes which cultivated poetry appear to have been near neighbors at an epoch not very far removed from that in question, and afterwards to have been scattered in large bands over a much wider extent of country. And nearly all those who

[1] "Essai sur les Inscriptions du Safa," from the *Journal Asiatique* (Paris, 1882).

[2] Sachau, *Monatsbericht der Berliner Akademie der Wissenschaften*, 10th February 1881, and *Z. D. M. G.*, xxxvi. 345 *sq.*

[3] Le Bas and Waddington, No. 2464, and *Z. D. M. G.*, xxxviii, 530.

[4] Comp. the article Mo'allaḳát.

were not Christians paid respect to the sanctuary of Mecca. It is a total mistake, but one frequently made by Europeans, to designate the Arabic language as "the Koraishite dialect." This expression never occurs in any Arabic author. True, in a few rare cases we do read of the dialect of the Koraish, by which is meant the peculiar local tinge that distinguished the speech of Mecca; but to describe the Arabic language as "Koraishite" is as absurd as it would be to speak of English as the dialect of London or of Oxford. This unfortunate designation has been made the basis of a theory very often repeated in modern times,—namely, that classical Arabic is nothing else but the dialect of Mecca, which the Koran first brought into fashion. So far from this being the case, it is certain that the speech of the *towns* in the Hijáz did not agree in every point with the language of the poets, and, as it happens, the Koran itself contains some remarkable deviations from the rules of the classical language. This would be still more evident if the punctuation, which was introduced at a later time, did not obscure many details. The traditions which represent the Koraish as speaking the purest of all Arabic dialects are partly the work of the imagination and partly compliments paid to the rulers descended from the Koraish, but are no doubt at variance with the ordinary opinion of the Arabs themselves in earlier days. In the Koran Mohammed has imitated the poets, though, generally speaking, with little success; the poets, on the other hand, never imitated him. Thus the Koran and its language exercised but very little influence upon the poetry of the following century and upon that of later times, whereas this poetry closely and slavishly copied the productions of the old heathen period. The fact that the poetical literature of the early Moslems has been preserved in a much more authentic form than the works of the heathen poets proves that our idea of the ancient poetry is on the whole just.

Dialect of the Koraish.

The Koran and Islam raised Arabic to the position of one of the principal languages of the world. Under the leadership of the Koraish the Bedouins subjected half the world to both their dominion and their faith. Thus Arabic acquired the additional character of a sacred language. But soon it became evident that not nearly all the Arabs spoke a language precisely identical with the classical Arabic of the poets. The northwestern Arabs played a particularly important part during the period of the Omayyads. The ordinary speech of Mecca and Medina was, as we have seen, no longer quite so primitive as that of the desert. To this may be added that the military expeditions brought those Arabs who spoke the classical language into contact with tribes from out-of-the-way districts, such as 'Omán, Baḥrain (Bahrein), and particularly the north of Yemen. The fact that numbers of foreigners, on passing over to Islam, became rapidly Arabized was also little calculated to preserve the unity of the language. Finally, the violent internal and external commotions which were produced by the great events of that time, and stirred the whole nation, probably accelerated linguistic change. In any case, we know from good tradition that even in the 1st century of the Flight the distinction between correct and incorrect speech was quite perceptible. About the end of the 2d century the system of Arabic grammar was constructed, and never underwent any essential modification in later times. The theory as to how one should express oneself was now definitely fixed. The majority of those Arabs who lived beyond the limits of Arabia already diverged far from this standard; and in particular the final vowels which serve to indicate cases and moods were no longer pronounced. This change, by which Arabic lost one of its principal advantages, was no doubt hastened by the fact that even in the classical style such terminations were omitted whenever the word stood at the end of a sentence (in pause); and in the living language of the Arabs this dividing of sentences is very frequent. Hence people were already quite accustomed to forms without grammatical terminations.

Changes in classical Arabic.

Through the industry of Arabic philologists we are able to make ourselves intimately acquainted with the system, and still more with the vocabulary of the language, although they have not always performed their task in a critical manner. We should be all the more disposed to admire the richness of the ancient Arabic vocabulary when we remember how simple are the conditions of life amongst the Arabs, how painfully monotonous their country, and consequently how limited the range of their ideas must be. Within this range, however, the slightest modification is expressed by a particular word. It must be confessed that the Arabic lexicon has been greatly augmented by the habit of citing as words by themselves such rhetorical phrases as an individual poet has used to describe an object: for example, if one poet calls the lion the "tearer" and another calls him the "mangler," each of these terms is explained by the lexicographers as equivalent to "lion." One branch of literature in particular, namely, lampoons and satirical poems, which for the most part have perished, no doubt introduced into the lexicon many expressions coined in an arbitrary and sometimes in a very strange manner. Moreover, Arabic philologists have greatly underrated the number of words which, though they occur now and then in poems, were never in general use except among particular tribes. But in spite of these qualifications it must be admitted that the vocabulary is surprisingly rich, and the Arabic dictionary will always remain the principal resource for the elucidation of obscure expressions in all the other Semitic tongues. This method, if pursued with the necessary caution, is a perfectly legitimate one.

Vocabulary.

Poems seldom enable us to form a clear idea of the language of ordinary life, and Arabic poetry happens to have been distinguished from the very beginning by a certain tendency to artificiality and mannerism. Still less does the Koran exhibit the language in its spoken form. This office is performed by the prose of the ancient traditions (Ḥadíth). The genuine accounts of the deeds of the Prophet and of his companions, and not less the stories concerning the battles and adventures of the Bedouins in the heathen period and in the earlier days of Islam, are excellent models of a prose style, although in some cases their redaction dates from a later time.

Classical Arabic is rich not only in words but in grammatical forms. The wonderful development of the broken plurals, and sometimes of the verbal nouns must be regarded as an excess of wealth. The sparing use of the ancient terminations which mark the plural has somewhat obscured the distinction between plurals, collectives, abstract nouns, and feminines in general. In its manner of employing the verbal tenses genuine Arabic still exhibits traces of that poetical freedom which we see in Hebrew; this characteristic disappears in the later literary language. In connecting sentences Arabic can go much further than Hebrew, but the simple parataxis is by far the most usual construction. Arabic has, however, this great advantage, that it scarcely ever leaves us in doubt as to where the apodosis begins. The attempts to define the tenses more clearly by the addition of adverbs and auxiliary verbs lead to no very positive result (as is the case in other Semitic languages also), since they are not carried out in a systematic manner. The arrangement of words in a sentence is governed by very strict rules. As the subject and object, at least in ordinary cases, occupy fixed positions, and as the genitive is invariably placed after the noun that governs it, the use of case-endings loses much of its significance.

Grammatical forms and rules.

This language of the Bedouins had now, as we have seen, become that of religion, courts, and polished society. In the streets of the towns the language already diverged considerably from this, but the upper classes took pains to speak "Arabic." The poets and the *beaux esprits* never ventured to employ any but the classical language, and the "Atticists," with pedantic seriousness convicted the most celebrated among the later poets (for instance Motanabbí) of occasional deviations from the standard of correct speech. At the same time, however, classical Arabic was the language of business and of science, and at the present day still holds this position. There are, of course, many gradations between the pedantry of purists and the use of what is simply a vulgar dialect. Sensible writers employ a kind of κοινή, which does not aim at being strictly correct and calls modern things by modern names, but which, nevertheless, avoids coarse vulgarisms, aiming principally at making itself intelligible to all educated men. The reader may pronounce or omit the ancient terminations as he chooses. This language lived on, in a sense, through the whole of the Middle Ages, owing chiefly to the fact that it was intended for educated persons in general and not only for the learned, whereas the poetical schools strove to make use of the long extinct language of the Bedouins. As might be expected, this κοινή, like the κοινή of the Greeks, has a comparatively limited vocabulary, since its principle is to retain only those expressions from the ancient language which were generally understood, and it does not borrow much new material from the vulgar dialects.

Arabic of educated society.

It is entirely a mistake to suppose that Arabic is unsuited for the treatment of abstract subjects. On the contrary, scarcely any language is so well adapted to be the organ of scholasticism in all its branches. Even the tongue of the ancient Bedouins had a strong preference for the use of abstract verbal nouns (in striking contrast to the Latin, for example); thus they oftener said "Needful is thy sitting" than "It is needful that thou shouldst sit." This tendency was very advantageous to philosophical phraseology. The strict rules as to the order of words, though very unfavorable to the development of a truly eloquent style, render it all the easier to express ideas in a rigidly scientific form.

In the meantime Arabic, like every other widely spread language, necessarily began to undergo modification and to split up into dialects. The Arabs are mistaken in attributing this development to the influence of those foreign languages with which Arabic came into contact. Such influences can have had but little to do with the matter; for were it otherwise the language of the interior of Arabia must have remained unchanged, yet even in this region the inhabitants are very far from speaking as they did a thousand years back. A person who in Arabia or elsewhere should trust to his knowledge of classical Arabic only would resemble those travellers from the north who endeavor to make themselves understood by Italian waiters through the medium of a kind of Latin. The written language has, it is true, greatly retarded the development of the dialects. Every good Moslem repeats at least a few short súras several times a day in his prayers, besides being minutely acquainted with the sacred book; and this must have had a powerful influence upon the speech of the people at large. But nevertheless dialects have formed themselves and have diverged considerably from one another. Of these there are indeed but few with which we are tolerably well acquainted; that of Egypt alone is known with real accuracy.[1] Although the French have occupied Algeria for about fifty years, we still possess but imperfect information with respect to the language of that country. It is closely connected with that of Morocco on the one hand and with that of Tunis on the other. Arabic has long been banished from Spain; but we possess a few literary works written in Spanish Arabic, and just before it became too late Pedro de Alcala composed a grammar and a lexicon of that dialect.[2] We have also a few ancient specimens of the Arabic which was once spoken in Sicily. To the western group of dialects belongs the language of Malta, which, cut off as it is from other Arabic dialects and exposed to the influence of Italian, has developed itself in a very strange manner; in it a considerable number of books have already been printed, but with Latin characters. The dialects of Arabia, Syria, and the other Eastern provinces, in spite of many valuable works, are not yet sufficiently well known to admit of being definitely classified.

Minor Arabic dialects.

There can be no doubt that the development of these dialects is in part the result of older dialectical variations, which were already in existence in the time of the Prophet The histories of dialects which differ completely from one another often pursue an analogous course. In general, the Arabic dialects still resemble one another more than we might expect when we take into consideration the great extent of country over which they are spoken and the very considerable geographical obstacles that stand in the way of communication. But we must not suppose that people, for instance, from Mosul, Morocco, San'á, and the interior of Arabia would be able to understand one another without difficulty. It is a total error to regard the difference between the Arabic dialects and the ancient language as a trifling one, or to represent the development of these dialects as something wholly unlike the development of the Romance languages. No living Arabic dialect diverges from classical Arabic so much as French or Rouman from Latin; but, on the other hand, no Arabic dialect resembles the classical language so closely as the Lugodoric dialect, which is still spoken in Sardinia, resembles its parent speech, and yet the lapse of time is very much greater in the case of the latter.

Sabæan.—Long before Mohammed, a peculiar and highly developed form of civilization had flourished in the table land to the south-west of Arabia. The more we become acquainted with the country of the ancient Sabæans and with its colossal edifices, and the better we are able to decipher its inscriptions, which are being discovered in ever-increasing numbers, the easier it is for us to account for the haze of mythical glory wherewith the Sabæans were once invested. The Sabæan inscriptions (which till lately were more often called by the less correct name of "Himyaritic") begin long before our era and continue till about the 4th century. The somewhat stiff character is always very distinct; and the habit of regularly dividing the words from one another renders decipherment easier, which, however, has not yet been performed in a very satisfactory manner, owing in part to the fact that the vast majority of the documents in question consist of religious votive tablets with peculiar sacerdotal expressions, or of architectural notices abounding in technical terms. These incriptions fall into two classes, distinguished partly by grammatical peculiarities and partly by peculiarities of phraseology. One dialect, which forms the causative with *ha*, like Hebrew and others, and employs, like nearly all the Semitic languages, the termination *h* (*hú*) as the suffix of the third person singular, is the Sabæan properly speaking. The other, which expresses the causative by *sa* (corresponding to the Shaphel of the Aramæans and others), and for the suffix uses *s* (like the Assyrian *sh*), is the Minaic. To this latter branch belong the numerous South Arabic inscriptions recently found in the north of the Ḥijás, near Ḥejr, where the Minæans must have had a commercial settlement. The difference between the two classes of inscriptions is no doubt ultimately based upon a real divergence of dialect. But the singular manner in which districts containing Sabæan inscriptions and those containing Minaic alternate with one another seems to point in part to a mere hieratic practice of clinging to ancient modes of expression. Indeed it is very probably due to conscious literary conservatism that the language of the inscriptions remains almost entirely unchanged through many centuries. A few inscriptions from districts rather

Sabæan inscriptions.

[1] W. Spitta-Bey. *Grammatik des arabischen Vulgärdialects von Aegypten* (Leipsic, 1880).

[2] They were published in 1505, reprinted by Lagarde (*Petri Hispani de Lingua Arabica Libri duo*, Göttingen, 1883).

more to the east exhibit certain linguistic peculiarities, which, however, may perhaps be explained by the supposition that the writers did not, as a rule, speak this dialect, and therefore were but imperfectly acquainted with it.

Grammatical forms.

As the Sabæan writing seldom indicates the vowels, our knowledge of the language is necessarily very incomplete; and the unvarying style of the inscriptions excludes a great number of the commonest grammatical forms. Not a single occurrence of the first or second person has yet been detected, with the possible exception of one proper name, in which "our god" apparently occurs. But the knowledge which we already possess amply suffices to prove that Sabæan is closely related to Arabic as we are acquainted with it. The former language possesses the same phonetic elements as the latter, except that it has at least one additional sibilant, which appears to have been lost in Arabic. It possesses the broken plural, a dual form resembling that used in Arabic, etc. It is especially important to notice that Sabæan expresses the idea of indefiniteness by means of an appended *m*, just as Arabic expresses it by means of an *n*, which in all probability is a modification of the former sound. Both in this point and in some others Sabæan appears more primitive than Arabic, as might be expected from the earlier date of its monuments. The article is formed by appending an *n*. In its vocabulary also Sabæan bears a great resemblance to Arabic, although, on the other hand, it often approaches more nearly to the northern Semitic languages in this respect; and it possesses much that is peculiar to itself.[1]

Soon after the Christian era Sabæan civilization began to decline, and completely perished in the wars with the Abyssinians, who several times occupied the country, and in the 6th century remained in possession of it for a considerable period. In that age the language of central Arabia was already penetrating into the Sabæan domain. It is further possible that many tribes which dwelt not far to the north of the civilized districts had always spoken dialects resembling central Arabic rather than Sabæan. About the year 600 "Arabic" was the language of all Yemen, with the exception perhaps of a few isolated districts, and this process of assimilation continued in later times. Several centuries after Mohammed learned Yemenites were acquainted with the characters of the inscriptions which abounded in their country; they were also able to decipher the proper names and a small number of Sabæan words the meaning of which was still known to them, but they could no longer understand the inscriptions as a whole. Being zealous local patriots, they discovered in those inscriptions which they imagined themselves to be capable of deciphering many fabulous stories respecting the glory of the ancient Yemenites.

Dialects akin to Sabæan.

Farther to the east, in the sea-coast districts of Shihr and Mahra, up to the borders of the barren desert of the interior, and also, we are told, in the island of Socotra, dialects very unlike Arabic are still spoken. Allusions to this fact are found in Arabic writers of the 10th century. These dialects depart widely from the ancient Semitic type, but bear some resemblance to the Sabæan, although they cannot be regarded as actually descended from the latter. One feature which they have in common with Sabæan is the habit of appending an *n* to the imperfect. Like the Ethiopic, and probably also the Sabæan, they use *k* (instead of *t*) in the terminations of the first person singular and the second person singular and plural of the perfect tense. In the suffixes of the third person there appears, at least in the feminine, an *s*, as in the Minaic. Unfortunately the information which we have hitherto possessed respecting these dialects is meagre and inexact, in part very inexact.[2] It is much to be wished that soon they may all be investigated as carefully as possible, the more so as there is danger in delay, for Arabic is gradually supplanting them.

Ethiopic.—In Abyssinia, too, and in the neighboring countries we find languages which bear a certain resemblance to Arabic. The Geez or Ethiopic[3] proper, the language of the ancient kingdom of Aksúm, was reduced to writing at an early date. To judge by the few passages communicated by Salt, the back of the inscription of Aeizanas, king of Aksúm about 350, exhibits writing in the Sabæan language, which appears to prove that the development of the Geez character out of the Sabæan, and the elevation of Geez to the rank of a literary language, must have taken place after the year 350. The oldest monuments of this language which are known with certainty are the two great inscriptions of Tázéná, a heathen king of Aksúm, dating from about 500. Hitherto our acquaintance with these inscriptions has been derived from very imperfect drawings[4]; but they amply suffice to show that we have here the same language as that in which the Ethiopic Bible is written, with the very same exact indication of the vowels,—a point in which Ethiopic has an advantage over all other Semitic characters. Who introduced this vocalization is unknown. When the above-mentioned inscriptions were made the Bible had probably been already translated into Geez from the Greek, perhaps in part by Jews; for Jews and Christians were at that time actively competing with one another, both in Arabia and in Abyssinia; nor were the former unsuccessful in making proselytes. The missionaries who gave the Bible to the Abyssinians must, at least in some cases, have spoken Aramaic as their mother-tongue, for this alone can explain the fact that in the Ethiopic Bible certain religious conceptions are expressed by Aramaic words. During the following centuries various works were produced by the Abyssinians in this language; they were all, so far as we are able to judge, of a more or less theological character, almost invariably translations from the Greek. We cannot say with certainty when Geez ceased to be the language of the people, but it was probably about a thousand years ago. From the time when the Abyssinian kingdom was reconstituted, towards the end of the 13th century, by the so-called Solomonian dynasty (which was of southern origin), the language of the court and of the Government was Amharic; but Geez remained the ecclesiastical and literary language, and Geez literature even showed a certain activity in numerous translations from those Arabic and Coptic works which were in use amongst the Christians of Egypt: besides these a few original writings were composed, namely, lives of saints, hymns, etc. This literary condition lasted till modern times. The language, which had long become extinct, was by no means invariably written in a pure form; indeed even in manuscripts of more ancient works we find many linguistic corruptions, which have crept in partly through mere carelessness and ignorance, partly through the influence of the later dialects. On points of detail we are still sometimes left in doubt, as we possess no manuscripts belonging to the older period. This renders it all the more important that the ancient and authentic inscriptions upon the monuments of Aksúm should be accurately published.

Geez, or Ethiopic proper.

Geez is more nearly related to Sabæan than to Arabic, though scarcely to such a degree as we might expect. The historical intercourse between the Sabæans and the people of Aksúm does not, however, prove that those

Characteristics of Geez.

[1] The literature relating to these inscriptions is widely scattered. Before the Parisian *Corpus* supplies us with the collected materials, we may hope to see the Sabæan grammar of D. H Müller, who, with Halévy, has lately rendered the greatest services in this department.

[2] See especially Maltzan, in *Z.D.M.G.*, vols. xxv. and xxvii.

[3] This name is due to the fact that the Abyssinians, under the influence of false erudition, applied the name Αἰθιοπία to their own kingdom.

[4] The authorities of the library of Frankfort have kindly enabled the present writer to consult Rüppell's copies, which are more accurate than the lithographs in his book. The English in 1868 did not seize the opportunity to examine thoroughly the

who spoke Geez were simply a colony from Sabæa; the language may be descended from an extinct cognate dialect of south Arabia, or may have arisen from a mingling of several such dialects. And this colonization in Africa probably began much sooner than is usually supposed. In certain respects Geez represents a more modern stage of development than Arabic; we may cite as instances the loss of some inflexional terminations and of the ancient passive, the change of the aspirated dentals into sibilants, etc. In the manuscripts, especially those of later date, many letters are confounded, namely, *h*, *ḥ*, and *kh*, *s* and *sh*, *ç* and *ḍ*; this, however, is no doubt due only to the influence of the modern dialects. To this same influence, and indirectly perhaps to that of the Hamitic languages, we may ascribe the very hard sound now given to certain letters, *ḳ*, *ṭ*, *ç*, and *ḍ*, in the reading of Geez. The last two are at present pronounced something like *ṭs* and *ts* (the German *z*). A peculiar advantage possessed by Geez and by all Ethiopic languages is the sharp distinction between the imperfect and the subjunctive: in the former a vowel is inserted after the first radical,—a formation of which there seem to be traces in the dialect of Mahra, and which is also believed to have existed in Assyrian. Geez has no definite article, but is very rich in particles. In the ease with which it joins sentences together and in its freedom as to the order of words it resembles Aramaic. The vocabulary is but imperfectly known, as the theological literature, which is for the most part very arid, supplies us with comparatively few expressions that do not occur in the Bible, whereas the more modern works borrow their phraseology in part from the spoken dialects, particularly Amharic. With regard to the vocabulary, Geez has much in common with the other Semitic tongues, but at the same time possesses many words peculiar to itself; of these a considerable proportion may be of Hamitic origin. Even some grammatical phenomena seem to indicate Hamitic influence; for instance, the very frequent use of the gerundive, a feature which has become still more prominent in the modern dialects, placed as they are in yet closer contact with the Hamitic. We must not suppose that the ancient inhabitants of Aksúm were of pure Semitic blood. The immigration of the Semites from Arabia was in all probability a slow process, and under such circumstances there is every reason to assume that they largely intermingled with the aborigines. This opinion seems to be confirmed by anthropological facts.

Tigré and Tigriña.

Not only in what is properly the territory of Aksúm (namely, Tigré, northeastern Abyssinia), but also in the countries bordering upon it to the north, including the islands of Dahlak, dialects are still spoken which are but more modern forms of the linguistic type clearly exhibited in Geez. The two principal of these are that spoken in Tigré proper and that of the neighboring countries. In reality, the name of Tigré belongs to both, and it would be desirable to distinguish them from one another as Northern and Southern Tigré. But it is the custom to call the northern dialect Tigré simply, whilst that spoken in Tigré itself bears the name of Tigriña, with an Amharic termination. It is generally assumed that Tigré bears a closer resemblance to Geez than does Tigriña, although the latter is spoken in the country where Geez was formed; and this may very possibly be the case, for Tigriña has during several centuries been very strongly influenced by Amharic, which has not been the case with Tigré, which is spoken partly by nomads. Of Tigré, which appears to be divided into numerous dialects, we have several glossaries; but of its grammar we as yet know but little. Written specimens of this language are almost entirely wanting. With Tigriña we are somewhat better acquainted,[1] but only as it is spoken in the centre of the country, near the site of the ancient Aksúm, where Amharic happens to be particularly strong,—above all, amongst the more educated classes. In Tigriña the older grammatical forms are often subjected to violent alterations; foreign elements creep in; but the kernel remains Semitic.

Amharic.

Very different is the case with Amharic, a language of which the domain extends from the left bank of the Takkazê into regions far to the south. Although by no means the only language spoken in these countries, it always tends to displace those foreign tongues which surround it and with which it is interspersed. We here refer especially to the Agaw dialects. Although Amharic has been driven back by the invasions of the Galla tribes, it has already compensated itself to some extent for this loss, as the Yedju and Wollo Gallas, who penetratèd into eastern Abyssinia, have adopted it as their language. With the exception, of course, of Arabic, no Semitic tongue is spoken by so large a number of human beings as Amharic. The very fact that the Agaw languages are being gradually, and, as it were, before our own eyes, absorbed by Amharic[2] makes it appear probable that this language must be spoken chiefly by people who are not of Semitic race. This supposition is confirmed by a study of the language itself. Amharic has diverged from the ancient Semitic type to a far greater extent than any of the dialects which we have hitherto enumerated. Many of the old formations preserved in Geez are completely modified in Amharic. Of the feminine forms there remain but a few traces; and that is the case also with the ancient plural of the noun. The strangest innovations occur in the personal pronouns. And certainly not more than half the vocabulary can without improbability be made to correspond with that of the other Semitic languages. In this, as also in the grammar, we must leave out of account all that is borrowed from Geez, which, as being the ecclesiastical tongue, exercises a great influence everywhere in Abyssinia. On the other hand, we must make allowance for the fact that in this language the very considerable phonetic modifications often produce a total change of form, so that many words which at first have a thoroughly foreign appearance prove on further examination to be but the regular development of words with which we are already acquainted.[3] But the most striking deviations occur in the syntax. Things which we are accustomed to regard as usual or even universal in the Semitic languages, such as the placing of the verb before the subject, of the governing noun before the genitive, and of the attributive relative clause after its substantive, are here totally reversed. Words which are marked as genitives by the prefixing of the relative particle, and even whole relative clauses, are treated as one word, and are capable of having the objective suffix added to them. It is scarcely going too far to say that a person who has learnt no Semitic language would have less difficulty in mastering the Amharic construction than one to whom the Semitic syntax is familiar. What here appears contrary to Semitic analogy is sometimes the rule in Agaw. Hence it is probable that in this case tribes originally Hamitic retained their former modes of thought and expression after they had adopted a Semitic speech, and that they modified their new language accordingly. And it is not certain that the partial Semitization of the southern districts of Abyssinia (which had scarcely any connection with the civilization of Aksúm during its best period) was entirely or even principally due to influences from the north.

In spite of its dominant position, Amharic did not for several centuries show any signs of becoming a literary language. The oldest documents which we

antiquities of Aksúm, and since then no traveller has taken the trouble to procure accurate copies of these extremely important monuments.

[1] Franz Praetorius, *Grammatik der Tigriñasprache*, Halle, 1872. The present writer was also permitted to use the manuscript grammar of a Belgian missionary, who spent a long time in the country.

[2] Only an advanced guard of the Agaw languages, the Bílín or dialect of the Bogos, is being similarly absorbed by the Tigré.

[3] Praetorius, however, in his very valuable grammar, *Die amharische Sprache* (Halle, 1879), has gone much too far in his attempts to connect Amharic words and grammatical phenomena with those that occur in Geez.

possess are a few songs of the 15th and 16th centuries, which were not, however, written down till a later time, and are very difficult to interpret. There are also a few Geez-Amharic glossaries, which may be tolerably old. Since the 17th century various attempts have been made, sometimes by European missionaries, to write in Amharic, and in modern times this language has to a considerable extent been employed for literary purposes; nor is this to be ascribed exclusively to foreign influence. A literary language, fixed in a sufficient measure, has thus been formed. Books belonging to a somewhat earlier period contain tolerably clear proofs of dialectical differences. Scattered notices by travellers seem to indicate that in some districts the language diverges in a very much greater degree from the recognized type.

The Abyssinian chronicles have for centuries been written in Geez, largely intermingled with Amharic elements. This "language of the chronicles," in itself a dreary chaos, often enables us to discover what were the older forms of Amharic words. A similar mixture of Geez and Amharic is exemplified in various other books, especially such as refer to the affairs of the Government and of the court.

Gurágné and Hararí.

The languages spoken still farther to the south, that of Gurágué (south of Shoa) and that of Harar, are perhaps more fitly described as languages akin to Amharic than as Amharic dialects. Until we possess more precise information respecting them, and in general respecting the linguistic and ethnographical condition of these countries, it would not be safe to hazard even a conjecture as to the origin of these languages, which, corrupt as they may be, and surrounded by tongues of a wholly different class, must still be regarded as Semitic. It is enough to repeat that the immigration of the Semites into these parts of Africa was probably no one single act, that it may have taken place at different times, that the immigrants perhaps belonged to different tribes and to different districts of Arabia, and that very heterogeneous peoples and languages appear to have been variously mingled together in these regions.

The clever and brilliant work of Renan, *Histoire générale des langues Sémitiques* (1st ed., Paris, 1855), could not fail to produce much effect at the time, in spite of the one-sided character and the actual mistakes that it contains. Even at the present day a *scholar* may read it with great interest and profit; but as a whole it has been superseded by the discoveries of the last twenty or thirty years. The remarks of Ewald, in the introduction to his Hebrew grammar, upon the mutual relationship of the Semitic languages are still worthy of perusal, much as they provoke contradiction. A work upon the subject which realizes for the present state of science what Renan endeavored to realize for his own time unfortunately does not exist. (TH. N.)

SEMLER, JOHANN SALOMO (1725–1791), ecclesiastical historian and critic, sometimes called "the father of German rationalism" (see RATIONALISM), was born at Saalfeld in Thuringia on 18th December, 1725. He was the son of a clergyman in poor circumstances, and had to fight his way in the world solely by his own talents. He grew up amidst Pietistic surroundings, which powerfully influenced him his life through, though he was never spiritually or intellectually a Pietist. As a boy he showed the omnivorous appetite for books which was characteristic of his later life. In his seventeenth year he entered the university of Halle, where he became the disciple, afterwards the assistant, and at last the literary executor of the orthodox rationalistic Professor Baumgarten. In 1749 he accepted the position of editor, with the title of professor, of the Coburg official *Gazette*, with leisure to pursue historical and scientific studies. But the next year he was invited to Altdorf as professor of philology and history, and six months later became a professor of theology in Halle. After the death of Baumgarten (1757) Semler became the head of the theological faculty of his university, and the fierce opposition which his writings and lectures provoked only helped to increase his fame as a professor. His popularity continued undiminished for more than twenty years, until 1779. In that year he came forward with a reply to the *Wolfenbüttel Fragments* (see REIMARUS) and to Bahrdt's confession of faith, a step which was interpreted by the extreme rationalists as a revocation of his own rationalistic position. Even the Prussian Government, which favored Bahrdt, made Semler painfully feel its displeasure at this new but really not inconsistent aspect of his position. But, though Semler was really not inconsistent with himself in attacking the views of Reimarus and Bahrdt, as a comparison of his works prior and subsequent to 1779 with those in question shows, his popularity began that year to decline, and towards the end of his life he felt painfully the necessity of emphasizing the apologetic and conservative value of true historical inquiry. With more justification, perhaps, might his defence of the notorious edict of Wöllner (1788), the cultus minister, be cited as a sign of the decline of his powers and of an unfaithfulness to his principles. He died at Halle on 14th March, 1791, worn out by his prodigious labors, embittered by his desertion, and disappointed at the issue of his work.

Semler's importance in the history of theology and the human mind is that of a critic of Biblical and ecclesiastical documents and of the history of dogmas. He was not a philosophical thinker or theologian, though he insisted, more or less confusedly, and yet with an energy and persistency before unknown, on certain distinctions of great importance when properly worked out and applied, *e.g.*, the distinction between religion and theology, that between private personal beliefs and public historical creeds, and that between the local and temporal and the permanent elements of historical religion. His great work was that of the critic. He was the first to reject with sufficient proof the equal value of the Old and the New Testaments, the uniform authority of all parts of the Bible, the divine authority of the traditional canon of Scripture, the inspiration and supposed correctness of the text of the Old and New Testaments, and, generally, the identification of revelation with Scripture. Though to some extent anticipated by the English deist Thomas Morgan, Semler was the first to take due note of and use for critical purposes the opposition between the Judaic and anti-Judaic parties of the early church. He led the way in the task of discovering the origin of the Gospels, the Epistles, the Acts of the Apostles, and the Apocalypse. He revived previous doubts as to the direct Pauline origin of the Epistle to the Hebrews, called in question Peter's authorship of the first epistle, and referred the second epistle to the end of the 2d century. He wished to remove the Apocalypse altogether from the canon. In textual criticism Semler pursued further the principle of classifying MSS. in families, adopted by R. Simon and Bengel. Though he lacked almost every qualification of the true church historian, Semler did the work of a pioneer in many periods in several departments of ecclesiastical history. Tholuck pronounces him "the father of the history of doctrines" and Baur "the first to deal with that history from the true critical standpoint." At the same time, it is admitted by all that he was nowhere more than a pioneer. Baur's description of his work in one department of ecclesiastical history is true of his work generally. "His writings on the history of dogma resemble a fallow-field waiting to be cultivated or a building-site on which, underneath refuse and ruins, lie the materials in chaotic confusion for a new edifice. The consequence was that as he was always occupied in preliminary labors, he brought nothing to even partial completion; and, though his general critical standpoint was correct, in its application to details his criticism could only be regarded as extremely bold and arbitrary."

Tholuck gives 171 as the number of Semler's works, of which only two reached a second edition, and none is now read for its own sake. Amongst the chief are—*De demoniacis* (Halle, 1760, 4th ed. 1779), *Selecta capita historiæ ecclesiasticæ* (3 vols., Halle, 1767–69), *Von freier Untersuchung des Kanon* (Halle, 1771–72), *Apparatus ad liberalem N. T. interpretationem* (1767; *ad V. T.*, 1773), *Institutio ad doctrinam Christ. liberaliter discendam* (Halle, 1774), *Ueber historische, gesellschaftliche, und moralische Religion der Christen* (1786), and his autobiography, *Semler's Lebensbeschreibung, von ihm selbst abgefasst* (Halle, 1781–82).

For estimates of Semler's labors, see Gass, *Gesch. der prot. Dogmatik* (Berlin, 1854-67); Dorner, *Gesch. der prot. Theol.* (Munich, 1867); Tholuck, art. in Herzog's *Real-Encyklopädie;* Hilgenfeld, *Einleitung in das Neue Test.* (Leipsic, 1875); Baur, *Epochen der kirchlichen Geschichtschreibung* (1852); and Ritschl, *Gesch. des Pietismus* (Bonn, 1880-84).

SEMLIN (Hung. *Zimony;* Servian, *Semun*), a town of Austria-Hungary, the easternmost in the Military Frontier district, stands on the south bank of the Danube, on a tongue of land between that river and the Save. It is the see of a Greek archbishop, has a real school of lower grade, five Roman Catholic and two Greek churches, a synagogue, a theatre, and a custom-house. The population (10,046) consists mostly of Servians, with a few Germans, Greeks, Illyrians, Croats, Gipsies, and Jews. Semlin has recently undergone improvement in its streets and buildings; but its suburb Franzenthal near the Danube consists mostly of mud huts thatched with reeds. The town is surrounded by a stockade. On the top of Zigeunerberg are the remains of the castle of John Hunyadi, who died here in 1456. Semlin has a considerable trade, sending woollen cloth, porcelain, and glass to Turkey, and obtaining in return yarn, leather, skins, honey, and meerschaum pipes. It is a principal quarantine station for travellers from Turkey. Steam ferry boats cross to Belgrade several times a day, and larger vessels run up the Save as far as to Sissek.

SEMPER, Gottfried (1803–1879), German architect and writer on art, was born at Altona on 29th November, 1803. His father intended him for the law, but irresistible impulse carried him over to art. His early mastery of classical literature led him to the study of classic monuments in classic lands, while his equally conspicuous talent for mathematics gave him the laws of form and proportion in architectural design. While a student of law at the university of Göttingen he fell under the influence of K. O. Müller, and in after years followed closely in his footsteps. Semper's architectural education was carried out successively in Hamburg, Berlin, Dresden, in Paris under Gau, and in Munich under Gärtner; afterwards he visited Italy and Greece. In 1834 he was appointed professor of architecture in Dresden, and during fifteen years received many important commissions from the Saxon court. He built the opera house, which made his fame, the new museum and picture gallery, likewise a synagogue. In 1848 his turbulent spirit led him to side with the revolution against his royal patron; he furnished the rebels with military plans, and was eventually driven into exile. Semper came to London at the time of the Great Exhibition of 1851, and the prince consort found him an able ally in carrying out his plans. He was appointed teacher of the principles of decoration; and his lectures in manuscript, preserved in the art library, South Kensington, deserve to be better known. He was also employed by the prince consort to prepare a design for the Kensington Museum; he likewise made the drawings for the Wellington funeral car. In 1853 Semper left London for Zurich on his appointment as professor of architecture, and with a commission to build in that town the polytechnic school, the hospital, etc. In 1870 he was called to Vienna to assist in the great architectural projects since carried out round the Ring. A year later, after an exile of over twenty years, he received a summons to Dresden, on the rebuilding of the first opera house, which had been destroyed by fire in 1869; his second design was a modification of the first. The closing years of his life were passed in comparative tranquility between Venice and Rome, and in the latter city he died, on 15th May, 1879.

Semper's style was a growth from the classic orders through the Italian Cinque Cento. He forsook the base and rococo forms he found rooted in Germany, and, reverting to the best historic examples, fashioned a purer Renaissance. He stands as a leader in the practice of polychrome, since widely diffused, and by his writings and example did much to reinstate the ancient union between architecture, sculpture, and painting. Among his numerous literary works are *Ueber Polychromie u. ihren Ursprung* (1851), *Die Anwendung der Farben in der Architektur u. Plastik bei den Alten, Der Stil in den technischen u. tektonischen Künsten* (1860–63). His *Notes of Lectures on Practical Art in Metals and Hard Materials: its Technology, History, and Style,* remains in MS. His teachings are sometimes encumbered by speculations reaching far beyond the domain of his art.

SENAAR (Sennaar, properly Sennár), a country of east Central Africa, commonly identified with the "Island of Meroe" of the ancients, and included in the central division of Egyptian (Eastern) Súdán, as reorganized in the year 1882. By European writers the term is often applied to the whole region lying between the Atbára (Takazze) and the White Nile, but by native usage is restricted to the district confined between the latter river and the Baḥr-el-Azraḳ (Blue Nile), and its eastern tributaries, the Rahad and the Dender. It is bordered north and northeast by Upper Nubia, east by Abyssinia, west by the White Nile (Baḥr-el-Abiaḍ), separating it from Kordofán, and stretches from the confluence of the two Niles at Khartúm southwards, in the direction of the Berta highlands in the east and the Búrún and Dinka plains in the west. As thus defined, Sennár extends across five degrees of latitude (16° to 11° N.), with a total length of about 350 miles, a mean breadth of 120 miles, an area of 40,000 square miles, and an approximate population of 300,000. It comprises two physically distinct tracts, the densely wooded and well-watered Jezírat el-Jesírát ("Isle of Isles") between the Rahad and the Blue Nile, and the "island" of Sennár proper, a nearly level steppe land confined between the two main streams. This western and much larger division, which has a mean elevation of under 2000 feet above sea-level, consists mainly of alluvial and sandy matter, resting on a bed of granite and porphyritic granite, which first crops out some ten days' journey south of Khartúm, in the Jebel es-Segati and the Jebel el-Moye, near the town of Sennár on the Baḥr-el-Azraḳ. Between these two groups the plain is dotted over with isolated slate hills containing iron and silver ores. But beyond Sennár the boundless steppe, either under a tall coarse grass, or overgrown with mimosa scrub, or else absolutely waste, again stretches uninterruptedly for another ten or eleven days' journey to the Roséres (Rosaires) district, where the isolated Okelmi and Keduss Hills, containing quartz with copper ore, rise 1000 feet above the right bank of the Blue Nile and 3000 above the sea. Here the plain is furrowed by deep gullies flushed during the rainy season; and farther south the land, hitherto gently sloping towards the northwest, begins to rise rapidly, breaking into hills and ridges 4000 feet high in the Fazogl district, and farther on merging in the Berta highlands with an extreme altitude of 9000 to 10,000 feet. In these metalliferous uplands, recently explored by Marno and Schuver, rises the Tumat, which is washed for gold, and which after a northerly course of nearly 100 miles joins the left bank of the Blue Nile near Fazogl and Famaka. South of and parallel with the Tumat flows the still unexplored Jabus (Yabus), on which stands Fadasi, southernmost of the now abandoned Egyptian stations in the Baḥr-el-Azraḳ basin. This point also marks the present limit of geographical exploration in the direction of the conterminous Galla country, Schuver being the only European traveller who has hitherto succeeded in penetrating to any distance south of the Jabus.

Sennár lies within the northern limits of the tropical rains, which reach to Khartúm, and fall between June and September. In this part of its course the Blue Nile rises from May to August, when the northern and western winds prevail, nearly coinciding with the cool and healthy season. But they are followed by the hot khamúsín from the south or the samúm (simoom) from the northwest charged with fine sand from the Libyan Desert. Still more dreaded are the miasmatic exhalations caused by the glowing sun playing on stagnant waters after the floods and giving rise to the "Sennár fever," which drives the natives themselves from the plains to the southern uplands. The temperature, which rises at times to over 120° Fahr., is also very changeable, often sinking from 100° Fahr. during the day to under 60° Fahr. at night.

The soil, mainly alluvial, is naturally fertile, and wher-

ever water and hands are available yields bounteous crops of maize, pulse, cotton, tobacco, sesame, and especially durra, of which as many as twenty varieties are said to be cultivated. The forest vegetation, mainly confined to the "Isle of Isles" and the southern uplands, includes the *Adansonia* (baobab), which in the Fazogl district attains gigantic proportions, the tamarind, of which bread is made, the deleb palm, several valuable gum trees (whence the term Sennári often applied in Egypt to gum arabic), some dyewoods, ebony, ironwood, and many varieties of acacia. These forests are haunted by the two-horned rhinoceros, the elephant, lion, panther, numerous apes and antelopes, while the crocodile and hippopotamus frequent all the rivers. The chief domestic animals are the camel, horse, ass, ox, buffalo (used both as a beast of burden and for riding), sheep with a short silky fleece, the goat, cat, dog, and pig, which last here reaches its southernmost limit. The tsetse fly appears to be absent, but is replaced in some districts by a species of wasp, whose sting is said to be fatal to the camel in the rainy season.

The "African Mesopotamia" is occupied by a partly settled partly still nomad population of an extremely mixed character, including representatives of nearly all the chief ethnical divisions of the continent. But the great plain of Sennár is mainly occupied by Hassanieh Arabs in the north, by Abu-Rof (Rufaya) Hamites of Beja stock (Robert Hartmann) in the east as far as Fazogl, and elsewhere by the Funj (Fung, Fungheh), traditionally from beyond the White Nile, and affiliated by some to the Kordofán Nubas, by others more probably to the Nilotic Negro Shillúks. These Funj, who have been the dominant race since the 15th century, have become almost everywhere assimilated in speech, religion, and habits to the Arabs. Nevertheless on their sacred Mount Guleh the traveller Prnyssenaere found them still performing pagan rites, while according to Marno the Búrúns, the southernmost branch of the race between the Berta highlanders and the Nilotic Denkas, are addicted to cannibalism. The Berta highlanders themselves (Jebalain, as the Arabs collectively call them) are of more or less pure Negro stock and number about 80,000, grouped in several semi-independent principalities. The "no-man's-land" stretching north of Dar-Berta and east of the Tumat valley is also occupied by distinct nationalities, such as the Kadalos in the extreme north, the Sienetjos and Gumus in the east, here bordering on the Abyssinian Agaws, the Jabus and Gánti in the south. Most of these appear to be of Negro and Negroid stock; but the Sicuetjos, said to be a surviving remnant of the primitive population of the whole country, are doubtless akin to the Sienetjos of Damot and Gojam in Abyssinia. They are certainly not blacks, and have a yellow or fair complexion, lighter than that of southern Europeans.

The Sennári people cultivate a few industries, such as cotton-weaving, pottery, gold, silver, and iron work, matting, and leather work (camel saddles, sandals, etc.), noted throughout Súdán. But their chief pursuits are stock-breeding, agriculture, and trade,—exporting to Egypt and Abyssinia gold, hides, durra, sesame, gums, ivory, horses, and slaves. The chief centres of population, all on the Bahr-el-Azrak, are Fazogl (Fazoklo), now replaced by Famaka, at the Tumat confluence; Rosères, formerly capital of an independent state; Sennár, also an old capital, which gives its name to the whole region; Wod-Medineh at the Rahad confluence; and Khartúm, just above the junction of the two Niles. A few miles above Khartúm are the extensive ruins of Soba, former capital of the Funj empire, which at one time stretched from Wady Halfa to Dar-Berta and from Suakin to beyond Kordofán, but which was overthrown by Ismail Pasha in the year 1822. (A. H. K.)

SÉNANCOUR, Étienne Pivert de (1770–1846), French man-of-letters, was born at Paris in November, 1770. His family was noble and not poor, but his fortunes were ruined by the Revolution. Before that event, however, Sénancour had met with mishap. He was a sickly youth and was destined for the church, but ran away from home and established himself in Switzerland. Here he married and spent some years; his wife died, and he returned to Paris about the end of the century. In 1804 he published the singular book entitled *Obermann*, which has continued to be in a fashion popular to the present day, and the next year a treatise *De l'Amour*, which had even more vogue at first, but is now little read. *Obermann*, which is to a great extent inspired by Rousseau, which attracted the admiration of George Sand, and which had a considerable influence over the last generation in France and England, is a series of letters supposed to be written by a solitary and melancholy person, whose headquarters were in a valley of the Jura, but who writes also from divers other places. The style is meritorious, the descriptive power very considerable, the thought sometimes original, and the expression of a certain form of the *maladie du siècle* effective and striking. But, viewed from the strictly critical point of view, there is perhaps a certain unreality about the book. Its idiosyncrasy in the large class of Wertherian-Byronic literature has justly enough been said to be that the hero, instead of feeling the vanity of things, recognizes his own inability to be and do what he wishes. Sénancour is tinged to some extent with the older *philosophe* form of freethinking, and expresses less revolt from the 18th century than Chateaubriand. Having no resources but his pen, Sénancour during the half-century which elapsed between his return to France and his death at St. Cloud in February, 1846, was driven to literary hack work, and even his more independent productions have none of the attraction of *Obermann*. When George Sand and Sainte-Beuve revived interest in this latter, Thiers and Villemain successively obtained for the author from Louis Philippe pensions which enabled him to pass his last days in comfort. He committed the usual mistake of writing late in life a continuation to *Obermann*, entitled *Isabelle* (1833), but it has been wisely forgotten.

SENEBIER, Jean (1742–1809), a Swiss pastor and voluminous writer on vegetable physiology, was born at Geneva on 6th May, 1742. He is remembered on account of his contributions to our knowledge of the influence of light on vegetation. Though Malpighi and Hales had shown that a great part of the substance of plants must be obtained from the atmosphere, no progress was made until more than a century later, when Bonnet observed on leaves plunged in aerated water bubbles of gas, which Priestley recognized as oxygen. Ingenhousz proved the contemporaneous disappearance of carbonic acid: but it was Senebier who clearly showed that this activity was confined to the green parts, and to these only in sunlight, and first gave a connected view of the whole process of vegetable nutrition in strictly chemical terms, so preparing the way for the quantitative researches of N. T. de Saussure. Senebier died at Geneva on 22d July, 1809.

See Sachs, *Geschichte d. Botanik*, and *Arbeiten*, vol. ii.

SENECA, Lucius Annæus (*c.* 3 B.C.–65 A.D.), the most brilliant figure of his time, was the second son of the rhetorician Marcus Annæus Seneca, and, like him, a native of Corduba in Hispania. From his infancy of a delicate constitution, he devoted himself with intense ardor to rhetorical and philosophical studies and early won a reputation at the bar. Caligula threatened his life, and under Claudius his political career received a sudden check, for the influence of Messalina having effected the ruin of Julia, the youngest daughter of Germanicus, Seneca, who was compromised by her downfall, was banished to Corsica, 41 A.D. There eight weary years of waiting were relieved by study and authorship, with occasional attempts to procure his return by such gross flattery of Claudius as is found in the work *Ad Polybium de Consolatione* or the panegyric on Messalina which he afterwards suppressed. At length the tide turned; the next empress, Agrippina, had him recalled, appointed prætor, and entrusted with the education of her son Nero, then (48) eleven years old. Seneca became in fact Agrippina's confidential adviser; and his pupil's accession increased his power. He was consul in 57, and during the first bright years of the new reign, the incomparable *quinquennium Neronis*, he shared the actual administration of affairs with the worthy Burrus, the prætorian præfect. The government in the hands of these men of remarkable insight and energy was wise and humane; their influence over Nero, while it lasted, was salutary, though

sometimes maintained by doubtful means. When there came the inevitable rupture between mother and son they sided with the latter; and Seneca, who drew up all Nero's state papers, was called upon to write a defence of matricide. We must, however, regard the general tendency of his measures; to judge him as a Stoic philosopher by the counsels of perfection laid down in his writings would be much the same thing as to apply the standard of New Testament morality to the career of a Wolsey or Mazarin. He is the type of the man of letters who as courtier and minister rises into favor by talent and suppleness (*comitas honesta*), and is entitled as such to the rare credit of a beneficent rule. In course of time Nero got to dislike him more and more; the death of Burrus in 62 gave a shock to his position. In vain did he petition for permission to retire, offering to Nero at the same time his enormous fortune. Even when he had sought privacy on the plea of ill health he could not avert his doom; on a charge of being concerned in Piso's conspiracy he was forced to commit suicide. His manly end might be held in some measure to redeem the weakness of his life but for the testimony it bears to his constant study of effect and ostentatious self-complacency ("conversus ad amicos, imaginem vitæ suæ relinquere testatur").

Seneca is at once the most eminent among the Latin writers of the Silver Age and in a special sense their representative, not least because he was the originator of a false style. The affected and sentimental manner which gradually grew up in the first century A.D. became ingrained in him, and appears equally in everything which he wrote, whether poetry or prose, as the most finished product of ingenuity concentrated upon declamatory exercises, substance being sacrificed to form and thought to point. Every variety of rhetorical conceit in turn contributes to the dazzling effect, now tiusel and ornament, now novelty and versatility of treatment, or affected simplicity and studied absence of plan. But the chief weapon is the epigram (*sententia*), summing up in terse incisive antithesis the gist of a whole period. "Seneca is a man of real genius," writes Niebuhr, "which is after all the main thing; not to be unjust to him, one must know the whole range of that literature to which he belonged and realize how well he understood the art of making something even of what was most absurd." His works were upon various subjects. (1) His *Orations*, probably the speeches which Nero delivered, are lost, as also a biography of his father, and (2) his earlier scientific works, such as the monographs describing India and Egypt and one upon earthquakes (*Nat. Qu.*, vi. 4, 2). The seven extant books of *Physical Investigations* (*Naturales Quæstiones*) treat in a popular manner of meteorology and astronomy; the work has little scientific merit, yet here and there Seneca, or his authority, has a shrewd guess, *e.g.*, that there is a connection between earthquakes and volcanoes, and that comets are bodies like the planets revolving in fixed orbits. (3) The *Satire on the Death* (and deification) *of Claudius* is a specimen of the "satira Menippea" or medley of prose and verse. The writer's spite against the dead emperor before whom he had cringed servilely shows in a sorry fashion when he fastens on the wise and liberal measure of conferring the franchise upon Gaul as a theme for abuse. (4) The remaining prose works are of the nature of moral essays, bearing various titles,—twelve so-called *Dialogues*, three books *On Clemency* dedicated to Nero, seven *On Benefits*, twenty books of *Letters to Lucilius*. They are all alike in discussing practical questions and in addressing a single reader in a tone of familiar conversation, the objections he is supposed to make being occasionally cited and answered. Seneca had the wit to discover that conduct, which is after all "three-fourths of life," could furnish inexhaustible topics of abiding universal interest far superior to the imaginary themes set in the schools and abundantly analyzed in his father's *Controversiæ* and *Suasoriæ*, such as poisoning cases, or tyrannicide, or even historical persons like Hannibal and Sulla. The innovation took the public taste,—plain matters of urgent personal concern sometimes treated casuistically, sometimes in a liberal vein with serious divergence from the orthodox standards, but always with an earnestness which aimed directly at the reader's edification, progress towards virtue, and general moral improvement. The essays are in fact Stoic sermons; for the creed of the later Stoics had become less of a philosophical system and more of a religion, especially at Rome, where moral and theological doctrines alone attracted lively interest. The school is remarkable for its anticipation of modern ethical conceptions, for the lofty morality of its exhortations to forgive injuries and overcome evil with good; the obligation to universal benevolence had been deduced from the cosmopolitan principle that all men are brethren. In Seneca, in addition to all this, there is a distinctively religious temperament, which finds expression in phrases curiously suggestive of the spiritual doctrines of Christianity. Yet the verbal coincidence is sometimes a mere accident, as when he uses *sacer spiritus;* and in the same writings he sometimes advocates what is wholly repulsive to Christian feeling, as the duty and privilege of suicide.

Eight of the tragedies which bear Seneca's name are undoubtedly genuine. In them the defects of his prose style are exaggerated; as specimens of pompous rant they are probably unequalled; and the rhythm is unpleasant owing to the monotonous structure of the iambics and the neglect of synapheia in the anapæstic systems. The prætexta *Octavia*, also ascribed to him, contains plain allusions to Nero's end, and must therefore be the product of a later hand.

Our materials for a knowledge of Seneca are ample, and are variously presented in such works as Merivale's *Romans under the Empire*, cc. 52–54; Zeller's *Greek Philosophy* (Eng. tr. *Eclecticism*, pp. 202–245); and the histories of Roman literature by Bernhardy, Teuffel (§§ 282–285), and Simcox (ii. pp. 1–27, London, 1883). His elder brother Annæus Seneca Novatus, afterwards adopted by a Junius Gallio, was the proconsul of Achaia before whom St. Paul pleaded (Acts xviii. 12). The date of Seneca's birth must be approximately inferred from *Nat. Qu.*, i. 1, 3; *Ep.* 108, 22. His mother's name was Helvia; her sister brought him as a child to Rome and nursed him tenderly. His teachers were Attalus, a Stoic, and Sotion, a pupil of the Sextii. In his youth he was a vegetarian and a water-drinker, but his father checked his indulgence in asceticism. Before his exile he had served as quæstor, was married, and had two children born. Caligula said his style was mere mosaic (*commissuras meras*) or "sand without lime," and would have put him to death, had he not been assured that so consumptive a subject could not last long (Suet., *Calig.*, 63; Dio Cassius, lix. 19, 7). Upon a Pompeian fresco a butterfly appears as charioteer of a dragon,—Seneca and Nero. His second wife was Pompeia Paulina, of noble family; she attempted to die with him. His enormous wealth was estimated at 300 millions of sesterces. He had 500 ivory tables inlaid with citron wood (Dio, lxi. 10, lxii. 2). The judgment of Tacitus (*Ann.*, xiii. 4, 13, 42 *sq.*, xiv. 52–56, xv. 60 *sq.*) is more favorable than that of Dio, who may possibly derive his account from the slanders of some personal enemy like Suilius. Seneca has found many champions—Lipsius (the introduction to his ed.); Diderot, *Essai sur les Règnes de Claude et de Néron* (iii. 1–407, Paris, 1875); Volquardsen, *Ehrenrettung* (Hadersleben, 1839); Martha, *Les Moralistes sous l'Empire Romain* (2d ed., Paris, 1866). For the dates of his works, see H. Lehmann, in *Philologus*, viii. p. 309; F. Jonas, *De ordine librorum Sen.* (Berlin, 1870); A. Martens, *De Sen. vita* (Altona, 1871); also R. Volkmann, in Mager's *Pädagog. Revue*, xviii. pp. 259–276 (1857). At least eighteen prose works have been lost, among them *De superstitione*, an attack upon the popular conceptions of the gods; and *De matrimonio*, which, to judge by the extant fragments, must have been interesting reading. Since Gellius (xii. 2, 3) cites a book xxii. of the *Letters to Lucilius*, some of these have been lost. His style is elaborately criticized by Quintilian (*Inst.*, x. 1, 125–131), also by Fronto (p. 155 *sq.*; Gellius, xii. 2, 1). The doubt as to his authorship of the tragedies is due to a blunder of Sidonius Apollinaris (ix. 229–231); against it must be set Quintilian's testimony ("ut Medea apud Senecam," ix. 2, 8). Some of the Fathers, probably in admiration of his ethics, reckoned Seneca among the Christians; this assumption in its turn led to the forgery of a correspondence between St. Paul and Seneca, which was known to Jerome (comp. Augustin, *Ep.* 153; "Seneca . . . cujus etiam ad Paulum apostolum leguntur epistolæ"). This has given rise to an interesting historical problem, most thoroughly discussed in the commentary on the *Ep. to the Philippians* by Dr. Lightfoot, bishop of Durham (London, new ed., 1879, pp. 270–333), who cites (p. 278 note) among earlier authorities A. Fleury, *St. Paul et Sénèque* (Paris, 1853); C. Aubertin, *Étude* (1853), also new ed., *Sénèque et St. Paul* (Paris, 1870); F. C. Baur (1858), republished in *Drei Abhandlungen* (Leipsic, 1876); F. W. Farrar, *Seekers after God* (London, s.a.); and G. Boissier, in the *Revue des Deux Mondes*, xcii., 1871, pp. 40–71. Add the articles by F. X. Kraus, in *Theolog. Quartalschrift*, vol. xlix. pp. 609–624 (Tübingen, 1867), and by A. Harnack in *Theolog. Lit.-Zeitung*, 1881, pp. 444–449, the latter being a review of E. Westerburg, *Untersuchung der Sage, dass Seneca Christ gewesen sei* (Berlin, 1881).

The best text of the prose works, that of Haase in Teubner's series (1852), was re-edited in 1872–74; he followed the critical labors of Fickert (Berlin, 3 vols., 1842–45). More recently Gertz has revised the text of *Libri de beneficiis et de clementia* (Berlin, 1876) and H. A. Koch that of the *Dialogorum libri XII.* (completed by Vahlen, Jena, 1879). There is no complete exegetical commentary, either English or German. Bücheler's edition of the Ἀποκολοκύντωσις may be found in *Symbola philol. Bonnens.*, i. (1864), pp. 31–39. Little has been done systematically since the notes of Lipsius and Gronovius. There is, however, Ruhkopf's ed. with Latin notes, 5 vols. (Leipsic, 1797–1811), and Lemaire's variorum ed. (Paris, 1827–32, 8 vols., prose and verse). The text of the tragedies was edited by Peiper and Richter for Teubner's series (1867), and more recently by F. Leo (Berlin, 2 vols., 1878–79). Nisard, *Études de mœurs et de critique sur les poètes de la décadence* (4th ed., Paris, 1878), has criticised them in detail. Of some 300 monographs enumerated in Engelmann may be mentioned, in addition to the above, G. Boissier, *Les tragédies de Sénèque ont-ils été représentés?* (Paris, 1861); A. Dörgens, *Senec. disciplinæ*

moralis cum Antoniniana comparatio (Leipsic, 1857); E. F. Gelpke, *De Senec. vita et moribus* (Bern, 1848); Holzherr, *Der Philosoph Seneca* (Rastadt, 1858). (R. D. H.)

SENECA FALLS, a post village and township of the United States, in Seneca county, New York, 41 miles southwest of Syracuse by the Auburn division of the New York Central Railroad, occupies a beautiful situation on Seneca river, the outlet of Seneca Lake. It turns the water-power of the falls to account in the manufacture of steam fire-engines, fire-extinguishing apparatus, pumps, machinery, knit goods, flour, yeast, etc. The population of the village was 5880 in 1880, and of the township 6853.

SENEFELDER, Alois. See Lithography, vol. xiv. pp. 703–4.

SENEGAL, a river of western Africa, which falls into the Atlantic about 16° N. lat., 9 or 10 miles below St. Louis. It is formed at Bafulabé[1] (13° 50′ N. lat. and 10° 50′ W. long.) by the junction of the Ba-fing or Black River and the Ba-khoy or White River. The Ba-fing, which has a width at the confluence of 1475 feet, descends from the highlands of Futa-Jallon by a northward course of about 350 miles, during which it passes by a series of rapids from the altitude of 2460 feet, at which it takes its rise, to that of 360 feet, and receives from the right the Nunkolo and the Funkumah (with its tributary the Boki). The Ba-khoy, 800 feet wide at the confluence, has been previously flowing from east to west and gives that general direction to the Senegal, but its source is away in the southeast behind the country of Buré. That of its principal tributary, the Ba-ule (Red River), is more to the east and lies within a few miles of the course of the Niger in the Mandingo plateau. Below Bafulabé the Senegal, flowing northwest, passes a succession of falls—those of Guina (160 feet) and of Felu (50 or 60)—and arrives at Médine, after having accomplished 440 of its total course of 1000 miles. It receives only two important affluents,—from the right the "marigot" of Kulu, which comes from Kuniakhary, draining the slopes of the Kaarta plateau, and from the left the Falemé, which rises in the Futa-Jallon between Labé and Timbo and flows northwest in a permanent stream. Below Médine the Senegal presents a series of great reaches, which become more and more navigable as they approach the sea.

From the 1st of August to the 1st of October it is open as far as Médine to vessels not drawing more than 8 feet. Between Médine and Bakel (85 miles) there are twenty-seven "narrows," of which several, such as that at Kayes, are difficult; it is on this account that a railway has been projected between Kayes and the Niger. At Bakel below the confluence of the Falemé the river is navigable till the 1st of December, from Bakel to Saldé between the 15th of July and the 15th of December, and lastly from Mafu to the sea for a distance of 215 miles it is navigable all the year round. Outside the limits indicated navigation between Mafu and Médine is often precarious even for barges drawing little over a foot, and above Médine, though some reaches are deep enough, troublesome transhipments are necessary between reach and reach. Between Mafu and Saldé the Senegal changes its direction from northwest to west, and shortly before reaching the sea to southwest. The bar at the mouth can usually be crossed by vessels not drawing more than 10 feet, or at high tides a little more. Below Bakel the river becomes tortuous and encloses the great island of Morfil, 110 miles long, and a series of other islands, of which one is occupied by St. Louis. At this point the right branch of the river is only 500 feet from the sea, but the dunes along the coast turn it south for other 9 miles. The scantiness of its sources, the steepness of its upper course, and the rapid evaporation which takes place after the short rainy season would soon dry up the river-system of the Senegal, especially in the upper regions; but natural dams cross the channel at intervals and the water accumulates behind them in deep reaches, which thus act as reservoirs. In the rainy season the barriers are submerged in succession, beginning with the farthest up, the reaches are filled, and the plains of the lower Senegal are changed into immense marshes. Like Lake Mœris in antiquity on the Nile and the lake of Cambodia at the present time on the Me-kong, Lake Cayor on the right side of the lower Senegal and Lake Panieful on the left constitute reserve basins, receiving the surplus waters of the river during flood and restoring them in the dry season. For months together the latter forms the only drinking pond for the wild beasts of the surrounding country,—lions, elephants, leopards, panthers, ounces, cheetahs, hyænas, lynxes, giraffes, antelopes, gazelles, monkeys, jackals visiting it in crowds. In the upper part of the river the reservoirs are successively emptied to the level of the dams and receive no more water except from the permanent springs; but they are partially protected by curtains of verdure from the effects of the evaporation which makes itself so severely felt on the treeless seaboard. Owing to these natural "locks," similar to those of an artificial canal, the Senegal river never discharges less than 1700 or 1800 cubic feet per second. The lower Senegal forms the boundary between the dry and barren Sahara and the rich and productive region of the western Sudan; the line of its inundations is an ethnographic march between the nomadic Moor and the settled Negro.

[1] *Bafulabé* is a native word for "confluence."

SENEGAL,[2] a French colony of western Africa, composed of lines of fortified posts and a loose agglomeration of states and territories in various degrees of subjugation. The forts extend (*a*) from St. Louis at the mouth of the Senegal to Bammako on the Niger,[3] (*b*) along the coast of the Atlantic between St. Louis and the mouth of the Salum to the south of Cape Verd, and (*c*) along the so-called rivers of the south which fall into the ocean between the Gambia and Sierra Leone (*q.v.*). French influence is fully dominant along those lines either in the form of actual territorial possession or of a recognized protectorate.[4]

The colony is ruled by a governor, sends a deputy to the French legislature, and elects a general council of sixteen members, ten for the electoral district of St. Louis, four for that of Gorée-Dakar, and two for that of Rufisque. The three communes just named have each its municipal council. The population of those French possessions was in 1884 197,644,—46,364 urban, 143,200 rural, 8080 "floating." In the whole number there were only 1474 Europeans, of whom 1461 were French. The population of the protected countries cannot be ascertained. The most important places in the colony are St. Louis (18,924 inhabitants in 1883), Dagana (5375), Rufisque (4244), Médine (3000), Joal (2372), Gorée and Dakar (each 2000). The colony has only a single true port, that of Dakar to the east of the peninsula of Cape Verd, since 1885 connected with St. Louis by a railroad, 163 miles long, and visited by Atlantic steamers on their way from France to South America. Rufisque and Gorée have open roadsteads, where vessels anchor at some distance from the shore. The port of St. Louis in the Senegal is difficult of access owing to the bar, but it is the only place where vessels can repair serious damages. The principal

[2] For the physical geography, etc., see Senegambia.

[3] Along this line lie Richard Toll, Dagana (founded in 1821), Podor (1743 and 1854), Saldé (1859), Matam (1857), Bakel (1820), Kayes, Médine (1855), and Bafulabé (1879) on the Senegal, and between this river and the Niger the forts of Badumbé and Tukota on the Ba-khoy, Kita (1881), Kondu (1882), Niagassola (1884–85), and lastly Bammako (1883) or Bammaku, on the Niger.

[4] Arrondissement I.—On the circle of *Bakel* depend the post of Matam, the protected countries of Damga (1859), Guoy, Kamera, Guidimakha, Bondu, and Bambuk; on the circle of *Médine*, Khasso, Logo, and Natiaga; on the circle of *Bafulabé*, Barinta, Makadugu, Beteadugu, Farimbula, Bafing; on the circle of *Kita*, the province of Kita and Fuladugu; on the circle of *Bammako* Birgo and Little Beledugu. This arrondissement is under the command of a superior officer resident at Kayes. Arrondissements II., III.—These are formed by Lao and Toro (1863), protected countries attached to the circle of *Saldé;* the circle of *Podor*, which comprises the French portion of Toro and a fragment of Dimar; the circle of *Dagana*, on which depend the other portion of Dimar and a portion of Walo; the suburban district of St. Louis, including the other portion of Walo. Ross, Merinaghen, the cantons of Gandiole, M'pal, Khattet, Gondu, Dialakhar, N'diago, and Tubé; N'diambor and Merina N'guick, separated from Cayor and placed under French protection, as well as the kingdoms of Cayor and Baol; the suburb of Dakar with the island of Gorée, the cantons of Rufisque and the circles of *M'bijem, Thies, Portudal*, and *Joal*. Arrondissement IV.—The Rivers of the South district constitutes the fourth arrondissement under a lieutenant governor, and comprises the circle of *Kaolack* or *Salum;* those of *Carabane* and *Sedhiu* on the Cazamance, with the protected countries of Pakao, Balmadu, Suna, Yacine, Firdu; the circle of the *Rio Nuñez* formed by the Nalus and Landuman tribes; the circle of the *Rio Pongo* with the country of the Susus; the circle of *Mellacorée* with the protected countries of Samo, Kaback, Kabita, Kalum, Tabussu, Maneah, Correra, and the island of Tombo.

commercial centres are St. Louis (imports aud exports), Gorée (exports), and Rufisque (exports). The upper Senegal sends ground-nuts (known as Galam nuts), gum, millet, leather, and receives in exchange blue calico (guinée) from India, England, and Belgium, various other cotton stuffs, cotton yarn, guns and ammunitiou, tobacco, crushed rice, sugar (raw and refined), molasses, biscuits, tinsmiths' wares, etc. The colony also imports Swedish iron, which is mauufactured by the native blacksmiths into agricultural implements, knives, daggers, and spearheads. Cayor sells its ground-nuts for money. The rivers of the south district export ground-nuts, palm kernels, iudia-rubber, leather, coffee, in return for Euglish and Belgian blue calico, Hamburg brandy, English gunpowder, Euglish and Belgian guns, and American tobacco. An Euglish firm has twenty-three factories on the Rio Nuñez, and others on the Rio Pongo and the Mellacorée. The total value of the exports and imports of the colony was £1,325,711 [$6,442,955.46] in 1879, £1,774,089 [$8,622,072.54] in 1880, and £1,888,657 [$9,178,873.02] in 1883, the imports slightly preponderating over the exports. The value of the ground-nuts exported in 1883 was £700,000 [$3,402,000], that of the gums only £120,000 [$583,200]; aud the ground-nut trade is still rapidly developing. The imports comprise French goods £360,000 [$1,749,600], goods passiug as French £200,000 [$972,000], foreign goods £440,000 [$2,138,400], of which £240,000 [$1,166,400] represent English, £200,000 [$972,000] Belgian, £120,000 [$583,200] German, £80,000 [$388,800] American articles. In 1882 946 vessels entered and 960 cleared. The budget for the colony in 1884 was £100,320 [$487,555.20], for the communal expenses £14,560 [$70,761.60], and for the expenses of the capital £250,000 [$1,215,000].

History.—The navigators of Dieppe are said to have discovered the Seuegal about 1360. The Portuguese had some establishments on its banks in the 15th century; and the first French settlements were probably formed in the latter part of the 16th or beginning of the 17th century. Between 1664, when these French settlements were assigned to Colbert's West India Company, and 1758, when the colony was seized by the English, Senegal had passed under the administration of no fewer than seven different companies, none of which attaiued any great success, though from 1694 to 1724 affairs were couducted by a really able governor, André Brue. Iu 1677 the French captured from the Dutch Rufisque, Portudal, Joal, and Gorée, and they were confirmed in possession of these places by the treaty of Nimeguen (1678). In 1717 they acquired Portendic and in 1724 Arguin on the coast of the Sahara, which still belong to the colony. Gorée aud the district of Cape Verd were surrendered by the Euglish to the French in 1763, and by the treaty of peace in 1783 the whole of the Senegal was also restored; but the English again captured the colony in the wars of the first empire (Gorée 1800, St. Louis 1809), and, though the treaty of Paris authorized a complete restitution, the French authorities did not enter into possession till 1817. Between that date and 1854 little was effected by the thirty-seven governors who succeeded each other at St. Louis; but in this year the appointment of General Faidherbe proved the turning-point in the history of Senegal. He at once set about subduing the Moorish (Berber) tribes of the Trarzas, Braknas, and Duaish, whose "kings," especially the king of the Trarzas, had subjected the French settlers and traders to the most grievous and arbitrary exactions; and he bound them by treaty to confine their authority to the north bank of the Senegal. Iu 1855 he annexed the country of Walo and erected the fort of Médine in the country of Khasso. This last was a bold stroke for the purpose of stemming the advancing tide of Moslem invasion, which under Omar al-Hadji (Alegui) threatened the safety of the colony. In 1857 Médine was brilliantly defended by the mulatto Paul Holle against Omar, who with his army of 20,000 meu had to retire before the advance of General Faidherbe and turn his attention to the conquest of the native states of the Sudan. By treaty of 1860 Omar recognized the French claim to half of Bambuk, half of Khasso, Bondu, Kamera, Guoy, Guidimakha, Damga, Futa-Toro, Dimar, etc. Since then annexations and protectorates have followed in rapid succession under the governorships of Jauréguiberry, Faidherbe, and Brière de l'Isle. It is sufficient to mention the treaties of 1881 and 1885 by which the confederation of Futa-Jallon and Buré respectively recognized a French protectorate.

See Jannequin de Rochefort, *Voyage de Libye au royaume de Sénéga*, 1643; Adanson, *Histoire naturel du Sénégal*, 1757; Mollien, *Voyage dans l'intérieur de l'Afrique fait aux sources du Sénégal et de la Gambie en* 1818–1820; Tardieu, *Sénégambie et Guinée*, 1847; Faidherbe on "Populations noires des bassins du Sénégal et du Niger," in *Bull. Soc. de Géogr.*, Paris, 1854; *Sénégal et Niger, la France dans l'Afrique Occidentale*, 1879–83, published by the Ministry of Marine, 1884; Faidherbe, *Le Soudan français*, Lille, 1881–85; *Notices Coloniales pub. à l'occasion de l'Exposition d'Anvers*, 1885; *Annales Sénégalaises de* 1854 *à* 1885, *suivies des traités passés avec les indigènes*, 1886; and Rambaud, "Sénégal et Soudan Français," in *Revue des Deux Mondes*, 1885.

SENEGAMBIA, a country in the west of equatorial Africa, comprising, as the name indicates, the regions watered by the Senegal and the Gambia. It lies between 9° and 17° N. lat. and 6° and 17° 30′ W. long., being bounded on the N. by the Sahara, W. by the Atlantic, S. by Sierra Leone, and E. by the Joliba or upper Niger. The area is estimated at about 400,000 square miles. Accepting the course of the Senegal and its right-hand affluent the Ba-ule as the boundary towards the Sahara, the Joliba as the frontier towards Sêgu and Upper Guinea, and the watershed between the Mellacorée (Mellicoury) and the Great Scarcies as that between Senegambia and Sierra Leone, we have only for short distances to fall back on a mere conventional delimitation,—in the north between Sidian on the Ba-ule and Sansanding on the Niger *via* Murdia; in the southeast, from Sansanding to a point above Nyamina; and finally between the Joliba and the sources of the Great Scarcies. The Senegambian coast extends south-southwest almost in a straight line from the N'diadier or Mosquito lagoon (Marigot des Maringouins), formerly the northern mouth of the Senegal, to Cape Verd, the most western point of the African continent; then it bends south as far as Cape Roxo; and afterwards southeast as far as the Mellacorée. With the exception of the two great capes just mentioned, the only headlands of any importance are Cape St. Mary, forming the south side of the estuary of the Gambia; Cape Verga, between Rio Nuñez and Rio Pongo; and Konakry Point, opposite the Los (or Idolos) Islands. The only gulf on the whole coast is that which lies to the south of Cape Verd and contains the island of Gorée (*q.v.*); the other

Boundaries.

Coast.

Map of Senegambia.

inlets, such as the bay of Sangareah, are mere estuaries or river mouths. Apart from the island in the Senegal on which St. Louis is built and those formed by the deltas of the rivers, the only islands along the coast are Gorée, the Bissagos (or Bijug) Archipelago, the Los Islands, and the little island of Matakong. The coast in the northern part has the same appearance as that of the Sahara,—low, arid, desolate, and dune-skirted, its monotony relieved only here and there by cliffs and plateaus. Farther south it becomes low, marshy, and clothed with luxuriant vegetation. Behind the low flat seaboard the country rises into a vast plateau terminating eastwards in a mountainous region. Though of no great height, these mountains cover a large area and have numerous ramifications. Farther to the east they sink abruptly towards the Niger valley, while southwards they are prolonged towards Sierra Leone and the interior of Upper Guinea, perhaps forming those Kong Mountains which are said to exist between the ocean and the Niger basin. Under the name of Mounts Badet, Yandi, Maté, Kissi (of which the first form the "Alps" of Futa-Jallon) they descend on the west by a series of terraces to the plains of Senegambia, and on the north they extend to the left bank of the Senegal and even throw out some spurs into the desert beyond. The mountain region is cut by numerous erosion valleys. As to the general altitude nothing is accurately known, but the following points have been determined: Mount Daro, 4068 feet; Kuruworo, 3868; Warnani, 3799; Yenkina, 3560; Bogoma, 3524; Pampaya, 3290. The principal rivers are the Senegal, the Salum, the Yombas, the Gambia, the Casamance, the Cacheo, the Geba, the Rio Grande, the Cassini, the Compony, the Rio Nuñez, the Rio Pongo, the Dubreka or Konakry, the Forecareah, and the Mellacorée. They all rise in the mountains of the interior or at the foot of the highlands and fall into the Atlantic. Their general direction is from east to west with a southwest deflection, which becomes always more pronounced as we advance southwards. Unlike these rivers, the Joliba or NIGER (*q.v.*), flowing north and northeast, soon passes beyond Senegambia. Lagoons and backwaters are common; but there are no true lakes of any importance.

Interior.

The geological constitution of the country is as yet very imperfectly known, especially in the interior. The low region of the seaboard has a very uniform character. It consists of sandstones or clay rocks and loose beds of reddish soil containing marine shells. At certain points, such as Cape Verd and Cape Roxo, the sandstones crop out; it is the red color of the sandstone in fact which has given Cape Roxo or Cape Rouge its name. Clay slates also occur, and at intervals these sedimentary strata are interrupted by basaltic amygdaloid and volcanic rocks. For instance, the island of Gorée is basaltic; the Bissagos (Bissão) Islands are composed of scoriæ and other volcanic products; and a great part of the coast to the north of Rio Nuñez consists of basaltic and amygdaloid rocks. The base of the mountain is formed in certain places of clay slate, but more generally of granite, porphyry, syenite, or trachyte. In those districts mica schists and iron ores occur. Iron and gold are found in the mountains and the alluvial deposits. The streams also carry down gold dust. Many of the valleys are covered with fertile soils and there is generally a fertile belt along the river sides; but the rest of the country is rather arid and sterile.

Geology.

The climate is far from being so unhealthy as is frequently asserted. Except when yellow fever is raging, Europeans may live there as satisfactorily as at home. There are two seasons, the dry season and the rainy season or winter, the latter contemporaneous with our summer. Along the seaboard the dry season is cool and agreeable; in the interior it is mild only for the three months which correspond to our winter, and then it becomes a time of intolerable heat. The annual temperature increases as we advance south and more rapidly as we advance east into the interior, except, of course, where an ascent is made to higher altitudes. To the south of Cape Verd the changes of temperature become less and less marked; Bissão has a more equable climate than Gorée. Eastwards the monthly range of the thermometer becomes more extensive. The maximum readings, which are exceptional at St. Louis, become almost the rule at Bakel on the upper Senegal and at MacCarthy on the Gambia. In the north, on the banks of the Senegal, the northeast trade-winds blow for eight months of the year, the daily land and sea breezes which cool the atmosphere along the seaboard not being felt far inland. During the other four months there prevails a gentle southwest monsoon accompanied with frequent calms, storms, tornadoes, and rains. Southwards along the coast the trade-winds gradually decrease in both strength and duration, while the southwest monsoon becomes more powerful and persistent. The rainy season begins at Gorée between 27th June and 13th July, on the Gambia about 20th June, on the Casamance about the end of May, at the Bissagos Archipelago about the middle of May, and on the Rio Nuñez at the end of April. During this season Senegambia, drenched by heavy rains brought from the ocean, has everywhere one uniform appearance. The mean temperature is throughout very close on 81° Fahr. and the range of the thermometer is extremely limited. The rivers overflow and flood the lowlands. Storms are frequent. Vegetation displays its fullest energy. The fever exhalations are unfortunately also at their worst. At St. Louis, Gorée, Dagana, and all along the Senegal there are 35 days of rain, a slight increase being apparent in the upper course of the river. At St. Mary's, Bathurst, there are 48 days, at Sedhiu 84, at Bissão 111, at Boké 137,—a steady increase as we approach the equator. The number of storms follows almost the same ratio of increase, and showers which last two or three hours at St. Louis give place to whole days of rain on the Casamance and the Rio Nuñez.

Climate.

The king of the Senegambian trees is the baobab (*Adansonia digitata*), which sometimes at the height of 24 feet has a diameter of 34 feet and a circumference of 104. Acacias are very numerous, one species, *A. Adansonia*, being indeed the commonest of all Senegambian trees and valuable for its ship-timber. Among the palm-trees the *ronier* deserves to be mentioned, as the wood resists moisture and the attacks of insects; in some places, as in Cayor, it forms magnificent forests. The wood of the cailcedra (*Khaya senegalensis*), a tall tree, is used in joiner's work and iulayiug, and its bark furnishes a bitter tonic. The mampatas grows sometimes 100 feet high, its branches beginning only at a height of about 25 feet. The tree producing the famous kola-nut[1] grows on the banks of the southern streams. It is almost needless to mention the m'bilor, the gonat, the mimosa, fig-trees, orange-trees, cocoa-palms, mango-trees, pomegranates, sycamores, and so on. The dimb, the neteru, the tiamauoi, the dimbguton, the gologne, the n'tabo yield edible fruits. The cultivated plants are millet, rice, tobacco, haricots, ground-nuts, indigo (wild indigo is also abundant), cotton (also found wild), maize, sugar-cane, and the butter-tree or karité.

Flora.

The Senegambian liou is quite different from the Barbary lion; its color is a deeper and brighter yellow, and its mane is neither so thick nor so long. Other beasts of prey are the leopard, the wild cat, the cheeta, the civet, and the hyæna. The wild boar is clumsier than the European variety. Antelopes and gazelles occur in large herds all through upper Senegambia, the giraffe is common in the region of the upper Senegal; the elephant is rare; the hippopotamus is gradually disappearing. Crocodiles swarm both in the upper Senegal and the upper Niger. Monkeys and apes of different species (the chimpanzee, the colobus, the cynocephalus, etc.), the squirrel, rat, and mouse abound. The hedgehog, marmot, porcupine, hare, rabbit, etc., are also met with. Among the more noteworthy birds are the ostrich, which migrates to the Sahara; the bustard, occurring in desert and uncultivated districts; the marabout, a kind of stork, with its beak black in the middle and red at the point, which frequents the moist meadow-lands and the lagoons; the brown partridge, the rock partridge, and the quail in the plains and on the mountain sides; and the guinea-fowl in the thickets and brushwood. Along the coast are caught the sperm whale, the manatee, and the cod-fish. The domestic animals are the horse, ass, ox, sheep, goat, dog, and camel.

Fauna.

The population of Senegambia cannot be ascertained with any approach to accuracy, but it may be roughly stated at from ten to twelve millions. It comprises three distinct races,—the Moor, the Negro, and the European. The Moors, or rather Berbers (Trarzas, Brakuas, and Duaish), belong strictly to the right bank of the Senegal and appear in Senegambia only exceptionally. The Negroes form the bulk of the population. They are divided into Pouls (Peuls, Fulbe, Fulah, or Fellatah), Tou-

Population.

[1] A very complete account of this nut will be found in Nachtigal, *Sahara und Sudan*.

couleurs, Mandingoes, Sarakolés, Wolofs, Sereres, Diolas, Bambaras, Balantes, Biafares, Papels, Nalus, Landumans, Bagas, and Susus. The Pouls inhabit Futa, Damga, Bondu, and Futa-Jallon; they have a reddish complexion and almost straight hair, their body fairly stout, but their limbs slim. They are gentle and hospitable, but addicted to theft. The Toucouleurs, Poul half-breeds, belonging originally to Futa-Jallon, are similar to the Negro proper; they are treacherous, warlike, fond of plunder, and fanatical in their Mohammedanism. The Mandiugocs or Malinkés inhabit the basins of the upper Niger and the upper Senegal and the western slope of the mountains of Futa-Jallon. They comprise the Mandingo proper, occupying Manding, and the Malinkés and Souinkés, scattered about Bambuk, Buré, and Fuladugu. Under the name of Wakore or Wangara they are also found in all the immense tract which extends to the north of the Kong Mountains. They are tall of stature and of great muscular strength. The Sarakolés are one of the branches of the Bambara race produced by crossing with the Pouls. Their character is mild and pacific. Scattered about in Guoy, Kamera, and Guidimakha, they are fond of trade and engage in it with activity. The Wolofs and the Sereres inhabit the seaboard from St. Louis to Cape Verd and the left bank of the Senegal from its mouth to Richard Toll and Dagana. They are tall and robust, with black and glossy skin. Most of them are fetishists. The Diolas have flat noses, thick lips, harsh features, and a prominent belly; the body is tattooed. The Bambaras, who have invaded Kaarta and Khasso, have a coppery black complexion and frizzly hair; their cheeks are marked with deep scars. The Balantes inhabit the left bank of the Casamance; they are as cruel and as fond of pillage as the Mandiugoes, but are more generous towards the vanquished. The Biafares live on the banks of the Rio Grande and the Papels in the valley of the Cacheo and the Geba. The Nalus and the Landumans are tributary to the French ports of the Rio Nuñez and the Rio Pougo. Islam is gradually detaching them from fetishism. The Bagas occupy the coast between the Rio Nuñez and the Rio Pongo. The Susus formerly dwelt on the upper Niger, but they were expelled by the invasion of the Mohammedans and are at the present time settled in the valley of the Rio Pougo. The principal languages of Senegambia are Wolof, Poul, Sereres, Maudingo, and Arabic. Wolof is spoken in a large part of Senegambia, in Wolof, Walo, Cayor, Dakar, Baol, Sine, Salum, and in the towns of St. Louis and Gorée. The river Senegal marks the line of separation between Wolof and Arabic. Poul is the language of the Pouls and the Toucouleurs; Mandingo comprises several dialects,—Malinké, Souinké, Bambara. The few Europeans are mainly civil and military officials or traders. White planters are rare. The natives of Senegambia are generally divided into two quite distinct classes,—freemen and slaves. The griots are a kind of bards or trouvères who live at the expense of those whose praises they sing. Polygamy is generally practiced. Circumcision of the adults of both sexes is a rite accompanied with superstitious observances. Every canton, every village in independent Senegambia is governed either by a chief ("king") or by an "almamy" elected by a group of villagers.

History. Senegambia is divided into French Senegambia (with the territories placed under French protection), English Senegambia, Portuguese Senegambia, and independent Seuegambia, comprising the native states not under the protection of a European power. French Senegambia is called the colony of SENEGAL (*q.v.*). English Senegambia comprises the establishments of the GAMBIA (*q.v.*) and the islands of Los. Portuguese Senegambia consisted till quite recently of Bissagos Archipelago and the "factories" of Zighinchor on the Casamance, Cacheo and Farim on the Rio Cacheo, and Geba on the Geba. By an arrangement effected in 1886 Portugal ceded Zighinchor to France in exchange for Massabé, on the Loango coast. Germany, which seemed at one time disposed to place various territories of Dubreka, Koba, and Kabitai under its protection, has formally abandoned the plan. The independent states are not very numerous, but for the most part they are more extensive than the protected countries. They were, quite recently,—Jolof, lying between the Senegal and the Gambia in one direction, and between the Falemé and the ocean in the other; Buré in the Mandiugo region, a territory abounding in gold; Guidimakha, in Gangara, on the right bank of the Senegal. There still remain among the more important Kaarta, the country of Segu, and Futa-Jallon.

Communication. Several lines of English, French, and German packets call at the Senegambian ports, and small steamers ascend the navigable portions of the rivers. A railway unites St. Louis and Dakar, and another line is being constructed from Kayes to Bafulabé (on the upper Senegal), with a projected extension to Bammako. There is telegraphic communication between Dakar and St. Louis, and a second line puts all the ports of the upper Niger and the left bank of the Senegal into connection with St. Louis, which has touch of Europe by means of a submarine cable passing by way of the Canary Islands to Cadiz. The foreign trade of Senegambia consists in the exportation of gums, ground-nuts, sesame, oil, india-rubber, birds' feathers, hides, wax, and ivory, coffee from the Rio Nuñez, and rice from the Casamance, and the importation of iron, alcoholic liquors, firearms, ammunition, coral, beads, tobacco, preserved foods, and blue calico (guinée). Trade. (D. K.*)

SENIOR, NASSAU WILLIAM (1790–1864), English political economist, was born at Compton, Berks, on 26th September 1790, the eldest son of the Rev. J. R. Senior, vicar of Durnford, Wilts. He was educated at Eton and Magdalen College, Oxford; at the university he was a private pupil of Richard Whately, afterwards archbishop of Dublin, with whom he remained connected by ties of lifelong friendship. He took the degree of B.A. in 1811, was called to the bar in 1819, and in 1836, during the chancellorship of Lord Cottenham, was appointed a master in chancery. On the foundation of the professorship of political economy at Oxford in 1825, Senior was elected to fill the chair, which he occupied till 1830, and again from 1847 to 1852. In 1830 he was requested by Lord Melbourne to inquire into the state of combinations and strikes, to report on the state of the law, and to suggest improvements in it. He was a member of the Poor Law Inquiry Commission of 1832, and of the Handloom Weavers Commission of 1837; the report of the latter, published in 1841, was drawn up by him, and he embodied in it the substance of the report he had prepared some years before on combinations and strikes. He was also one of the commissioners appointed in 1861 to inquire into popular education in England. In the later years of his life, during his visits to foreign countries, he studied with much care the political and social phenomena they exhibited. Several volumes of his journals have been published, which contain much interesting matter on these topics, though the author probably rated too highly the value of this sort of social study. Senior was for many years a frequent contributor to the *Edinburgh*, *Quarterly*, *London*, and *North British Reviews*, dealing in their pages with literary as well as with economic and political subjects. He died at Kensington on 4th June, 1864.

His writings on economic theory consisted of an article in the *Encyclopædia Metropolitana*, afterwards separately published as *An Outline of the Science of Political Economy* (1836, 3d ed. 1854), and his lectures delivered at Oxford. Of the latter the following were printed—*An Introductory Lecture* (1827, 3d ed. 1831); *Two Lectures on Population*, with a correspondence between the author and Malthus (1831): *Three Lectures on the Transmission of the Precious Metals from Country to Country, and the Mercantile Theory of Wealth* (1828); *Three Lectures on the Cost of obtaining Money and on some Effects of Private and Government Paper Money* (1830); *Three Lectures on Wages and on the Effects of Absenteeism, Machinery, and War, with a Preface on the Causes and Remedies of the Present Disturbances* (1830, 2d ed. 1831); *A Lecture on the Production of Wealth* (1847); and *Four Introductory Lectures on Political Economy* (1852). Several of his lectures were translated into French by M. Arrivabène under the title of *Principes Fondamentaux d'Économie Politique* (1835). Senior also wrote on administrative and social questions—*A Letter to Lord Howick on a Legal Provision for the Irish Poor, Commutation of Tithes, and a Provision for the Irish Roman Catholic Clergy* (1831, 3d ed. 1832, with a preface containing suggestions as to the measures to be adopted in the "present emergency"); *Statement of the Provision for the Poor and of the Condition of the Laboring Classes in a considerable portion of America and Europe, being the Preface to the Foreign Communications in the Appendix to the Poor Law Report* (1835); *On National Property, and on the Prospects of the Present Administration and of their Successors* (anon.; 1835); *Letters on the Factory Act, as it affects the Cotton Manufacture* (1837); *Suggestions on Popular Education* (1861); *American Slavery* (in part a reprint from the *Edinburgh Review;* 1862); *An Address on Education delivered to the Social Science Association* (1863). His contributions to the reviews were collected

in volumes entitled *Essays on Fiction* (1864); *Biographical Sketches* (1865, chiefly of noted lawyers); and *Historical and Philosophical Essays* (1865). In 1859 appeared his *Journal kept in Turkey and Greece in the Autumn of* 1857 *and the Beginning of* 1858; and the following were edited after his death by his daughter—*Journals, Conversations, and Essays relating to Ireland* (1868); *Journals kept in France and Italy from* 1848 *to* 1852, *with a Sketch of the Revolution of* 1848 (1871); *Conversations with Thiers, Guizot, and other Distinguished Persons during the Second Empire* (1878); *Conversations with Distinguished Persons during the Second Empire, from* 1860 *to* 1863 (1880); *Conversations and Journals in Egypt and Malta* (1882); also in 1872 *Correspondence and Conversations with Alexis de Tocqueville from* 1834 *to* 1859.

Senior's literary criticisms do not seem to have ever won the favor of the public; they are, indeed, somewhat formal and academic in spirit. The author, while he had both good sense and right feeling, appears to have wanted the deeper insight, the geniality, and the catholic tastes which are necessary to make a critic of a high order, especially in the field he chose,—that, namely, of imaginative literature. His tracts on practical politics, though the theses they supported were sometimes questionable, were ably written and are still worth reading, but cannot be said to be of much permanent interest. But his name will continue to hold an honorable, though secondary, place in the history of political economy. Senior regards political economy as a purely deductive science, all the truths of which are inferences from four elementary propositions. It is, in his opinion, wrongly supposed by J. S. Mill and others to be a hypothetic science,—founded, that is to say, on postulates not corresponding with social realities. The premises from which it sets out are, according to him, not assumptions but facts. It concerns itself, however, with wealth only, and can therefore give no practical counsel as to political action; it can only suggest considerations which the politician should keep in view as elements in the study of the questions with which he has to deal. The conception of economics as altogether deductive is certainly erroneous, and puts the science from the outset on a false path. But deduction has a real, though limited, sphere within it. Hence, though the chief difficulties of the subject are not of a logical kind, yet accurate nomenclature, strict definition, and rigorous reasoning are of great importance. To these Senior has given special attention, and, notwithstanding occasional pedantries, with very useful results. He has in several instances improved the forms in which accepted doctrines were habitually stated. He has also done excellent service by pointing out the arbitrary novelties and frequent inconsistencies of terminology which deface Ricardo's principal work,—as, for example, his use of "value" in the sense of "cost of production," and of "high" and "low" wages in the sense of a certain proportion of the product as distinguished from an absolute amount, and his peculiar employment of the epithets "fixed" and "circulating" as applied to capital. He shows, too, that in numerous instances the premises assumed by Ricardo are false. Thus he cites the assertions that rent depends on the difference of fertility of the different portions of land in cultivation; that the laborer always receives precisely the necessaries, or what custom leads him to consider the necessaries, of life; that, as wealth and population advance, agricultural labor becomes less and less proportionately productive; and that therefore the share of the produce taken by the landlord and the laborer must constantly increase, whilst that taken by the capitalist must constantly diminish; and he denies the truth of all these propositions. Besides adopting some terms, such as that of "natural agents," from Say, Senior introduced the word "abstinence"—which, though obviously not free from objection, is for some purposes useful—to express the conduct of the capitalist which is remunerated by interest; but in defining "cost of production" as the sum of labor and abstinence necessary to production he does not seem to see that an amount of labor and an amount of abstinence are disparate, and do not admit of reduction to a common quantitative standard. He has added some important considerations to what had been said by Smith on the division of labor. He distinguishes usefully between the rate of wages and the price of labor. But in seeking to determine the law of wages he falls into the error of assuming a determinate wage-fund, and states as an economic truth what is only an identical proposition in arithmetic. Whilst entertaining such an exaggerated estimate of the services of Malthus that he extravagantly pronounces him "as a benefactor of mankind on a level with Adam Smith," he yet shows that he modified his opinions on population considerably in the course of his career, regards his statements of the doctrine with which his name is associated as vague and ambiguous, and asserts that, "in the absence of disturbing causes, subsistence may be expected to increase in a greater ratio than population." It is urged by Périn, and must, we think, be admitted, that by his isolation of economics from morals, and his assumption of the desire of wealth as the sole motive-force in the economic domain, Senior has, in common with most of the other followers of Smith, tended to set up egotism as the legitimate ruler and guide of practical life. It is no sufficient answer to this charge that he makes formal reserve in favor of higher ends. From the scientific side, Cliffe Leslie has abundantly proved the unsubstantial nature of the abstraction implied in the phrase "desire of wealth," and the inadequacy of such a principle for the explanation of economic phenomena.

(J. K. I.)

SENLIS, a town of France, in the department of Oise, lies on the right side of the Nonette, a left-hand affluent of the Oise, 34 miles north-northeast of Paris by the Northern Railway on the branch line (Chantilly-Crépy) connecting the Paris-Creil and Paris-Soissons lines. In 1881 it had only 6870 inhabitants; but its antiquity, its historical monuments, and its situation in a beautiful valley, in the midst of the three great forests of Hallatte, Chantilly, and Ermenonville, render it interesting. Its Gallo-Roman walls, 23 feet high and 13 feet thick, are, with those of St. Lizier (Ariège) and Bourges, the most perfect in France. They enclose an oval area 1024 feet long from east to west and 794 feet wide from north to south. At each of the angles formed by the broken lines of which the circuit of 2756 feet is composed stands or stood a tower; numbering originally twenty-eight, and now only sixteen, they are semicircular in plan, and up to the height of the wall are unpierced. The Roman city had only two gates; the present number is five. The site of the prætorium was afterwards occupied by a castle occasionally inhabited by the kings of France from Clovis to Henry IV. and still represented by ruins dating from the 11th, 13th, and 16th centuries. In the neighborhood of Senlis the foundations of a Roman amphitheatre, 138 feet by 105, have also been discovered. The old cathedral of Notre Dame (12th, 13th, and 16th centuries) was begun in 1155 on a vast scale; but owing to the limited resources of the diocese progress was slow and the transept was finished only under Francis I. The total length is 269 feet, but the nave (98 feet high) is shorter than the choir. At the west front there are three doors and two bell towers. The right-hand tower (256 feet high) is very striking: it consists above the belfry stage, of a very slender octagonal drum with open-work turrets and a spire with eight dormer windows. The left-hand tower, altered in the 16th century, is crowned by a balustrade and sharp roof. In the side portals, especially in the southern, the flamboyant Gothic is displayed in all its delicacy. Externally the choir is extremely simple. In the interior the sacristy pillars with capitals of the 10th century are noteworthy. The episcopal palace, now an archæological museum, dates from the 13th century; the old collegiate church of St. Frambourg was rebuilt in the 12th century in the style which became characteristic of the "saintes chapelles" of the 13th and 14th centuries; St. Pierre, though enclosed by cavalry barracks, has preserved its two towers. The ecclesiastical college of St. Vincent, occupying the old abbey of this name, has a very elegant church, the date of which has been greatly disputed by archæologists, who sometimes wrongly refer it to Queen Anne of Russia. The town-house and several private houses are also of architectural interest.

Senlis can be traced back to the Gallo-Roman township of the Silvanectes which afterwards became Augustomagus. Christianity was introduced by St. Rieul at the close of the 3d century. During the first two dynasties of France Senlis was a royal residence. After the dismemberment of the Carlovingian empire it belonged to the counts of Vermandois and then to the royal domain, and obtained a communal charter in 1173. Its bishop, Guérin, elected in 1214, signalized himself at the battle of Bouvines. The burgesses took part in the Jacquerie of the 14th century,

then sided with the Burgundians and the English, whom, however, they afterwards expelled. The Leaguers were there beaten by the duke of Longueville and La Noue. In the time of Henry IV. the local manufactures employed 200 masters and 4000 men, but all industrial activity has now disappeared. The bishopric was suppressed at the Revolution, and this suppression was confirmed by the Concordat.

SENNA (Arab. *sanâ*), a popular purgative, consisting of the leaves of two species of *Cassia*, viz., *C. acutifolia*, Del., and *C. angustifolia*, Vahl. *C. acutifolia* is a native of many districts of Nubia, *e.g.*, Dongola, Berber, Kordofan, and Senaar, but is grown also in Timbuctoo and Sokoto. The leaflets are collected twice a year by the natives, the principal crop being gathered in September after the rainy season and a smaller quantity in April. The leaves are dried in the simplest manner by cutting down the shrubs and exposing them on the rocks to the burning sun until quite dry. The leaflets then readily fall off and are packed in large bags made of palm leaves, and holding about a quintal each. These packages are conveyed by camels to Assouan and Darao and thence to Cairo and Alexandria, or by ship by way of Massowah and Suakim. The leaflets form the Alexandrian senna of commerce. Formerly this variety of senna was much adulterated with the leaves of *Solenostemma Argel*, Hayne, which, however, are readily distinguishable by their minutely wrinkled surface. Of late years Alexandrian senna has been shipped of much better quality. Occasionally a few leaves of *C. obovata*, Coll., may be found mixed with it. *C. angustifolia* affords the Bombay, East Indian, Arabian, or Mecca senna of commerce. This plant grows wild in the neighborhood of Yemen and Hadramaut in the south of Arabia, in Somali Land, and in Sind and the Punjab in India. The leaves are chiefly shipped from Mocha, Aden, Jeddah, and other Red Sea ports to Bombay and thence to Europe, the average imports into Bombay amounting to about 250 tons annually, of which one-half is re-exported. Bombay senna is very inferior in appearance to the Alexandrian, as it frequently contains many brown and decayed leaflets and is mixed with leaf-stalks, etc. *C. angustifolia* is also cultivated in the extreme south of India, and there affords larger leaves, which are known in commerce as Tinnevelly senna. This variety is carefully collected, and consists almost exclusively of leaves of a fine green color, without any admixture of stalks. It is exported from Tuticorin.

Senna appears to have been introduced into Europe about the 9th century by Arabian physicians, by whom, however, the pods seem to have been preferred to the leaves. The medicinal activity of senna leaves appears to be due to a very unstable colloid glucoside to which the name of cathartic acid has been given. It is readily decomposed by a temperature much below 100° Fahr. (*Pharm. Jour. Trans.*, [3], xv. p. 704), and hence cold preparations of senna are the most active. In the free state it is soluble in dilute alcohol and in water, forming a brown solution, but is almost insoluble in strong alcohol and entirely so in ether and chloroform. Combined with ammonia it forms an active purgative. Two bitter principles named sennacrol and senna-picrin have been extracted from senna by Ludwig; the former is soluble and the latter insoluble in ether. A yellow coloring matter has also been obtained from senna, but it appears probable that it is only a decomposition product of cathartic acid. Senna must be included among the irritant purgatives, since cathartic acid has no aperient effect when injected into the blood. Owing to its colloid character, it is absorbed with difficulty, and its action is thus exerted throughout the greater part of the intestinal canal.

SENNACHERIB. See BABYLONIA, vol. iii. p. 162, and ISRAEL, vol. xiii. p. 424 *sq.*

SENNAR. See SENAAR.

SENS, a town of France, chef-lieu of an arrondissement in the department of Yonne, lies on the right side of the Yonne near its confluence with the Vanne, and on the railway from Paris to Lyons, 70 miles southeast of the former city at the intersection of the line from Orleans to Troyes. It derives its importance from its antiquity and its archiepiscopal see. The cathedral of St. Étienne occupies the site of an ancient temple on which St. Savinian is said to have built, at the close of the 3d century, a little church consecrated to the Virgin. The present Gothic cathedral, erected between 1122 and 1168, subsequently underwent alteration in the 13th century and again under Louis XII. The west front measures 154 feet in breadth; the middle portal has good sculptures, representing the parable of the virgins and the story of St. Stephen. The right-hand portal contains twenty-two remarkable statuettes of the prophets, which have suffered considerable injuries. Above this portal rises the stone tower, decorated with armorial bearings and with statues representing the principal benefactors of the church. The bells in the campanile, by which the tower is surmounted, enjoyed immense reputation in the Middle Ages; the two which still remain, La Savinienne and La Potentienne, weigh respectively 15 tons 7 cwts. and 13 tons 13 cwts. The left portal is adorned with two bas-reliefs, Liberality and Avarice, as well as with the story of John the Baptist. The portal on the north side of the cathedral is one of the finest examples of French 16th-century sculpture. Glass windows of the 12th to the 16th century are preserved, some of them representing the legend of St. Thomas of Canterbury. Among the interior adornments are an altarpiece finely carved in stone, the tomb of the dauphin (son of Louis XV.) and his consort, Marie Josèphe of Saxony, one of the masterpieces of Coustou, and bas-reliefs from the mausoleum of Cardinal Duprat. The treasury contains a fragment of the true cross presented by Charlemagne, and the vestments of St. Thomas of Canterbury. It was in the cathedral of Sens that St. Louis, in 1234, married Marguerite of Provence, and five years later deposited the crown of thorns. The official buildings of the cathedral, dating from the 13th century, have been restored by Viollet-le-Duc. The old judgment-hall and the dungeons had remained intact; in the first story is the synod hall, vaulted with stone and lighted by beautiful grisaille windows. A Renaissance structure connects the buildings with the archiepiscopal palace, which also dates from that period. The oldest of the other churches of Sens is St. Savinian, the foundation of which dates from the 3d century, while the crypt is of the early part of the 11th, and the upper portions of the bell-tower of the first years of the 13th. The contents of the museum of sculptured stones have been mainly derived from the old fortifications, which were themselves constructed during barbarian invasion from the ruins of public monuments. The only town gate still preserved is that known as the dauphin's (1777). In the public library are a number of MSS. and a famous missal with ivory covers. The chemist Thenard has his statue in the town. The population in 1881 numbered 13,440.

Sens, when the capital of the Senones, one of the most powerful peoples of Gaul, bore the name of Agenticum. It was not finally subdued by the Romans till after the defeat of Vercingetorix. On the division of Gaul into seventeen provinces under the emperor Valens, Agenticum became the metropolis of the 4th Lugdunensis. Theatres, circuses, amphitheatres, triumphal arches, and aqueducts were all built in the town by the Romans. It was the meeting point of six great highways. The inhabitants, converted to Christianity by the martyrs Savinian and Potentian, held out against the Alemanni and the Franks in 356, against the Saracens in 731 or 738, and finally against the Normans in 886,—the last having besieged the town for six months. At the commencement of the feudal period Sens was governed by counts, who had become hereditary towards the middle of the 10th century; and the contests of these counts with the archbishops or with their feudal superiors often led to much bloodshed and disaster. Several councils were held at Sens, notably that at which St. Bernard and Abelard met. The burgesses in the middle of the 12th century formed a defensive association which carried on war against the clergy, and Philip Augustus re-

stored the commune. In the ardor of its Catholicism Sens massacred the Protestants in 1562, and it was one of the first towns to join the League. Henry IV. did not effect his entrance till 1594, and he then deprived the town of its privileges. In 1622 Paris, hitherto suffragan to Sens, was made an archbishopric, and the bishoprics of Chartres, Orleans, and Meaux were transferred to the new jurisdiction. In 1791 the archbishopric was reduced to a bishopric of the department of Yonne. Suppressed in 1801, the see was restored in 1807 with the rank of archbishopric. The town was occupied by the invaders in 1814 and 1870–71.

SENSITIVE PLANT. See MIMOSA; comp. PHYSIOLOGY, vol. xix. pp. 69, 70, 71.

SEONI, or SEONEE, a British district of India, in the Central Provinces, lying between 21° 36′ and 22° 58′ N. lat. and 79° 14′ and 80° 19′ E. long., with an area of 3247 square miles, is bounded on the N. by Jabalpur, on the E. by Mandla and Bálághát, on the S. by Nágpur and Bhandára, and on the W. by Narsinhpur and Chhindwára. Seoni is a portion of the upland tract formed by the Sátpura Hills which extend along the south bank of the Narbadá (Nerbudda) from the plains of Broach on the west to the Maikal range in the east; and it is remarkable for the beauty of its scenery and the fertility of its valleys. The northern and western portions of the district include the plateaus of Lakhnádon and Seoni; the eastern section consists of the watershed and elevated basin of the Wainganga; and in the southwest is a narrow strip of rocky land known as Dongartál. The plateaus of Seoni and Lakhnádon vary in height from 1800 to 2000 feet; they are well cultivated, clear of jungle, and their temperature is always moderate and healthy. Geologically the north part of Seoni consists of trap hills and the south of crystalline rock. The soil of the plateaus is the rich black cotton soil formed by disintegrated trap, of which about two-thirds of the district are said to consist, but towards the south, where cliffs of gneiss and other primitive formations occur, the soil is silicious and contains a large proportion of clay. Seoni is hilly throughout, the hills for the most part being clothed with small stunted trees; but in the valleys and on the plateaus forest trees are very thinly scattered and are seldom of large size. The chief river of the district is the Wainganga, with its affluents the Hirí, Ságar, Thelí, Bijná, and Thánwar; other streams are the Tímar and the Sher, affluents of the Narbadá. The average annual rain-fall is about 50 inches.

The census of 1881 returned the population of Seoni district at 334,733 (males 167,925, females 166,808); of these 179,705 were Hindus, 13,442 Mohammedans, 99 Christians, and 139,444 aboriginals. SEONI (*q.v.*) is the only town with a population exceeding 10,000. Of the total district area of 3247 square miles only 1098 are cultivated, and of the portion lying waste 613 are returned as cultivable. Wheat forms the staple crop; rice and other food-grains are also extensively grown; and among miscellaneous products are cotton, fibres, and sugar-cane. In 1883–84 the gross revenue of Seoni amounted to £35,419 [$172,136.34], of which the land-tax yielded £15,379 [$74,741.94]. Trade is chiefly carried on by means of markets in the towns. Manufactures consist of coarse cloth and some pottery of superior quality made at Kánhiwára. At Khawása, in the midst of the forest, leather is beautifully tanned. The only means of communication is by road, the aggregate length of which is estimated at 90 miles. Seoni came under British rule early in the 19th century, on the downfall of the Nagpúr power, and it was formed into a separate district in 1861.

SEONI, principal town and administrative headquarters of the above district, is situated in 22° 5′ 30″ N. lat. and 79° 35′ E. long., midway between Nágpur and Jabalpur. It was founded in 1774 by Mohammed Amín Khán, and contains large public gardens, a fine market-place, and a handsome tank. In 1881 the population was 10,203.

SEPIA is a valuable and much used deep brown pigment obtained from the ink-sacs of various species of CUTTLE-FISH (*q.v.*); that from which it is principally obtained is *Sepia officinalis*, a native of the Mediterranean, and especially abundant in the upper parts of the Adriatic, where it is a prized article of food. To obtain sepia the ink-sac is, immediately on the capture of the animal, extracted from the body and speedily dried to prevent putrefaction. The contents are subsequently powdered, dissolved in caustic alkali, and precipitated from the solution by neutralizing with acid. The precipitate after washing with water is ready to make up into any form required for use.

Sepia-bone or *cuttle-bone* consists of the internal "shell" or skeleton of *Sepia officinalis* and other allied species. It is an oblong convex structure from 4 to 10 inches in length and 1 to 3 inches in greatest width, consisting internally of a highly porous cellular mass of carbonate of lime with some animal matters covered by a hard thin glassy layer. It is used principally as a polishing material and for tooth powder, and also as a moulding material for fine castings in precious metals.

SEPOY, the usual English spelling of *sipáhí*, the Persian and Urdú term for a soldier of any kind. The word *sipáh*, "army," from which *sipáhí*,[1] "soldier," is derived, corresponds to the Zend *çpádha*, Old Persian *çpáda*, and has also found a home in the Turkish, Kurdish, and Pashto (Pushtu) languages (see Justi, *Handbuch der Zendsprache*, p. 303, 6), while its derivative is used in all Indian vernaculars, including Tamil and Burmese, to denote a native soldier, in contradistinction to *gorá*, "a fair-complexioned (European) soldier." Towards the middle of the 18th century efforts were made by the East India Company to train natives of good caste, both Hindus and Mohammedans, for military service under the company. Though they were made to use the musket, they remained for some time chiefly armed in the fashion of the country, with sword and target; they wore the Indian dress—the turban, vest, and long drawers—and were provided with native officers under English superior command. Under their European leaders they were found to do good service and to face danger with constancy and firmness. In the progress of time a considerable change took place, and natives of every description were enrolled in the service. Though some corps that were almost entirely formed of the lowest classes achieved considerable reputation for valor in the field, it was not considered safe to encourage the system; and the company reverted to their practice of recruiting from none but the most respectable classes of native society. It is on record that a corps of 100 sepoys from Bombay and 400 from Tellicherry joined the army at Madras in 1747, that the regular sepoys at Madras were employed in the defence of Arcot (1751), and that a company of Bombay sepoys were present at the victory of Plassey.

For instances of the early occurrence of the word see Burnell and Yule's *Glossary of Anglo-Indian Terms*, s.v. On the history of the sepoys compare Captain Williams's *Historical Account of the Rise and Progress of the Bengal Infantry* (London, 1817); Captain Broome's *History of the Rise and Progress of the Bengal Army* (Calcutta, 1850); Colonel Wilson's *History of the Madras Army* (London, 1882–85, in 3 volumes); No. xxxvi. of the *Quarterly Review*: and the military histories of India generally.

SEPTEMBER, the seventh month of the old Roman year, had thirty days assigned to it. By the Julian arrangement, while retaining its former name and number of days, it became the ninth month. The Ludi Magni (Ludi Romani) in honor of Jupiter, Juno, and Minerva began on the 4th of September. The principal ecclesiastical feasts falling within the month are—the Nativity of the Blessed Virgin on the 8th, the Exaltation of the Holy Cross on the 14th, St. Matthew the Apostle on the 21st, and St. Michael the Archangel on the 29th. September was called "harvest month" in Charlemagne's calendar, and it corresponds partly to the Fructidor and partly to the Vendémiaire of the first French republic.

SEPTICÆMIA. After a wound, whether the result of accident or of operation by the surgeon, blood-

[1] [In the form *Spahi* it is also a Franco-Algerine military term.—AM. ED.]

poisoning may occur. Sepsis or putrefaction in the wound is the most evident local condition which has been associated by clinical observers with blood-poisoning, and hence the term "septicæmia." Within recent years the relation of micro-organisms to the different forms of blood-poisoning has come prominently into notice; putrefaction is now known to be only one of the fermentative changes due to the presence of certain micro-organisms in a wound, and it is admitted that there are many organisms which, when they enter a wound, may give rise there to fermentative changes that are non-putrefactive. (See SCHIZOMYCETES.)

Such organisms have recently been divided into two great groups,—those which can only grow in dead or decaying matter and those which can grow in the living tissues and in the blood, which in this relation must be looked upon as a tissue. The first group has been termed "saprophytic." The second group may be termed "pathogenic," to distinguish them from the saprophytic variety. But no distinct line of demarcation can yet be drawn between these two groups, and as a matter of fact some pathogenic organisms may equally with the saprophytic find a pabulum in dead and decaying matter. Yet there can be no doubt that the more common varieties of septic organisms or saprophytes can only grow in dead or decaying matter, and that the living tissues, more especially when their power of vitality is great, are able to resist and destroy the saprophytes. There are also some organisms which, as far as is known at present, may be innocuous and give rise to no symptoms, local or general, when they are implanted in the human body. When an organism finds in the tissues a fit pabulum for its growth and development, the elements in the tissue are broken up, and the products are termed a "ptomaine" (πτῶμα). This ptomaine may irritate the wound and prevent healing; it may also be absorbed into the blood and poison it, hence the term "ptomaine poisoning." Both the saprophytic and the pathogenic organism may form a ptomaine in the wound. When the poisoning is due to a saprophyte the absorption of the ptomaine has been termed "sapræmia"; the ptomaine of the saprophyte has been called "sepsin." No special name has yet been given to the ptomaine formed in the wound by the pathogenic organism; nor has any name been given to the condition due to the absorption of the ptomaine formed by the pathogenic organism. Our knowledge is not yet sufficient to enable us to separate these two varieties of ptomaine poisoning. There can, however, be little doubt that they do exist as separate conditions, and also there can be little doubt that in some instances both forms of poisoning may be present at one and the same time.

The pathogenic organism, however, has another power which gives rise to an entirely separate condition. Not only may it form its ptomaine in the wound, but the organism itself can enter into and be carried by the blood-stream and lymph-stream to distant parts. It can live in the blood or lymph-stream and can grow there: it may be arrested in the capillaries of the bloodvessels, or in the lymphatic glands of the lymph-vessels, and in these situations may form, so to speak, a colony of organisms which develop and form ptomaines; and the ptomaines, passing into the blood, may still further poison the patient. This power of the pathogenic organism is infective, and the term "infection" has been applied to the process. These colonies or secondary foci of infection often go on to suppuration; hence the term "secondary" applied to the abscesses which have long been observed in some forms of blood-poisoning. It was at one time thought that the pus-cells in the original wound passed into the blood, and, being caught in the capillaries, were the cause of the abscess-formation in the parts distant from the wound: hence the term "pyæmia" or pus in the blood. The pus-cells may enter the blood-stream; it is not, however, the cellular element that is the essence of the condition, but the organism which the cellular element may carry along with it. The hectic condition observed in a case of long-continued suppuration is in all probability a chronic form of blood-poisoning. In very acute cases, in which the poison is either concentrated, virulent, or in large quantity, death may occur within a very few hours. In other cases the condition may become chronic, and if the strength of the patient can be kept up by stimulants recovery often takes place. The chances of recovery are much greater when the condition is not truly an infective one. When the manufactory of the ptomaine is only in the wound, the organism may be there destroyed by the use of powerful antiseptics or antifermentatives. The primary cause being removed, the patient may then be saved. When, however, the pathogenic organism gets into the blood-stream and distant foci of infection are formed, the chances of ultimate recovery are greatly diminished. Various unsuccessful attempts have been made by the internal administration of antifermentatives so to alter the blood that the micro-organism cannot find in it or the tissues a fit nidus. The point to attend to is to prevent organismal fermentation in wounds by careful antiseptic or rather antifermentative precautions. Just as the word "septicæmia" has a more general application than can now be strictly allowed if we look to the derivation of the word and the present state of our knowledge, so the word "antiseptic" is applied to all substances which prevent organismal fermentation, although many of these organisms are undoubtedly non-septic in their character.

SEPTUAGINT. The Septuagint (*οἱό*, LXX.) or Alexandrian version of the Old Testament seems to be named from the legend of its composition by seventy, or more exactly seventy-two, translators. In the *Letter of Aristeas* (Aristæus)[1] this legend is recounted as follows: Demetrius Phalereus, keeper of the Alexandrian library, proposed to King Ptolemy II. Philadelphus to have a Greek translation of the Jewish law made for the library. The king consented and sent an embassy, of which the author of the letter was a member, to the high priest Eleazar at Jerusalem asking him to send six ancient, worthy, and learned men from each of the twelve tribes to translate the law for him at Alexandria. Eleazar readily consented and sent the seventy-two men with a precious roll of the law. They were most honorably received at the court of Alexandria and conducted to the island (Pharus), that they might work undisturbed and isolated. When they had come to an agreement upon a section Demetrius wrote down their version; the whole translation was finished in seventy-two days. The Jewish community of Alexandria was allowed to have a copy, and accepted the version officially,—indeed a curse was laid upon the introduction of any changes in it.

There is no question that this *Letter* is spurious.[2] Aristeas is represented as a heathen, but the real writer must have been a Jew and no heathen. Aristeas is represented as himself a member of the embassy to Eleazar; but the author of the *Letter* cannot have been a contemporary of the events he records, else he would have known that Demetrius fell out of favor at the very beginning of the reign of Philadelphus, being said to have intrigued against his succession to the throne.[3] Nor could a genuine honest witness have fallen into the absurd mistake of making delegates from Jerusalem the authors of the Alexandrian version. The forgery, however, is a very early one. "There is not a court-title, an institution, a law, a magistracy, an office, a technical term, a formula, a peculiar phrase in this letter which is not

[1] Edited by S. Schard (Frankfort, 1610), by Havercamp (in his *Josephus*), and by M. Schmidt (in Merx's *Archiv.*, 1868). Comp. Lumbroso, in the *Transactions* of the Turin Academy, 1869.

[2] Scaliger, *In Eus. Chron. animadv.*, No. 1734; H. Hody, *De Bibliorum Textibus Originalibus.*

[3] Hermippus Callimachius, *ap.* Diog. Laert., v. 78.

found on papyri or inscriptions and confirmed by them."[1] That in itself would not necessarily imply a very early date for the piece; but what is decisive is that the author limits canonicity to the law and knows of no other holy book already translated into Greek. Further, what he tells about Judæa and Jerusalem is throughout applicable to the period when the Ptolemies bore sway there and gives not the slightest suggestion of the immense changes that followed the conquest of Palestine by the Seleucids. Thus, too, it is probable that the Jewish philosopher Aristobulus, who lived under Ptolemy Philometor (180–145), derived his account of the origin of the LXX. from this *Letter*, with which it corresponds.[2]

If now the *Letter* is so old, it is incredible that it should contain no elements derived from actual tradition as to the origin of the LXX., and we must try to separate these from the merely fabulous. To this end we must consider what is the main aim and object of the forgery. The chief thing in the *Letter* is the description of a seven days' symposium of the seventy translators at the Alexandrian court, during which each of them has a question to answer, and raises the admiration of the king for the wisdom produced among the Jews by their knowledge of the law. Further, very great weight is laid on the point that the LXX. is the official and authoritative Bible of the Hellenistic Jews, having been not only formally accepted by the synagogue at Alexandria but authorized by the high priest at Jerusalem and the seventy elders who are in fact its authors. Other matters receive no special emphasis, and the presumption is that what is said about them is not deliberate fiction and in part at least is true. Thus it has always been taken as a fact that the version originated at Alexandria, that the law was translated first, and that this took place in the time of Ptolemy II. On the other hand, it has been thought difficult to believe that the scholarly tastes of the Alexandrians, personified in Demetrius Phalereus as the presiding genius of the Alexandrian library, could have furnished the stimulus to reduce the translation to writing. One can hardly call this intrinsically improbable in view of the miscellaneous literary tastes of the court of the Ptolemies. But it has been thought much more likely that the Septuagint was written down to satisfy the religious needs of the Jews by a translated Torah, since in fact the version is fitted for Jews and could have been intelligible only to them, and indeed never came to be circulated and known outside of their circles. Here, however, we must distinguish between written and oral interpretation. If interpretation was needed in the synagogue service, it was an oral interpretation that was given. It was not a natural thing for the Jews to *write* the translation, —indeed they had religious scruples against such a course. Only "Scripture" was to be written, and to put the contents of Scripture in writing in any other than the old holy form was deemed almost a profanation,—a feeling of which there is evidence in the *Letter* itself.[3] It is well known how in Palestine the Targum was handed down orally for centuries before it was at last reduced to writing; and, if, on the contrary, at Alexandria a written version came into existence so early, it is far from improbable that this was due to some influence from without. That the work is purely Jewish in character is only what was inevitable in any case. The translators were necessarily Jews and were necessarily and entirely guided by the living tradition which had its focus in the synagogal lessons. And hence it is easily understood that the version was ignored by the Greeks, who must have found it barbarous and unintelligible, but obtained speedy acceptance with the Jews, first in private use and at length also in the synagogue service.

The next direct evidence which we have as to the origin of the LXX. is the prologue to Ecclesiasticus, from which it appears that about 130 B.C. not only the law but "the prophets and the other books" were extant in Greek. With this it agrees that the most ancient relics of Jewish-Greek literature, preserved in the extracts made by Alexander Polyhistor (Eus., *Præp. Ev.*, ix.), all show acquaintance with the LXX. These later translations, too, were not made to meet the needs of the synagogue, but express a literary movement among the Hellenistic Jews, stimulated by the favorable reception given to the Greek Pentateuch, which enabled the translators to count on finding an interested public. If a translation was well received by reading circles amongst the Jews, it gradually acquired public acknowledgment and was finally used also in the synagogue, so far as lessons from other books than the Pentateuch were used at all. But originally the translations were mere private enterprises, as appears from the prologue to Ecclesiasticus and the colophon to Esther. It appears also that it was long before the whole Septuagint was finished and treated as a complete work.

As the work of translation went on so gradually and new books were always added to the collection the compass of the Greek Bible came to be somewhat indefinite. The law always maintained its preëminence as the basis of the canon; but the prophetic collection changed its aspect by having various Hagiographa incorporated with it according to an arbitrary arrangement by subjects. The distinction made in Palestine between Hagiographa and Apocrypha was never properly established among the Hellenists. In some books the translators took the liberty to make considerable additions to the original, and these additions—*e.g.*, those to Daniel—became a part of the Septuagint. Nevertheless learned Hellenists were quite well aware of the limits of the canon and respected them. Philo can be shown to have known the Apocrypha, but he never cites them, much less allegorizes them or uses them in proof of his tenets. And in some measure the widening of the Old Testament canon in the Septuagint must be laid to the account of Christians. As regards the character of the version, it is a first attempt, and so is memorable and worthy of respect, but at the same time displays all the weaknesses of a first attempt. Though the influence of contemporary ideas is sometimes perceptible, the Septuagint is no paraphrase, but in general closely follows the Hebrew,—so closely indeed that we can hardly understand it without a process of retroversion, and that a true Greek could not have found any satisfaction in it. The same Greek word is forced to assume the whole range of senses which belongs in Semitic speech to the derivatives of a single root; a Hebrew expression which has various Greek equivalents according to the context is constantly rendered in one way; the aorist, like the Hebrew perfect, is employed as an inchoative with a much wider range of application than is tolerated in classical Greek. At the same time, many passages are freely rendered and turned where there is no particular need to do so, and that even in books like the *Prophetæ Priores*, in which the rendering is generally quite stiff. The literalness of the version is therefore due not to scrupulousness but to want of skill, and probably in part also to accommodation to a kind of Jewish Greek jargon which had already developed in the mouths of the people and was really Hebrew or Aramaic in disguise. This Jewish dialect in turn found its standard in the Septuagint.

As the version is the work of many hands, it is naturally not of uniform character throughout all its parts,—indeed considerable varieties of character sometimes appear in one and the same book. The older constituents of the canon have an unmistakable

[1] G. Lumbroso, *Recherches sur l'Écon. Pol. de l'Égypte sous les Lagides* (Turin, 1870), p. xiii.

[2] Clem. Alex., *Strom.*, i. p. 342, ed. Sylb.; Euseb., *Præp. Ev.*, ix. 6, p. 410 *sq.*; comp. Valckenaer, *Diatribe de Aristobulo*, Leyden, 1806, reprinted in Gaisford's ed. of the *Præp. Ev.*

[3] In what is told of the authors Theopompus and Theodectes, who ventured to insert certain things out of the law in their profane works.

family likeness as contrasted with the later books; this one may see by comparing Kings with Chronicles or Isaiah and Jeremiah with Daniel. The Pentateuch is considered to be particularly well done and Isaiah to be particularly unhappy. Some of the Hagiographa (Ecclesiastes, Canticles, Chronicles) are reproduced with verbal closeness; others, on the contrary (Job, Esdras, Esther, Daniel), are marked by a very free treatment of the text, or even by considerable additions. It is not, however, always easy to tell whether a Septuagint addition is entirely due to the translator or belongs to the original text, which lay before him in a recension divergent from the Massoretic. The chief impulse in recent times to thorough investigation of the character of the several parts of the Septuagint was given by Lagarde in his *Anmerkungen zur griechischen Uebersetzung der Proverbien*, Leipsic, 1863.

The Septuagint came into general use with the Grecian Jews even in the synagogue. Philo and Josephus use it, and so do the New Testament writers. But very early small corrections seem to have been introduced, especially by such Palestinians as had occasion to use the LXX., in consequence partly of divergent interpretation, partly of differences of text or of pronunciation (particularly of proper names). The Old Testament passages cited by authors of the first century of the Christian era, especially those in the Apocalypse, show many such variations from the Septuagint, and, curiously enough, these often correspond with the later versions (particularly with Theodotion), so that the latter seem to rest on a fixed tradition. Corrections in the pronunciation of proper names so as to come closer to the Massoretic pronunciation are especially frequent in Josephus. Finally a reaction against the use of the Septuagint set in among the Jews after the destruction of the temple,—a movement which was connected with the strict definition of the canon and the fixing of an authoritative text by the rabbins of Palestine. But long usage had made it impossible for the Jews to do without a Greek Bible, and to meet this want a new version was prepared corresponding accurately with the canon and text of the Pharisees. This was the version of Aquila, which took the place of the Septuagint in the synagogues, and long continued in use there.[1] A little later other translations were made by Jews or Jewish Christians, which also followed the official Jewish canon and text, but were not such slavish reproductions as Aquila's version; two of these were Greek (Theodotion, Symmachus) and one Syriac (Peshito).

Meantime the Greek and Latin Christians kept to the old version, which now became the official Bible of the catholic church. Yet here also, in process of time, a certain distrust of the Septuagint began to be felt, as its divergence from the Jewish text was observed through comparison of the younger versions based on that text, or came into notice through the frequent discussions between Jews and Christians as to the Messianic prophecies. On the whole the Christians were disposed to charge the Jews with falsifying their Scriptures out of hatred to Christianity,—a charge which has left its echoes even in the Koran. But some less prejudiced scholars did not share this current view, and went so far in the other direction as simply to identify the Jewish text with the authentic original. Thus they fell into the mistake of holding that the later Jewish text was that from which the Septuagint translators worked, and by which their work was to be tested and measured. On these critical principles Origen prepared his famous *Hexapla*, in which he placed alongside of the Septuagint, in six parallel columns, the three younger versions and the Hebrew text in Hebrew and in Greek characters. The Septuagint text he corrected after the younger versions, marking the additions of the LXX. with a prefixed obelus (—, ÷), as a sign that they should be deleted, and supplying omissions, generally from Theodotion, with a prefixed asterisk (*). The end of the passage to which the obelus or asterisk applied was marked with a metobelus (⋖). The same signs were used for various readings, the reading of the LXX. being obelized, and the variant, from another version corresponding to the Hebrew text, following it with an asterisk. It was only in simpler cases, however, that this plan could be carried through without making the text quite unreadable; the more complicated variations were either tacitly corrected or left untouched, the reader being left to judge of them by comparing the parallel columns. Origen made most change in the proper names, which he amended in conformity with the Jewish pronunciation of the period, and in the order of the text, which, to preserve the parallelism in the columns, he made to follow the Hebrew.[2]

Origen's critical labors had a very great influence in shaping the text of the Septuagint, though in quite another direction than he designed. Even before his time the Septuagint was largely contaminated by admixture from the other versions, but such alterations now began to be made systematically. Thus he intensified a mischief which to be sure had begun before him, and even before the labors of Aquila, Theodotion, and Symmachus. The most significant evidence of this contamination of the text lies in the conflate readings, where the same Hebrew words are translated twice, or sometimes even thrice, or where two Hebrew readings of the same passage are represented, sometimes by simple juxtaposition of renderings that differ but slightly, at other times by a complicating interlacing of very different forms of the Greek. These conflate readings, however, in which the true reading survives along with the false, are the least fatal corruptions; in many cases the genuine text has disappeared altogether before the correction, as can be seen by comparing different MSS. A faithful picture of the corruption of the text of the Septuagint as it has come down to us is given in the apparatus to the great Oxford edition of Holmes and Parsons (5 vols., Oxford, 1798–1827).

Not long after Origen there arose almost contemporaneously three recensions of the Septuagint, which became established in three regions of the Greek Church. "Alexandria et Ægyptus in Septuaginta suis Hesychium laudat auctorem, Constantinopolis usque Antiochiam Luciani martyris exemplaria probat, mediæ inter has provinciæ Palestinæ codices legunt, quos ab Origene elaboratos Eusebius et Pamphilus vulgaverunt; totusque orbis hac inter se trifaria varietate compugnat," says Jerome in the *Præf. in Paralip. ad Chromatium.* According to this the text of Eusebius is that of Origen,—*i.e.*, a separate edition of the fifth column of Hexapla, which contained the Septuagint with asterisks and obeli. The text of Hesychius has not yet been identified with certainty;[3] that of Lucian is, according to Field and Lagarde, most probably given in *Codd. Holmes.*, 19, 82, 93, 108, and another series of MSS. for the prophets. It is by no means the case, however, that all our MSS. can be arranged in three families; many belong to none of the three recensions, and among these are such important codices as the Alexandrian (A) and the Vatican (B).

[1] *Corpus Juris Civ.*, Nov. cxlvi.

[2] The best collection of the fragments of the Hexapla is that of Field, *Origenis Hexaplorum quæ supersunt*, Oxford, 1867–74.

[3] See, however, Ceriani's note on the recensions of LXX. in the *Rendiconti* of the R. Instituto Lombardo for 18th February, 1886, where it is shown that the *Codex rescriptus Dublinensis*, Holmes, viii. (edited at Dublin, 1880), and other MSS. written in Egypt, which Ceriani had already cited in his *Monumenta* (vol. iii. p. xx.) present many features of correspondence with the Coptic versions and with the readings of Cyril of Alexandria. "All these documents at any rate present the character of the Hesychian recension, being all Egyptian testimonies contemporary with or little later than Jerome." Most of their characteristic readings appear also in MS. Holmes, 106, to which MSS. 26, 33, 86, 97, 198, 206 are also akin. For an attempt to determine the MSS. containing or akin to the Hesychian recension in Ezekiel, see Cornill, *Das Buch Ezechiel*, Leipsic, 1886, p. 66 *sq.*

The divergences of the LXX. from the Hebrew are particularly great in the books of Samuel and Kings, also in the prophets, especially in Ezekiel, and still more in Jeremiah, and finally also in Job and Proverbs. In Jeremiah the differences extend to the order of the chapters in the second half of the book, and therefore have always attracted special attention. In Proverbs too the individual proverbs are differently arranged in the LXX., and similar differences can be traced in the versions of Ecclesiasticus. In the Pentateuch there are considerable variations only in the last part of Exodus. The text of the genuine Septuagint is generally shorter than the Massoretic text.

The chief editions of the Septuagint are—(1) the Complutensis, 1514–17; (2) the Aldine, 1518; (3) the Sixtine, 1587; (4) the first Oxford edition by Grabe, 1707–20; (5) the second Oxford edition by Holmes and Parsons, 1798–1827; (6) Lagarde's edition of Lucian, vol. i., Göttingen, 1883.

The LXX. is of great importance in more than one respect: it is probably the oldest translation of considerable extent that ever was written, and at any rate it is the starting-point for the history of Jewish interpretation and the Jewish view of Scripture. And from this its importance as a document of exegetical tradition, especially in lexical matters, may be easily understood. It was in great part composed before the close of the canon—nay, before some of the Hagiographa were written—and in it alone are preserved a number of important ancient Jewish books that were not admitted into the canon. As the book which created or at least codified the dialect of Biblical Greek, it is also the key to the New Testament and all the literature connected with it. But its chief value lies in the fact that it is the only independent witness for the text of the Old Testament which we have to compare with the Massoretic text. Now it may seem that the critical value of the LXX. is greatly impaired, if not entirely cancelled, by the corrupt state of the text. If we have not the version itself in authentic form we cannot reconstruct with certainty the Hebrew text from which it was made, and so cannot get at various readings which can be confidently confronted with the Massoretic text; and it may be a long time before we possess a satisfactory edition of the genuine Septuagint. But fortunately in this case sound results in detail must precede and not follow the establishment of a text sound throughout. The value of a Septuagint reading must be separately determined in each particular case, and the proof that a reading is good is simply that it necessarily carries us back to a Hebrew variant, and cannot be explained by looseness of translation. It is therefore our business to collect as many Greek passages as possible which point to a various reading in the Hebrew text of the translators as compared with the Massoretic text. And for this we must not confine ourselves to one recension but use all recensions that our MSS. offer. For, though one recension may be better than another, none of them has been exempt from the influences under which the genuine Septuagint was brought into conformity with the received Hebrew text, and those influences have affected each recension in a different way, and even differently in the different books. In this process, as indeed in all textual criticism, much of course must be dependent on individual judgment. But that it should be so appears to have been the design of providence, which has permitted the Old Testament text to reach us in a form that is often so corrupt as to sin against both the laws of logic and of grammar—of rhetorical and poetical form. (J. WE.)

SEPULCHRE, CANONS REGULAR OF THE HOLY, an order founded in 1114 by Arnold, patriarch of Jerusalem (or according to another account in 1099 by Godfrey of Bouillon), on the rule of St. Augustine. It admitted women as well as men and soon spread rapidly over Europe. In the 17th century it received a new rule from Urban VIII. Shortly after this the canons became extinct; but the canonesses are still to be found in France, Baden, and the Netherlands. They live a strictly monastic life and devote themselves mainly to the work of education.

SEPULCHRE, KNIGHTS OF THE HOLY, an English military order which was said to date from the 12th century and which became extinct at the Reformation. A similar order, founded in France, lasted from the end of the 15th century till the time of the Revolution; it was resuscitated by Louis XVIII. in 1814, but again became extinct in 1830.

SEPULCHRE, THE HOLY, the rock-cut tomb in which, after His crucifixion, the body of our Lord was placed. Few questions of topography have been debated with greater persistence or, in many cases, with greater bitterness than that of the site of this tomb. Only a brief sketch of the leading features of the controversy can be given here.

The only information on the subject to be gained from the New Testament is that the tomb was in a garden "in the place where Christ was crucified" (John xix. 41), which again was "near the city" (John xix. 20) and "without the gate" (Heb. xiii. 12), and that the watch, proceeding from the sepulchre to the chief priest's, "came *into* the city" (Matt. xxviii. 11). The first requisite, therefore, of any locality professing to be that of the Sepulchre is that it should, at the date of the crucifixion, have been *without* the walls of Jerusalem.[1]

The existing church of the Holy Sepulchre, which is admitted on all hands to have occupied the same site for the last 800 years, is in the heart of the present town, 300 yards from the nearest point of the existing wall and in the immediate vicinity of the bazaars. Saewulf,[2] writing in 1102, Hildebrand of Oldenburg[3] in 1211, and Jacobus de Vitriaco[4] in 1220, assert that up to the time of Hadrian the site was still without the circuit of the walls. Brocardus[5] in 1230 states that the modern walls included more in breadth than they did at the time of Christ, and that there were even some who refused to believe that the present site was the true one. Orderieus[6] in 1320 and William de Baldensel[7] in 1336 corroborated Saewulf; but Baldensel adds that the Sepulchre then shown was no longer the one in which the body of Christ had been laid, for that had been cut out of the solid rock, while the other was formed out of stones cemented together. Gretser[8] in 1598 and Quæresimus[9] in 1616–25 refer to the objections started in their time by some whom the latter calls "misty Western heretics," and the difficulty was broadly enunciated by Monconys[10] in 1647. It was not, however, until 1741 that the site was openly declared to be false by Korte.[11] The attack of the latter writer was followed up in greater detail by Plessing[12] in 1789, and in England by Dr. Edward Clarke[13] in 1810; but until the appearance of the *Biblical Researches* of Dr. Robinson of New York in 1841[14] the attention of inquirers in England and America can hardly be said to have been seriously

[1] The revised text of John xix. 20 reads ὅτι ἐγγὺς ἦν τῆς πόλεως ὁ τόπος ὅπου ἐσταυρώθη ὁ ἰησοῦς; but the best accredited reading is ὅτι ἐγγὺς ἦν ὁ τόπος τῆς πόλεως. Mr. Buckton, in *Notes and Queries* (2d series, ii. 97), argues that according to the latter reading Calvary must have been within the city. He would explain Heb. xiii. 12 as spoken "for the allegorical purpose of the writers" of the temple, but offers no explanation of Matt. xxviii. 11.

[2] *Recueil de Voyages* (Soeiété de Géog.), iv. 84, Paris, 1839.

[3] Leo Allatius, Σύμμικτα, p. 146, Cologne, 1653.

[4] *Gesta Dei per Francos*, p. 1079, Hanover, 1611.

[5] Canisius, *Thesaurus*, iv. 17, 21, Antwerp, 1735.

[6] *Peregrinatores Medii Ævi quatuor*, ed. Laurent, p 149, Leipsic, 1864.

[7] Canisius, *Thesaurus*, iv. 348–349.

[8] *De Cruce Christi*, bk. i. chap. 17, Ingolstadt, 1598.

[9] *Terræ Sanctæ Elucidatio*, ii. 515, Antwerp, 1639.

[10] *Voyages*, Paris, 1665–66, 4to, i. 307.

[11] *Reise nach dem gelobten Lande*, Altona, 1741.

[12] *Ueber Golgotha und Christi Grab*, Halle, 1789.

[13] *Travels*, Cambridge, 1810–23.

[14] London, 1841, afterwards re-issued with a supplemental journey in 1856.

drawn to the subject. This elaborate work called forth energetic replies from Cardinal Newman[1] and Williams,[2] the latter of whom subsequently republished his work in two large volumes in 1849, which, to the upholders of tradition, may be said to occupy the same position as those of the American author to its opponents. Since that date the writers on both sides have been numerous; among them may be specially noted, as impugning the accuracy of tradition, Fergusson, Tobler, the author of an elaborate essay in the *Museum of Classical Antiquities* for 1853, Barclay, Bonar, Schwartz, Sandie, and Conder; and on the other side Lord Nugent, Schutz, Krafft, Schaffter, De Saulcy, Abbé Michon, Thrupp, De Vogué, Lewin, Pierotti, Caspari, and Sir Charles Warren.

The main question on which the dispute has turned is the circuit of the walls at the time of Christ. The city at that date was surrounded by two walls. The first or oldest began, according to Josephus, "in the north, at the tower called Hippicus, and extended to what was termed the Xystus; it then formed a junction with the council house, and terminated at the western colonnade of the temple."[3] By almost all the writers on either side this northern portion of the first wall is traced along the southern side of the depression, which extends from the central valley eastwards to the Jaffa gate.[4] From some point in that northern line of wall the second wall took its departure, and of it all we are told by Josephus is that "it had its beginning at the gate called Gennath, belonging to the first wall, and reached to the Antonia, encircling only the western quarter of the city." If this Gennath gate was near Hippicus, the line of the second wall, in order to exclude the present site, must be drawn along a route curiously unsuited, from the slope of the hill, for defensive purposes; and that it was near Hippicus seems demonstrable from the declaration of Josephus that the city in his time was "fortified by three walls except where it was encompassed by impassable ravines[5]; from the absence of any record of an attack on the first wall till the second had been taken; from a variety of incidental references in the siege by Titus; from the apparent necessity of including within its circuit the pool Amygdalon, now known as Hezekiah's Pool or Birket Hamman el-Batrak;[6] and from the remarkably small area which would otherwise be included by it.

Writers on both sides have pressed into their service the remains of ancient buildings found in the districts traversed by the second wall according to their respective theories. It seemed doubtful, till quite recently, if any sound argument could be based on these, the ruins being too fragmentary and occurring in too many different quarters to warrant any positive identification with a line of fortification as distinguished from other edifices.[7] But in the summer of 1885 a stretch of ancient wall 40 or 50 yards in length was disinterred, running northwards from the open space within the Jaffa gate to the west of Hezekiah's pool, which certainly, as figured in the January number of the *Quarterly Reports* of the Palestine Exploration Fund, seems to go a long way to settle the question against the genuineness of the existing site.

Considerable stress has been laid by some writers on the existence of ancient Jewish sepulchres, of a date apparently anterior to the Christian era, in the rock on which the present church is built, as proving that that rock could not have been within the circuit of the walls, inasmuch as it is alleged "the Jews never buried within their towns."[8] There is, however, no trace in the historical books of the Bible of any aversion on the part of the Jews to intramural interment. Whatever width of interpretation may be given to the recorded burial of eleven of the kings of Judah "*in* the city of David," the phrase can hardly be held to prove that such burial-place was *without* the walls; while 2 Chron. xxviii. 27 and xxxiii. 20 seem to point very strongly in the opposite direction. Joab also, we are told, was buried "in his own house in the wilderness,"[9] and Samuel "in his house at Ramah."[10] But the most striking case of all is Hebron, where in the midst of the city are found the jealously guarded walls which enclose the cave of Machpelah. If, then, these tombs are older than the time of Christ, there seems little difficulty in crediting that they might have been included within the second wall. We know for a certainty that they were within the third. The curious point rather is that their existence in the rock may be used as a strong argument against the site, for, speaking of the disinterment of the rock of the sepulchre from the accumulated soil heaped over it by the Romans, Eusebius[11] impresses on us the fact that there was "only one cave within it, lest, had there been many, the miracle of Him who overthrew death should have been obscured."

One argument remained which, at least up to 1847, it seemed difficult for the impugners of the orthodox site to meet, namely,—Was it at all probable that Constantine should have been deceived, either by erroneous inference or by wilful misrepresentation, when in 325 he erected a monumental church over what was then believed to be the holy tomb? Apart from the consideration that of all localities this seemed to be the least likely to pass from the memory of the Christian church,[12] its exact position had been in a manner identified by the existence on the rock of Golgotha of a temple or statue of Venus, and on the site of the resurrection of a statue of Jupiter erected by Hadrian in the 2d century; and the fact remains that on the superincumbent rubbish being cleared away by the orders of Constantine a cave was discovered, which it seems difficult, even were we willing with Taylor[13] to impute deliberate fraud to the existing bishop of Jerusalem, to believe could have been previously prepared beneath a heathen shrine, and in the midst of a population of pagans and of Jews.[14]

In 1847 Fergusson, in his *Essay on the Ancient Topography of Jerusalem*, attempted to show that Constantine had built his memorial church on another site altogether, and that it was still existing under another name. On the eastern hill of the city, in the sacred

[1] "Essay on the Miracles recorded in Eccles. History," prefixed to translation of Fleury's *Eccles. Hist. to end of 4th Century*, Oxford, 1842.

[2] *The Holy City*, London, 1845.

[3] *Bell. Jud.*, v. 4, 2.

[4] Fergusson and Sandie place Hippicus at the northwestern angle of the modern wall, and thus include the existing church of the sepulchre within the first wall itself, but they have overlooked the assertion of the Jewish historian, that from the ravines which surrounded the latter it was almost impregnable. Bonar, while placing Hippicus somewhere near the same spot, does not define the locality, and Schwartz seeks to identify it with "a high rocky hill north of the so-called Grotto of Jeremiah" and far beyond the northern limits of the modern city.

[5] *Bell. Jud.*, v. 4, 1.

[6] It is of course quite possible to draw a line, as Lewin does, which, while it includes this pool, will yet exclude the existing church, but all probability seems opposed to such a route.

[7] Pierotti gives a detailed plan of the whole district in which the remains which he seeks to identify with the second wall occur (*Jerusalem Explored*, pl. xxx.). But from this it would seem extremely doubtful whether any of those ruins can be identified with a city wall, or should not merely be regarded as portions of detached buildings, the walls of which project, now to the east, now to the west, of the imagined line.

[8] Lord Nugent, *Lands Classical and Sacred*, London, 1845, ii. 47. These tombs have been described by Hepworth Dixon, in *Gentleman's Magazine*, March, 1877, and more fully by Clermont-Ganneau in *Quarterly Report* of the Palestine Exploration Fund, 1877, p. 76. In 1885 two additional sepulchral chambers were discovered in the same rock a little to the southeast of the present church, of which a plan and notices are given by Schick in *Zeitschrift des deutschen Palaestina-Vereins*, 1884, vol. viii. p. 171.

[9] 1 Kings ii. 34. [10] 1 Samuel xxv. 1.

[11] *Theophania*, Lee's translation, p. 199.

[12] Origen (*Cont. Cels.*, i. 51) speaks of Calvary as of a spot well known in his day (185–254).

[13] *Ancient Christianity*, 4th ed., London, 1844, ii. 277.

[14] Finlay (*Greece under the Romans*, p. 561) has argued that exact identification would be easy from the minute registration of property which prevailed in the Roman empire and extended to the provinces, by which the position of Golgotha and the property of Joseph of Arimathea might easily have been traced. But he seems to press his point too far (see Fallmerayer, *Golgotha und das heilige Grab*, 4to, Munich, 1852, p. 8).

Mohammedan enclosure of the Harám-es-Sherîf, and on a spot generally considered to have formed part of the temple area, stands the magnificent octagonal building called the Dome of the Rock, usually but erroneously believed to have been erected by the caliph 'Omar, and so popularly known as the mosque of 'Omar. The jealousy of the Moslems had, with rare exceptions, prevented up to quite recent times the intrusion of Christians within its sacred precincts, but it was known to have been erected over a large mass of native rock rising above the surface of the ground and having a cave within it. A section of the building, very roughly executed, was given in the *Travels of Ali Bey*, published in 1816 (vol. ii. p. 74); but in 1833 Mr. Catherwood, under the pretext of being a civil engineer in the employment of Mehemet Ali, and of examining into the structural condition of the building with a view to its repair, spent three weeks in examining it and its surroundings, of which he made elaborate drawings and sections. A general account of his investigations and their results, published in W. H. Bartlett's *Walks about the City and Environs of Jerusalem* (p. 148), led to Fergusson's getting access to those drawings, which confirmed him in the belief he had already begun to entertain from other sources, that the Dome of the Rock was originally a Christian edifice; and in the essay referred to he argued at great length and with much vigor on both architectural and historical grounds that it and the Golden Gateway—a walled-up entrance to the Harám from the east—were built in the time of Constantine; that the former was the church of the Anastasis, erected by that emperor over the tomb of our Lord, and the latter the entrance to the atrium of the great basilica described by Eusebius[1] as immediately adjoining; and that the transference of the site from the eastern to the western hill took place somewhere about the commencement of the 11th century, when, in consequence of the invasion of the Turks, the Christians were driven from the former hill for a time. This work was followed up by his article "Jerusalem" in Smith's *Dictionary of the Bible* and by several minor publications[2]; and the whole question was, with some modifications, reargued by him at great length in *The Temples of the Jews and the other Buildings in the Haram Area at Jerusalem* in 1878.

Though at first Fergusson's essay seemed to fall dead, it inaugurated a discussion which has within the last twenty years been carried on with much keenness. His views have been supported on architectural grounds by Unger,[3] and on general grounds by Sandie,[4] Smith,[5] and Langlois,[6] while among the multitude of his opponents may be specially noted Williams,[7] Lewin,[8] the Abbé Michon,[9] De Vogué,[10] Pierotti,[11] Sir Charles Warren,[12] and Captain Conder.[13]

The architectural arguments in favor of Fergusson's theory have forced Lewin, one of his most strenuous opponents, to argue that the Dome of the Rock may have been a temple to Jupiter erected by Hadrian, which he imagines may have been restored or rebuilt by Maximin Daza, the successor of Diocletian.[14] But they must be studied in Fergusson's own works or in that of Unger above referred to. The topographical objections are mainly founded on the necessity of restricting the Jewish temple to the southeastern corner of the Harám, the site, however, assigned to it by Lewin himself and Thrupp,[15] and on the difficulty of supposing a place of interment so near the sacred building. But Josephus, at the time of the siege, speaks of the "monuments of King Alexander," whatever that may mean, existing just over against or in front of the north colonnade of the temple.[16]

As regards the historical argument, it would certainly appear that up to the close of the 6th century the balance of evidence is in favor of the eastern site. The narrative of the Pilgrim of Bordeaux[17] may perhaps be read as supporting either view. But Antoninus Martyr,[18] and Theodosius[19] can hardly be reconciled with the existing location; in two manuscripts of the latter[20] the writer believed that the same hill witnessed in succession the offering of Isaac, the vision of the angel at Araunah's threshing floor, the building of the temple, and the death and resurrection of our Lord. Many more passages might be quoted from writers of this period testifying to the belief that the hill that witnessed the offering of Isaac witnessed also the resurrection of Christ, and many others identifying the scene of the offering of Isaac with the hill on which the temple was built. Perhaps the strongest point in this connection against Fergusson is that so striking a fact as the identity of the hill of the Passion with that on which the temple stood should only be directly spoken to by a single writer. After the 9th century the historical evidence becomes more difficult to interpret. Fergusson would date the transference of the site about 1000; but it seems clear from Istakhri (978)[21] and Mokaddasi (987),[22] both of whom were unknown to him, that before their days the Dome of the Rock was a Mohammedan place of worship, and the latter expressly states that it was suggested by a great Christian church.[23] The natural date to assign for such a transference would be about 614, when the city was captured by the Persians, and, to quote the carefully guarded narrative of Gibbon, "the sepulchre of Christ and the stately churches of Helena and Constantine were consumed, or at least damaged by the flames." The buildings were repaired or rebuilt by Modestus a few years later, and their praises are sung by Sophronius, his successor in the patriarchate, but in terms which give little topographical information. Sophronius lived to see the capture of the city by 'Omar in 636, the earliest records of whose doings as yet available are the brief one of Theophanes (818) and the more lengthened one of Eutychius (937). From both of these it seems clear that the caliph confirmed the Christians in the possession of the sites (whatever these might be) which he found in their hands. In or about 670 the French bishop Arculph visited Jerusalem, and under the hand of Adamnanus we have a detailed account taken down from his lips,[24] and a plan of the church of the Resurrection as he saw it, which strikingly corresponds to the Dome of the Rock,—as, however, it necessarily would correspond with any church which had been erected in close imitation of that building.[25] There are passages,

1 *Vita Const.*, iii. 39.
2 *Notes on the Site of the Holy Sepulchre at Jerusalem*, London, 1861, and *The Holy Sepulchre and the Temple at Jerusalem*, London, 1865.
3 *Die Bauten Constantin's am heiligen Grabe*, Göttingen, 1863.
4 *Horeb and Jerusalem*, Edinburgh, 1864.
5 *The Temple and the Sepulchre*, London, 1865.
6 *Un Chapitre inédit de la Question des Lieux Saints*, Paris, 1861.
7 *The Holy City*, 2d ed., 2 vols., London, 1849.
8 *The Siege of Jerusalem by Titus*, etc., London, 1863.
9 *Voyage religieux en Orient*, 2 vols., Paris, 1854.
10 *Le Temple de Jérusalem*, fol., Paris, 1864–65.
11 *Jerusalem Explored*, 2 vols. fol., London, 1864.
12 *The Temple and the Tomb*, London, 1880.
13 Various papers in the *Quarterly Statement* of Palestine Exploration Fund.
14 *Archæologia*, xli. p. 157. Sepp has latterly tried to show that it was built by Justinian—*Die Felsenkuppel, eine Justinianische Sophienkirche, und die übrigen Tempel Jerusalems*, Munich, 1882.
15 *Ancient Jerusalem*, Cambridge, 1855.
16 *Bel. Jud.*, v. 5, § 3. Sandie's attempt (*Horeb and Jerusalem*, p. 259) to minimize this difficulty by supposing a rocky valley to have run up from the valley of Jehoshaphat westwards at this point, and so to have divided the temple from the tomb, seems inadmissible. Modern investigation shows that such a valley, or rather depression, did exist, but north, not south, of the Dome of the Rock.
17 *Itinera Latina* (Soc. de l'Or. Lat.), Geneva, 1879, i. pp. 16–18.
18 *Ib.*, pp. 100–106.
19 *Ib.*, pp. 63–66.
20 The Louvain and British Museum MSS., see *Notes and Queries*, 27th January, 1877.
21 *Bibl Geog. Arab.*, ed. De Goeje, Leyden, 1870–71, i. p. 56 *sq.*
22 *Ib.*, iii. p. 165 *sq.*
23 *Ib.*, iii. p. 159.
24 *Itin. Lat.* (Soc. de l'Or. Lat.), 1879, i. pp. 141–202.
25 The view that at the time when Arculph wrote the Dome of the Rock was in the hands of the Mohammedans seems strengthened by the well-known Cufic inscription which still runs round

however, in Arculph descriptive of the city very difficult to understand unless on the assumption that the transference of Sion, which had hitherto (see JERUSALEM) been identified with the eastern hill, had already in his time taken place. The next pilgrim who has left us a record is Willibald,[1] who visited the city early in the 8th century, and whose description applies on the whole better to the western than the eastern site; but, on the other hand, that of Bernard,[2] who travelled about 870, applies better to the eastern than to the western. If the transference can be supposed to have taken place at the time of the Persian invasion, one of the main difficulties in the adoption of Fergusson's theory will be greatly lessened, for the intervening period of more than 450 years would go far to explain how the crusaders, on gaining possession of the city in 1099, failed to make it their first business to revert to the original site. On the whole, the question is one which can hardly be satisfactorily determined until the Arabic authorities on the subject have been duly scrutinized, and as yet we have practically access to none earlier than the two above referred to.[3]

Within the last few years a third locality has been suggested. In 1878, Captain Conder, in his *Tent Work in Palestine* (i. pp. 372–376), expressed a strong conviction that the real site was to be found on a rocky knoll outside the northern wall, and close to the cave known as "Jeremiah's Grotto." He argued that not only did this locality meet the requirements of the Gospel narratives, being outside the city and near one of the great roads leading from the country, but that in this direction lay "the great cemetery of Jewish times" as testified by "the sepulchre of Simon the Just preserved by Jewish tradition," and the monument of Helena, "fitted with a rolling stone such as closed the mouth of the Holy Sepulchre." Here also, by early Christian tradition, had been the scene of the martyrdom of Stephen, which doubtless occurred at the place of public execution, and to this day, according to Dr. Chaplin, the Jews designate the knoll "by the name Beth has-Sekilah, 'the place of stoning' (domus lapidationis), and state it to be the ancient place of public execution mentioned in the Mishnah." The hill itself appears to present a striking resemblance to a human skull, and so to associate itself with the word "Golgotha." The adoption of this site by Dr. Chaplin, the Rev. S. Merrill, Schick, and perhaps especially by the late General Gordon,[4] has aided in giving it a considerable popularity. It is, however, a purely conjectural location, and involves the assumption that all the Christian writers from the 4th century downwards, as well as the mother of Constantine, were in error as to the real site.

(A. B. M'G.)

SEQUESTRATION. See BANKRUPTCY.

SEQUOIA, a genus of conifers, allied to *Taxodium* and *Cryptomeria*, forming one of several surviving links between the firs and the cypresses. The two species usually placed in this group are evergreen trees of large size, indigenous to the west coast of North America. Both bear their round or ovoid male catkins at the ends of the slender terminal branchlets; the ovoid cones, either terminal or on short lateral twigs, have thick woody scales dilated at the extremity, with a broad disk depressed in the centre and usually furnished with a short spine; at the base of the scales are from three to seven ovules, which become reversed or partially so by compression, ripening into small angular seeds with a narrow wing-like expansion.

The redwood of the Californian woodsmen, *S. sempervirens*, which may be regarded as the typical form,

Sequoia sempervirens.—*a*, green cones and catkin; *b*, section of cone; *c*, scale of cone.

abounds on the Coast Range from the southern borders of the State northwards into Oregon, and, according to De Candolle, as far as Nootka Sound. It grows to a gigantic size: a trunk has been recorded 270 feet in length, and a greater height is said to be occasionally reached, while a diameter of from 12 to 15 feet is sometimes attained at the base. In old age the huge columnar trunk rises to a great height bare of boughs, while on the upper part the branches are short and irregular. The bark is red, like that of the Scotch fir, deeply furrowed, with the ridges often much curved and twisted. When young the tree is one of the most graceful of the conifers: the stem rises straight and tapering, with somewhat irregular whorls of drooping branches, the lower ones sweeping the ground,—giving an elegant conical outline. The twigs are densely clothed with flat, spreading linear leaves, of a fine glossy green above and glaucous beneath; in the old trees they become shorter and more rigid, and partly lose their distichous habit. The globular brown catkins appear early in June; the cones, from 1 to 2

the colonnade of that building, and a complete translation of which by the late Professor Palmer will be found in the *Quarterly Report* of the Palestine Exploration Fund (1871, p. 164) and Fergusson's *Temples of the Jews* (p. 269). In it the construction of the dome of the building is dated 72 A.H. (691), but the name of the builder, which clearly was Abd-el-Melek in the original, has been erased, and that of Abdallah el-Mamún (198 A.H.; 813) fraudulently substituted, "the short-sighted forger," as Palmer calls him, having omitted to change the date as well as the name. In this inscription there is very special mention made of our Saviour, and in a way which seems inexplicable unless the building on which it was inscribed had been, in the mind of the writer, associated in some important respects with the history of Jesus. And the tradition that it was so continued long after; for we find Theoderic so late as 1176 writing of it, "Hoc templum, quod nunc videtur, ad honorem Domini nostri Jesu Christi ejusque piæ genetricis ab Helena regina et ejus filio, imperatore Constantino, constructum est" (ed. Tobler, St. Gall, 1865, p. 46). Fergusson believes this inscription to have been written in the 12th century, but is obliged to admit that the alphabet employed is identical with that found on the coins of Abd-el-Melek (*Temples of the Jews*, p. 24). A facsimile of the sentence containing the date and the forgery will be found in the Rev. Isaac Taylor's *The Alphabet* (London, 1883, i. p. 322).

[1] *Itin. Lat.* (Soc. de l'Or. Lat.), 1879, i. pp. 244–297.

[2] *Itin. Lat.* (Soc. de l'Or. Lat.), 1879, i. pp. 309–320.

[3] Palmer in the chapter contributed by him (mainly from Arabic sources) to *Jerusalem, the City of Herod and Saladin* (by W. Besant and E. H. Palmer, London, 1871), has failed to give, with rare exceptions, any clue to the date of the writers whose statements he embodied.

[4] *Reflections in Palestine*, London, 1884, pp. 1–3. See also *Quarterly Report* of Palestine Exploration Fund for 1883, p. 69; and Sir J. W. Dawson's *Egypt and Syria, their Physical Features in Relation to Bible History*, London, 1885, pp. 85–95, where two illustrations of the hill are given.

inches long, are at first of a bluish green color, but when mature change to a reddish brown; the scales are very small at the base, dilating into a broad, thick head, with a short curved spine below the deep transverse depression. The redwood forms woods of large extent on the seaward slope of the Coast Range, and occurs in isolated groups further inland. From the great size of the trunk and even grain of the red cedar-like wood it is a valuable tree to the farmer and carpenter: it splits readily and evenly, and planes and polishes well; cut radially, the medullary plates give the wood a fine, satiny lustre; it is strong and durable, but not so elastic as many of the western pines and firs. In England the tree grows well in warm situations, but suffers much in severe winters, its graceful form rendering it ornamental in the park or garden, where it sometimes grows 30 or 40 feet in height; its success as a timber tree would be doubtful. In the eastern parts of the United States it does not flourish. Discovered by Menzies in the end of the 18th century, it has long been known in British nurseries under the name of *Taxodium sempervirens*.

The only other member of the genus is the giant tree of the Sierra Nevada, *S. gigantea*, the largest of known conifers; it is confined to the western portion of the great Californian range, occurring chiefly in detached groups locally called "groves," at an altitude of from 4000 to 5000 feet above the sea. The leaves of this species are awl-shaped, short and rigid, with pointed apex; closely adpressed, they completely cover the branchlets. The male catkins are small, solitary, and are borne at the ends of the twigs; the cones are from 1½ to 3 inches long, ovoid, with scales thicker at the base than those of the redwood, and bearing below the depression a slender prickle. The young tree is more formal and rigid in growth than *S. sempervirens*, but when old the outline of the head becomes cylindrical, with short branches sparsely clad with foliage sprays. The bark, of nearly the same tint as that of the redwood, is extremely thick, and is channelled towards the base with vertical furrows; at the root the ridges often stand out in buttress-like projections. Some of these vast vegetable columns are upwards of 30 feet in diameter, and a few have attained a height of 400 feet or more.

The famous group known as the Mammoth Grove of Calaveras in California, containing above ninety large trees, stands in 38° N. lat., about 4370 feet above the sea, between the San Antonio and Stanislaus rivers. According to Vischer, it was discovered by a hunter in pursuit of a bear in 1852, but had apparently been visited before, as the date 1850 is cut on one of the trees. The bark of one of the finest trunks was foolishly stripped off to the height of 116 feet, and exhibited in New York and London; it now stands in the Crystal Palace, Sydenham. The tree, known as the "mother of the forest," soon died; at the base it measured 90 feet in girth, and the dead tree was 321 feet high; a prostrate trunk in the neighborhood is 18 feet in diameter 300 feet from the base. Some trees in the Mariposa grove rival these in size: one measures 101 feet round the root, and a cut stump is 31 feet in diameter. Gigantic as these trees are and imposing from their vast columnar trunks, they have little beauty, owing to the scanty foliage of the short rounded boughs; some of the trees stand very close together; they are said to be about 400 in number. Some are of vast age, perhaps 3000 years or more; they appear to be the remains of extensive woods belonging to a past epoch, and probably have been in distant time much injured by forest fires. The growth of the "mammoth tree" is fast when young, but old trees increase with extreme slowness. The timber is not of great value, but the heartwood is dense and of deeper color than that of *S. sempervirens*, varying from brownish red to very deep brown; oiled and varnished, it has been used in cabinet work. *S. gigantea* was brought to England by Lobb in 1853, and received from Dr. Lindley the name of *Wellingtonia*, by which it is still popularly known, though its affinity to the redwood is too marked to admit of generic distinction. In America it is sometimes called *Washingtonia*. In the Atlantic States it does not succeed; and, though nearly hardy in Great Britain, it is planted only as an ornament of the lawn or paddock. It is never likely to acquire any economic importance in Europe.

(C. P. J.)

SERAIEVO. See Bosna Serai.

SERAING, a town of Belgium, stretching nearly a mile along the right bank of the Meuse, across which a suspension bridge connects it with Jemeppe, 3 miles southwest of Liége. It has one of the largest manufactories of machinery on the Continent, founded by John Cockerill, an Englishman, in 1817, on the site of the former palace of the prince-bishops of Liége. Including offices, the works extend over 270 acres, employ 11,000 hands, and the annual value of their products is more than 45,000,000 francs. Down to 1882 they had turned out 52,600 engines or pieces of machinery, including the first locomotive engine built on the Continent (1835). After Cockerill's death in 1840, the works were purchased by "La John Cockerill Société." A monument was erected to his memory in 1871. The population, which numbered but 2226 in 1827, amounted to 24,315 in 1877, and is now (1886) estimated at about 27,500.

SERAMPUR, a town of British India, in Hugli (Hooghly) district, Bengal, situated on the right bank of the Hugli river, 13 miles by rail north of Calcutta, in 22° 45′ 26″ N. lat. and 88° 23′ 10″ E. long. It was formerly a Danish settlement, and remained so until 1845, when all the Danish possessions in India were ceded by treaty to the East India Company. Serampur is famed as the residence of a body of Protestant Baptist missionaries, who made it the centre of their Christianizing efforts. At the census of 1881 the population of the town was 25,559 (13,137 males and 12,422 females).

SERAPHIM. In the vision of Isaiah vi. the throne of God is surrounded by seraphim,—figures apparently human (ver. 6), but with six wings, which constantly proclaim the *trisagion*. The seraphim are not again mentioned in the Bible; but in a later Jewish theology they are taken to be a class of angels. As the whole vision of Isaiah is symbolical, the seraphim also are in this connection symbolical figures, aiding the delineation of Jehovah's awful holiness. But the imagery is probably borrowed from some popular conception analogous to that of the Cherubim (*q.v.*). The name is sometimes explained to mean "lofty ones," after the Arabic *sharufa* (Gesenius); but if it has a Hebrew etymology it must signify "burning ones" ("consuming," not "fiery"), so that in Isaiah's vision the seraphim will mean the same thing as the "devouring fire" of God's holiness (Isa. xxxiii. 14). But this, again, is a spiritual interpretation of the old Hebrew conception that Jehovah appears in the thunderstorm (Judges v. 4; Ps. xviii., xxix.) escorted by thunderbolts (*resheph*, Hab. iii. 5). Among the Phœnicians Resheph is a god (*C. I. S.*, i. 38), probably identical with the Arabian divine archer Kozaḥ, who shoots lightnings. In prophetic monotheism such mythological conceptions could only survive as personifications of the natural phenomena attending a theophany.

In Num. xxi. 6 *sq.* the word "seraphim" is used of a kind of serpents, not "fiery serpents" (A. V.) but burning, *i. e.*, poisonous ones (comp. *hēmah*, "glowing heat," "venom"). In Isa. xiv. 29 and xxx. 6 the singular *saraph* occurs with the epithet "flying," and from the second passage we see that such flying serpents were supposed to inhabit the desert between Palestine and Egypt; comp. Herod. ii. 75 and the white flying serpents in an Arabian legend (*Agh.*, xx. 135, 30).

SERAPIS, or Sarapis, in the Leyden papyrus Ὀσαράπις, *i.e.*, Osiris-Apis, apparently meaning the dead Apis worshipped as Osiris (see Apis), and so as lord of the underworld, was the name under which the Egyptian priests consulted by Ptolemy Soter incorporated with the old religion the Greek worship of Hades. The statue with the attributes of Hades which they professed to identify as Serapis (a name which had till then played no prominent part in Egyptian religion) was brought by the king from Sinope to Alexandria in consequence, it was given out, of a revelation granted to him in a dream (Plut., *Is. et Os.*,

28). The real object of Ptolemy was to provide a mixed Greek and Egyptian religion for his mixed subjects, especially in Alexandria; the true Egyptians disliked the innovation, and no Serapeum or Serapis temple was admitted within the walls of Egyptian cities (Macrob., i. 7, 14). Thus the great Serapeum at Memphis lay outside the town (Strabo, xvii. 1, 32), where its ruins were laid bare by Mariette in 1850. From papyri found on the spot it is known that a sort of monastery was connected with this and other Serapea. The so-called Egyptian Serapeum or series of Apis graves excavated in the rock near the Greek Serapeum is distinct and belongs to the old religion, though the old Osiris worship was gradually transferred to Serapis. The cult of Serapis also spread largely in the Græco-Roman world. Egyptian monasticism seems to have borrowed something from the monks of Serapis, and the Egyptian Christians were accused of worshipping Serapis as well as Christ (*Vita Saturnini*, 8), perhaps because they identified the god who is represented bearing a corn-measure on his head with the Biblical Joseph; see Firmicus Maternus, c. 13, and Suidas, *s.v.* Σάραπις.

SERENA, a city of Chili, capital of the province of Coquimbo, is situated on an elevated plain on the south side of the river Coquimbo, about 5 miles from the sea, in 29° 54′ S. lat. and 71° 13′ W. long. The original town was founded by Juan Bohon in 1544, on the opposite side of the river, and called by him Serena, after the town of that name in Spanish Estremadura, the birthplace of his chief, Pedro de Valdivia. Being shortly after destroyed by the Indians, it was rebuilt on its present site by Francisco de Aguirre in 1549. Serena is the seat of a bishopric embracing the whole of Chili to the north, and of a court of appeal the jurisdiction of which extends to the province of Atacama. The town is well supplied with water. The principal edifice is the cathedral (1844–60) built of a light porous stone, 216 feet long and 66 broad. The town contains eight other churches, an excellent lyceum, a theatre, an episcopal palace, and several convents and charitable institutions. It is connected by rail with its port 9 miles to the southwest, and with the Tamaya copper-mines. A narrow-gauge line up the Elqui valley was opened in 1883. Brewing has recently become an important industry. The population of Serena was 12,293 in 1875, or, including the suburbs of the Pampa (Alta and Baja) 14,403.

SERENUS OF ANTISSA, an ancient Greek geometer, the author of two treatises—*De Sectione Cylindri et Coni, libri duo*—which Halley has published in Greek and Latin along with his edition of the *Conics* of Apollonius of Perga. Great difference of opinion has existed as to his date: Halley says in his preface to the *Conics*, "We know nothing of Serenus except that he was born at Antissa, a town in the island of Lesbos; and that, besides his book *On the Section of the Cylinder*, and another *On the Section of the Cone*, he wrote commentaries on Apollonius; and that he lived before Marinus—the pupil of Proclus—as appears from the preface of Marinus to the *Data* of Euclid." Montucla says vaguely that Serenus lived within the first four centuries of the Christian era. Chasles places him about the same time as Pappus. Bretschneider pointed out that Antissa was completely destroyed by the Romans in 167 B.C., and inferred thence that Serenus lived *c.* 220–180 B.C. To this inference it has been fairly objected by Cantor, after F. Blass, that the name Serenus is Latin and that Antissa had been rebuilt at the time of Strabo. The statement of Halley that "he lived before Marinus" has been since repeated by many writers; but Heiberg has pointed out (*Rev. Crit. d'Hist. et de Litt.*, 1881, p. 381) that the passage referred to in support of this statement is faulty, and that the name of Serenus is certainly not to be found in it. Th. H. Martin, in his edition of the *Astronomy* of Theon of Smyrna (Paris, 1849), has published a fragment which in the MS. follows the text of Theon and is headed *From the Lemmas of the Philosopher Serenus*. This is unquestionably the same as Serenus of Antissa, to whom this appellation "philosopher" is given in the titles of the two treatises edited by Halley. No conclusion, however, can be drawn from this as to the date of Serenus, for the extract is not given by Theon but by an anonymous scholiast. M. Paul Tannery in an elaborate paper (*Bull. des Sc. Math. et Astron.*, 2d series, vii., 1883) has shown from the character of Serenus's writings that he lived long after the brilliant period of Greek mathematics, and that he must be placed chronologically between Pappus and Hypatia, consequently in the 4th century. This determination of the date of Serenus is accepted by Cantor (*Zeitschrift für Math. und Phys.*, August, 1885, p. 124).

In the treatise *On the Section of the Cone*, which is the less important of the two books, Serenus, as he tells us in the preface, was the first to take up the particular branch of that subject with which he deals. In it he treats of the area of a triangle formed by cutting a cone, right or scalene, on a circular base by a plane through the vertex. He shows how "to cut a right cone whose axis is not less than the semidiameter of the base by a plane through the vertex so that the triangle thus formed shall be equal to a given triangle" (Prop. 8), or "a maximum" (Prop. 13). He then considers the case of the scalene cone, solves the problem "to cut a given scalene cone by a plane through the vertex so as to form an isosceles triangle" (Prop. 21), and shows that, "of the triangles which are formed by cutting a scalene cone through the axis, the greatest is the isosceles, the least that which is at right angles to the base of the cone; of the rest, however, that which is nearer the greatest is greater than one more remote" (Prop. 22). The general questions for a scalene cone, corresponding to the problems for the right cone (Props. 8 and 13), and which depend on solid loci for their solution, are not attempted. These have been solved by Halley in his edition of Serenus, p. 68 *sq.*

In his preface to the treatise *On the Section of the Cylinder*, Serenus tells us that many geometers of his time supposed that the transverse sections of a cylinder were different from the elliptic sections of a cone, that he thought it right to refute this error and to prove that these sections were of the same kind. Having established this in a series of theorems ending with Prop. 18, he shows in Prop. 19 that "it is possible to exhibit a cone and a cylinder cutting one another in one and the same ellipse." He then solves problems such as—"given a cone (cylinder) and an ellipse on it, to find the cylinder (cone) which is cut in the same ellipse as the cone (cylinder)" (Props. 20, 21); "given a cone (cylinder), to find a cylinder (cone), and to cut both by one and the same plane so that the sections thus formed shall be similar ellipses" (Props. 22, 23); "given a cylinder cut in an ellipse, to construct a cone having the same base and altitude as the cylinder, so that the section of it by the same plane is an ellipse similar to the ellipse of the cylinder" (Prop. 25). In Props. 26–29 he shows how to cut a scalene cylinder or cone in an infinite number of ways by two planes—which are not parallel—so as to form similar ellipses (subcontrary sections). He then gives some theorems: "all the straight lines drawn from the same point to touch a cylindrical surface, on both sides, have their points of contact on the sides of a single parallelogram" (Prop. 31); "all the straight lines drawn from the same point to touch a conical surface, on both sides, have their points of contact on the sides of a single triangle" (Prop. 34). This last is proved by means of Prop. 33, where we find, indirectly stated, the property of an harmonic pencil.

SERES, SERRES, or SIROS, a town of Turkey in Europe, now at the head of a sanjak in the vilayet of Saloniki, is situated in the valley of the Strymon (Karasu), in a district so fertile as to bear among the Turks the name of Altin Ovassi or Golden Plain, and so thickly studded with villages as to have, when seen from the heights of Rhodope, the appearance of a great city with extensive gardens. The principal buildings are the Greek archiepiscopal palace, the Greek cathedral, restored since the great fire of 1879, by which it was robbed of its magnificent mosaics and woodwork, the Greek gymnasium and hospital (the former built of marble), the richly endowed Eski Jami, and the ruins of the once no less flourishing Ahmed Pasha or Aghia Sophia mosque, whose revenues used to be derived from the Crimea. On a hill above the town are the ruins of a fortress described in a Greek inscrip-

tion as a "tower built by Helen in the mountainous region." Cloth-factories and tanneries are the chief industrial establishments and lignite mines are worked in the neighborhood with some success. The population is 30,000.

Seres is the ancient Scris, Sire, or Sirrhæ, mentioned by Herodotus in connection with Xerxes's retreat, and by Livy as the place where Æmilius Paulus received a deputation from Perseus. In the 14th century, when Stephen Dushan of Servia assumed the title emperor of Servia, etc., he chose Sirrhæ as his capital; and it remained in the hands of the Servians till its capture by Sultan Murad. In 1396 Bayazid summoned his Christian vassals to his camp at Sirrhæ.

SERFDOM. See SLAVERY.

SERGHIEVSKIY POSAD, or TROITZE-SERGHIEVSK, a town of Russia, in the government of Moscow, which has grown up round the monastery of Troitze-Serghievskaya Lavra, 44 miles by rail to the northeast of Moscow. It is situated in a beautiful country, intersected by pleasant little valleys and varied with woods, the buildings extending partly over the hill occupied by the monastery and partly over the valley below. Including the extensive Kukuevsk suburbs, it had in 1884 31,400 inhabitants. There are several lower-grade schools, an infirmary for old women, and a school for girls. Numerous inns and hotels, some maintained by the monastery and others a rich source of revenue to it, accommodate the numerous pilgrims. Serghievsk has long been renowned for its manufactures of holy pictures (painted and carved), spoons, and a variety of other articles carved in wood, especially toys, sold to pilgrims. Within the last twenty years this industry has greatly developed; separate parts of certain toys are made elsewhere and brought to Serghievsk, where no fewer than 330 workshops, employing 1055 hands, with an annual production valued at more than £30,000 [$145,800], supply the finished article. Several other petty industries are carried on both in the town and in the neighboring villages.

The Troitsk monastery is the most sacred place in middle Russia, the Great Russiaus regarding it with more veneration than even the cathedrals and relics of the Kremlin of Moscow. It occupies a picturesque site on the top of a hill, protected on two sides by deep ravines and steep slopes. The walls, 25 to 50 feet in height, are fortified by nine towers, one of which, the Pyatnitsk, has been for some time a prison for both civil and ecclesiastical offenders. Eleven churches, including the Troitskiy (Trinity) and Uspenskiy cathedrals, a lofty bell-tower, a theological academy, various buildings for monks and pilgrims, and a hospital stand within the precincts, which are nearly two-thirds of a mile in circuit. A small wooden church, erected by the monk Sergius, and afterwards burned by the Tatars, stood on the site now occupied by the cathedral of the Trinity, which was built in 1422, and contains the relics of Sergius, as well as a holy picture which has frequently been brought into requisition in Russian campaigns. The Uspenskiy cathedral was erected in 1585; close beside it are the graves of Boris Godunoff and his family. In the southern part of the monastery is the church of Sergius, beneath which are spacious rooms where 200,000 dinners are distributed gratis every year to the pilgrims. The bell-tower, 290 feet high, has a bell weighing 137½ tons. Several monasteries of less importance occur in the neighborhood. The site now occupied by the Troitsk monastery was in the 14th century covered with impenetrable forests. In 1337 two brothers, Barthelemy and Stefan, sons of a Rostoff *boiar*, erected a church on the spot. The elder (born in 1314) took monastic orders under the name of Sergius, erected cells by the church, and became widely famous among the peasants around. The Moscow princes also showed great respect for the chief of the new monastery. Dmitri Joannovich Donskoi received the benediction of Sergius before setting out on the Tatar expedition which terminated in the victory of Kulikovo, and afterwards accepted the advice and help of the monk in his dealings with the prince of Ryazan. Sergius lived a life of diligence and simplicity, and declined to accept the office of metropolitan of Moscow. His monastery acquired great fame and became the wealthiest in middle Russia. Ivan the Terrible in 1561 made it the centre of the ecclesiastical province of Moscow. During the Polish invasion at the beginning of the 17th century it organized the national resistance, and supplied the combatants with money and food. In 1608–9 it withstood a sixteen months' siege by the Poles; at a later date the monks took a lively part in the organization of the army which crushed the outbreak of the peasants. In 1653 and 1689 Peter I. took refuge here from the revolted *streltzi*. The theological seminary, founded in 1744 and transformed in 1814 into an academy, reckons Platon and Philarete among its pupils.

SERGIUS I., pope from 687 to 701, came of an Antiochene family which had settled at Palermo, and owed his election as Conon's successor to skilful intrigues against Paschalis and Theodorus, the other candidates. In the second year of his pontificate he baptized King Ceadwalla of Wessex at Rome. For rejecting certain canons of the Trullan (Quinisext) council of 692, Justinian II. commanded his arrest and transportation to Constantinople, but the militia of Ravenna and the Pentapolis forced the imperial protospatharius to abandon the attempt to carry out his orders. Sergius was followed by John VI. as pope.

SERGIUS II., pope from 844 to 847, a Roman of noble birth, elected by the clergy and people to succeed Gregory IV., was forthwith consecrated without waiting for the sanction of the emperor Lothair, who accordingly sent his son Louis with an army to punish the breach of faith. A pacific arrangement was ultimately made, and Louis was crowned king of Lombardy by Sergius. In this pontificate Rome was ravaged and the churches of St. Peter and St. Paul robbed, by Saracens (August, 846). Sergius was succeeded by Leo IV.

SERGIUS III. succeeded Pope Christopher in 904, and reigned till 911. His pontificate, so far as is known, was remarkable for nothing but the rise of the "pornocracy" of Theodora and her daughters. Sergius restored the Lateran palace, which had been shattered by an earthquake. After him Anastasius III. sat on the pontifical throne.

SERGIUS IV., pope from 1009 to 1012, originally bore the name of Peter, and is said to have been the first to change his name on accession to the pontificate. He was a mere tool in the hands of the feudal nobility of the city (see ROME); he was succeeded by Benedict VIII.

SERGIUS, ST. The Eastern and Western Churches celebrate the martyrs Sergius and Bacchus, Roman officers who suffered under Maximian, on 7th October. Both were martyred in Syria, Sergius at Roṣáfa (Raṣíftá, Roṣáfat Hishám) near Rakka. Sergius was a very famous saint in Syria and Christian Arabia (comp. what is related of Chosroes II. in vol. xviii. p. 625); and Roṣáfa, which became a bishop's see (Le Quien, *Or. Chr.*, ii. 951), took the name of Sergiopolis, and preserved his relics in a fortified basilica. The church was adorned and the palace further strengthened by Justinian (Procopius, *Æd.*, ii. 9).

SERIEMA, or CARIAMA,[1] a South-American bird, sufficiently well described and figured in Maregrave's work (*Hist. Rer. Nat. Brasiliæ*, p. 203), posthumously published by De Laet in 1648, to be recognized by succeeding ornithologists, among whom Brisson in 1760 acknowledged it as forming a distinct genus *Cariama*, while Linnæus regarded it as a second species of *Palamedea* (see SCREAMER, vol. xxi. p. 578), under the name of *P. cristata*, Englished by Latham in 1785 (*Synopsis*, v. p. 20) the "Crested Screamer,"—an appellation, as already observed, since transferred to a wholly different bird. Nothing more seems to have been known of it in Europe till 1803, when Azara published at Madrid his observations on the birds of Paraguay (*Apuntamientos*, No. 340), wherein he gave an account of it under the name of "Saria," which it bore among the Guaranis,—that of "Cariama" being applied to it by the Portuguese settlers, and

[1] In this word the initial C, as is usual in Portuguese, is pronounced soft, and the accent laid upon the last syllable.

both expressive of its ordinary cry.[1] It was not, however, until 1809 that this very remarkable form came to be autoptically described scientifically. This was done by the elder Geoffroy St.-Hilaire (*Ann du Muséum*, xiii. pp. 362–370, pl. 26), who had seen a specimen in the Lisbon museum; and, though knowing it had already been received into scientific nomenclature, he called it anew *Microdactylus marcgravii*. In 1811 Illiger, without having seen an example, renamed the genus *Dicholophus*—a term which, as before stated (ORNITHOLOGY, vol. xviii. p. 49, note 1), has since been frequently applied to it—placing it in the curious congeries of forms having little affinity which he called *Alectorides*. In the course of his

Seriema.

travels in Brazil (1815–17), Prince Max of Wied met with this bird, and in 1823 there appeared from his pen *N. Act. Acad. L.-C. Nat. Curiosorum*, xi. pt. 2, pp. 341–350, tab. xlv.) a very good contribution to its history, embellished by a faithful life-sized figure of its head. The same year Temminck figured it in the *Planches Coloriées* (No. 237). It is not easy to say when any example of the bird first came under the eyes of British ornithologists; but in the Zoological *Proceedings* for 1836 (pp. 29–32) Martin described the visceral and osteological anatomy of one which had been received alive the preceding year.[2]

The Seriema, owing to its long legs and neck, stands some two feet or more in height, and in menageries bears itself with a stately deportment. Its bright red beak, the bare greenish blue skin surrounding its large yellow eyes, and the tufts of elongated feathers springing vertically from its lores, give it a pleasing and animated expression; but its plumage generally is of an inconspicuous ochreous gray above and white beneath,—the feathers of the upper parts, which on the neck and throat are long and loose, being barred by fine zigzag markings of dark brown, while those of the lower parts are more or less striped. The wing-quills are brownish black, banded with mottled white, and those of the tail, except the middle pair, which are wholly grayish brown, are banded with mottled white at the base and the tip, but dark brown for the rest of their length. The legs are red. The Seriema inhabits the *campos* or elevated open parts of Brazil, from the neighborhood of Pernambuco to the Rio de la Plata, extending inland as far as Matto Grosso (long. 60°), and occurring also, though sparsely, in Paraguay. It lives in the high grass, running away in a stooping posture to avoid discovery on being approached, and taking flight only at the utmost need. Yet it builds its nest in thick bushes or trees at about a man's height from the ground, therein laying two eggs, which Prof. Burmeister likens to those of the Land-Rail in color.[3] The young are hatched fully covered with gray down, relieved by brown, and remain for some time in the nest. The food of the adult is almost exclusively animal,—insects, especially large ants, snails, lizards, and snakes; but it also eats certain large red berries.

Until 1860 the Seriema was believed to be without any near relative in the living world of birds[4]; but in the Zoological *Proceedings* for that year (pp. 334–335) Dr. Hartlaub described an allied species discovered by Prof. Burmeister in the territory of the Argentine Republic.[5] This bird, which has since been regarded as entitled to generic division under the name of *Chunga burmeisteri* (*P.Z.S.*, 1870, p. 466, pl. xxxvi.), and seems to be known in its native country as the "Chunnia," differs from the Seriema by frequenting forest or at least bushy districts. It is also darker in color, has less of the frontal crest, shorter legs, a longer tail, and the markings beneath take the form of bars rather than stripes. In other respects the difference between the two birds seems to be immaterial.

There are few birds which have more exercised the taxonomer than this, and the reason seems to be plain. The Seriema must be regarded as the not greatly modified heir of some very old type, such as one may fairly imagine to have lived before many of the existing groups of birds had become differentiated. Looking at it in this light, we may be prepared to deal gently with the systematists who, having only the present before their eyes, have relegated it positively to this, that, or the other Order, Family, or other group of birds. There can be no doubt that some of its habits point to an alliance with the BUSTARD (vol. iv. p. 515) or perhaps certain Plovers (see PLOVER, vol. xix. p. 239), while its digestive organs are essentially, if not absolutely, those of the HERON (vol. xi. p. 679). Its general appearance recalls that of the SECRETARY-BIRD (*supra*, p. 648); but this, it must be admitted, may be merely an analogy and may indicate no affinity whatever. On the one hand we have authorities, starting from bases so opposed as Prof. Parker (*P.Z.S.*, 1863, p. 516) and Sundevall, placing it among the *Accipitres*,[6] while on the other we have Nitzsch, Prof. Burmeister,[7] Martin (*ut supra*), and Dr. Gadow (*Journ. f. Ornithologie*, 1886, pp. 445, 446) declaring in effect that this view of its affinities cannot be taken. Prof. Huxley has expressed himself more cautiously, and, while remarking (*P.Z.S.*, 1867, p. 455) that in its skull "the internasal septum is ossified to a very slight extent, and the maxillo-palatine processes may meet in the middle line, in both of which

[1] Yet Forbes states (*Ibis*, 1881, p. 358) that *Seriema* comes from *Siri*, "a diminutive of Indian extraction," and *Ema*, the Portuguese name for the Rhea (comp. EMEU, vol. viii. p. 157), the whole thus meaning "Little Rhea."

[2] The skeleton has been briefly described and figured by Eyton (*Osteol. Avium*, p. 190, pls. 3, K, and 28 bis, Fig. 1).

[3] This distinguished author twice cites the figure given by Thienemann (*Fortpflanzungsgesch. gesammt. Vögel*, pl. lxxii. Fig. 14) as though taken from a genuine specimen; but little that can be called Ralline in character is observable therein. The same is to be said of an egg laid in captivity at Paris; but a specimen in Mr. Walter's possession undeniably shows it (cf. *Proc. Zool. Society*, 1881, p. 2).

[4] A supposed fossil *Cariama* from the caves of Brazil, mentioned by Bonaparte (*C. R.*, xliii. p. 779 and others, has since been shown by Reinhardt (*Ibis*, 1882, pp. 321–332) to rest upon the misinterpretation of certain bones, which the latter considers to have been those of a *Rhea*.

[5] Near Tucuman and Catamarca (Burmeister, *Reise durch die La Plata Staaten*, ii. p. 508).

[6] The author of vol. i. of the British Museum *Catalogue of Birds* even refers it to the Family *Falconidæ* and sub-Family *Polyborinæ*, though he regards the OSPREY (vol. xviii. p. 60, note 2) as the type of a distinct sub-Order, thereby showing a want of penetration which it is difficult to excuse. Here it needs only be said that, whereas in a few points *Pandion* differs from the normal *Falconidæ*, *Cariama* diverges in characters too numerous to mention. The suggestion that the order *Accipitres* might be justifiably enlarged so as to include the Seriema has before (ORNITHOLOGY, vol. xviii. pp. 49, 50) met with conditional approval; but that this remarkable and peculiar form should be treated in the way just described indicates an amount of neglect of evidence hardly to be expected at the present day.

[7] Nitzsch, as Prof. Burmeister states in his masterly contribution to the natural history of this bird (*Abhandl. naturf. Gesellsch. Halle*, i. pp. 1-68, pls. 1, 2), in 1834 saw a defective skeleton sent to Munich by the Brazilian travellers Spix and Martius. His description of it was not, however, published until 1853. To it is appended a description by Dr. Creplin of some *Entozoa* found in the Seriema, but this unfortunately seems to give no help as to the systematic position of the bird.

respects it approaches the birds of prey," adds that "the ossified part of the nasal septum does not unite below the maxillo-palatines," and that in this respect it is unlike the *Accipitres;* finally he declares (p. 467) that, as *Otis* connects the *Geranomorphæ* with the *Charadriomorphæ*, so *Cariama* connects the former with the *Aetomorphæ*, "but it is a question whether these two genera may be better included in" the *Geranomorphæ*, "or made types of separate groups."

(A.N.)

SERIES. A series is a set of terms considered as arranged in order. Usually the terms are or represent numerical magnitudes, and we are concerned with the sum of the series. The number of terms may be limited or without limit; and we have thus the two theories, finite series and infinite series. The notions of convergency and divergency present themselves only in the latter theory.

Finite Series.

1. Taking the terms to be numerical magnitudes, or say numbers, if there be a definite number of terms, then the sum of the series is nothing else than the number obtained by the addition of the terms; *e.g.*, $4+9+10=23$, $1+2+4+8=15$. In the first example there is no apparent law for the successive terms; in the second example there is an apparent law. But it is important to notice that in neither case is there a determinate law; we can in an infinity of ways form series beginning with the apparently irregular succession of terms 4, 9, 10, or with the apparently regular succession of terms 1, 2, 4, 8. For instance, in the latter case we may have a series with the general term 2^n, when for $n=0, 1, 2, 3, 4, 5\ldots$ the series will be 1, 2, 4, 8, 16, 32, . . ; or a series with the general term $\frac{1}{6}(n^3+5n+6)$, where for the same values of n the series will be 1, 2, 4, 8, 15, 26, . . The series may contain negative terms, and in forming the sum each term is of course to be taken with the proper sign.

2. But we may have a given law, such as either of those just mentioned, and the question then arises, to find the sum of an indefinite number of terms, or say of u terms (n standing for any positive integer number at pleasure) of the series. The expression for the sum cannot in this case be obtained by actual addition; the formation by addition of the sum of two terms, of three terms, etc., will, it may be, suggest (but it cannot do more than suggest) the expression for the sum of n terms of the series. For instance, for the series of odd numbers $1+3+5+7+\ldots$, we have $1=1$, $1+3=4$, $1+3+5=9$, etc. These results at once suggest the law, $1+3+5\ldots+(2n-1)=n^2$, which is in fact the true expression for the sum of n terms of the series; and this general expression, once obtained, can afterwards be verified.

3. We have here the theory of finite series; the general problem is, u_n being a given function of the positive integer n, to determine as a function of n the sum $u_0+u_1+u_2\ldots+u_n$, or, in order to have n instead of $n+1$ terms, say the sum $u_0+u_1+u_2\ldots+u_n-1$.

Simple cases are the three which follow:

(i.) The arithmetic series.

$$a+(a+b)+(a+2b)\ldots+(a+\overline{n-1}\,b);$$

writing here the terms in the reverse order, it at once appears that twice the sum is $=2a+\overline{n-1}\,b$ taken n times: that is, the sum $=na+\frac{1}{2}n(n-1)b$. In particular we have an expression for the sum of the natural numbers

$$1+2+3\ldots+n=\frac{1}{2}n(n+1),$$

and an expression for the sum of the odd numbers

$$1+3+5\ldots+(2n-1)=n^2.$$

(ii.) The geometric series,

$$a+ar+ar^2\ldots+ar^{n-1};$$

here the difference between the sum and r times the sum is at once seen to be $=a-ar^n$, and the sum is thus

$=a\frac{1-r^n}{1-r}$; in particular the sum of the series

$$1+r+r^2\ldots+r^{n-1}=\frac{1-r^n}{1-r}.$$

(iii.) But the harmonic series,

$$\frac{1}{a}+\frac{1}{a+b}+\frac{1}{a+2b}\cdots+\frac{1}{a+(n-1)b},$$

or say $\frac{1}{1}+\frac{1}{2}+\frac{1}{3}\ldots+\frac{1}{n}$, does not admit of summation; there is no algebraical function of n which is equal to the sum of the series.

4. If the general term be a given function u_n, and we can find v_n a function of n such that $v_n+1-v_n=u_n$, then we have $u_0=v_1-v_0$, $u_1=v_2-v_1$, $u_2=v_3-v_2$, . . $u_n=v_n+1-v_n$: and hence $u_0+u_1+u_2\ldots+u_n=v_n+1-v_0$,—an expression for the required sum. This is in fact an application of the Calculus of Finite Differences. In the notation of this calculus v_n+1-v_n is written Δv_n; and the general inverse problem, or problem of integration, is from the equation of differences $\Delta v_n=u_n$ (where u_n is a given function of n) to find v_n. The general solution contains an arbitrary constant, $v_n=V_n+C$; but this disappears in the difference v_n+1-v_0. As an example consider the series

$$u_0+u_1\ldots+u_n=0+1+3\ldots+\frac{1}{2}n(n+1);$$

here, observing that

$$n(n+1)(n+2)-(n-1)n(n+1)=n(n+1)(\overline{n+2}-\overline{n-1}),=3n(n+1),$$

we have $v_n+1=\frac{1}{6}n(n+1)(n+2)$;

and hence $1+3+6\ldots+\frac{1}{2}n(n+1)=\frac{1}{6}n(n+1)(n+2)$,

as may be at once verified for any particular value of n.

Similarly, when the general term is a factorial of the order n, we have

$$1+\frac{r+1}{1}\ldots+\frac{n(n+1)\ldots(n+r1)}{1.2\ldots r}=\frac{n(n+1)\ldots(n+r)}{1.2\ldots(r+1)}.$$

5. If the general term u_n be any rational and integral function of n, we have

$$u_n=u_0+\frac{n}{1}\Delta u_0+\frac{n(n-1)}{1.2}\Delta^2u_0\ldots$$
$$+\frac{n(n-1)\ldots(n-p+1)}{1.2\ldots p}\Delta^p u_0,$$

where the series is continued only up to the term depending on p, the degree of the function u_n, for all the subsequent terms vanish. The series is thus decomposed into a set of series which have each a factorial for the general term, and which can be summed by the last formula; thus we obtain

$$u_0+u_1\ldots+u_n=(n+1)u_0+\frac{(n+1)n}{1.2}\Delta u_0\ldots$$
$$+\frac{(n+1)n(n-1)\ldots(n-p+1)}{1.2.3\ldots p+1)}\Delta^p u_0,$$

which is a function of the degree $p+1$.

Thus for the before-mentioned series $1+2+4+8+\ldots$, if it be assumed that the general term u_n is a cubic function of n, and writing down the given terms and forming the differences, 1, 2, 4, 8; 1, 2, 4; 1, 2; 1, we have

$u_n=1+\frac{n}{1}+\frac{n(n-1)}{1.2}+\frac{n(n-1)(n-2}{1.2.3}\Big\{=\frac{1}{6}(n^3+5n+6)$, as above$\Big\}$; and the sum $u_0+u_1\ldots+u_n$

$$=n+1+\frac{(n+1)n}{1.2}+\frac{(n+1)n(n-1)}{1.2.3}+\frac{(n+1)n(n-1)(n-2)}{1.2.3.4},$$
$$=\frac{1}{24}(n^4+2n^3+11n^2+34n+24).$$

As particular cases we have expressions for the sums of the powers of the natural numbers:

$1^2+2^2\ldots+n^2=\frac{1}{6}n(n+1)(2n+1)$; $1^3+2^3\ldots+n^3=\frac{1}{4}n^2(n+1)^2$ (observe that this $=(1+2\ldots+n)^2$); and so on.

6. We may, from the expression for the sum of the geometric series, obtain by differentiation other results:

thus $1+r+r^2\ldots+r^{n-1}=\frac{1-r^n}{1-r}$ gives

$$1+2r+3r^2\ldots+(n-1)r^{n-2}=\frac{d}{dr}\frac{1-r_n}{1-r},$$
$$=\frac{1-nr^{n-1}+(n-1)r^n}{(1-r^2};$$

and we might in this way find the sum $u_0+u_1r\ldots+u_nr^n$, where u_n is any rational and integral function of n.

7. The expression for the sum $u_0+u_1\ldots+u_n$ of an indefinite number of terms will in many cases lead to the sum of the infinite series $u_0+u_1\ldots$; but the theory of infinite series requires to be considered separately. Often in dealing apparently with an infinite series $u_0+u_1+\ldots$ we consider rather an indefinite than an infinite series, and are not in any wise really concerned with the sum of the series or the question of its convergency; thus the equation

$$\left(1+mx+\frac{m(m-1)}{1\cdot2}x^2+..\right)\left(1+nx+\frac{n(n-1)}{1\cdot2}x^2+..\right)$$
$$=1+(m+n)x+\frac{(m+n)(m+n-1)}{1\cdot2}x^2+..$$

really means the series of identities

$$(m+n)=m+n$$
$$\frac{(m+n)(m+n-1)}{1\cdot2}=\frac{m(m-1)}{1\cdot2}+2\frac{m}{1}\frac{n}{2}+\frac{n(n-1)}{1\cdot2},\text{ etc.,}$$

obtained by multiplying together the two series of the left-hand side. Again, in the method of generating functions we are concerned with an equation $\phi(t)=A_0+A_1t\ldots+A_nt^n+\ldots$, where the function $\phi(t)$ is used only to express the law of formation of the successive coefficients.

It is an obvious remark that, although according to the original definition of a series the terms are considered as arranged in a determinate order, yet in a finite series (whether the number of terms be definite or indefinite) the sum is independent of the order of arrangement.

Infinite Series.

8. We consider an infinite series $u_0+u_1+u_2+\ldots$ of terms proceeding according to a given law, that is, the general term u_n is given as a function of n. To fix the ideas the terms may be taken to be positive numerical magnitudes, or say numbers continually diminishing to zero; that is, $u_n>u_{n+1}$, and u_n is, moreover, such a function of n that by taking n sufficiently large u_n can be made as small as we please.

Forming the successive sums $S_0=u_0$, $S_1=u_0+u_1$, $S_2=u_0+u_1+u_2$, . . these sums S_0, S_1, S_2 . . . will be a series of continually increasing terms, and if they increase up to a determinate finite limit S (that is, if there exists a determinate numerical magnitude S such that by taking n sufficiently large we can make $S-S_n$ as small as we please) S is said to be the sum of the infinite series. To show that we can actually have an infinite series with a given sum S, take u_0 any number less than S, then $S-u_0$ is positive, and taking u_1 any numerical magnitude less than $S-u_0$, then $S-u_0-u_1$ is positive. And going on continually in this manner we obtain a series $u_0+u_1+u_2+\ldots$ such that for any value of n however large $S-u_0-u_1\ldots-u_n$ is positive; and if as n increases this difference diminishes to zero, we have $u_0+u_1+u_2+\ldots$,—an infinite series having S for its sum. Thus, if $S=2$, and we take $u_0<2$, say $u_0=1$; $u_1<2-1$, say $u_1=\frac{1}{2}$; $u_2<2-1-\frac{1}{2}$, say $u_2=\frac{1}{4}$; and so on, we have $1+\frac{1}{2}+\frac{1}{4}+\ldots=2$; or, more generally, if r be any positive number less than 1, then $1+r+r^2\ldots=\frac{1}{1-r}$, that is, the infinite geometric series with the first term = 1, and with a ratio $r<1$, has the finite sum $\frac{1}{1-r}$. This in fact follows from the expression $1+r+r^2\ldots+r^{n-1}=\frac{1-r^n}{1-r}$ for the sum of the finite series; taking $r<1$, then as n increases r^n decreases to zero, and the sum becomes more and more nearly $=\frac{1}{1-r}$.

9. An infinite series of positive numbers can, it is clear, have a sum only if the terms continually diminish to zero; but it is not conversely true that, if this condition be satisfied, there will be a sum. For instance, in the case of the harmonic series $1+\frac{1}{2}+\frac{1}{3}+\ldots$ it can be shown that by taking a sufficient number of terms the sum of the finite series may be made as large as we please. For, writing the series in the form

$$1+\frac{1}{2}+\left(\frac{1}{3}+\frac{1}{4}\right)+\left(\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+\frac{1}{8}\right)+\ldots,$$

the number of terms in the brackets being doubled at each successive step, it is clear that the sum of the terms in any bracket is always $>\frac{1}{2}$; hence by sufficiently increasing the number of brackets the sum may be made as large as we please. In the foregoing series, by grouping the terms in a different manner $1+\left(\frac{1}{2}+\frac{1}{3}\right)+\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}\right)+\ldots$, the sum of the terms in any bracket is always <1; we thus arrive at the result that ($n=3$ at least) the sum of 2^n terms of the series is $>1+\frac{1}{2}n$ and $<n$.

10. An infinite series may contain negative terms; suppose in the first instance that the terms are alternately positive and negative. Here the absolute magnitudes of the terms must decrease down to zero, but this is a sufficient condition in order that the series may have a sum. The case in question is that of a series $v_0-v_1+v_2-\ldots$, where v_0, v_1, v_2, . . are all positive and decrease down to zero. Here, forming the successive sums $S_0=v_0$, $S_1=v_0-v_1$, $S_2=v_0-v_1+v_2$, . . S_0, S_1, S_2, . . . are all positive, and we have $S_0>S_1$, $S_1<S_2$, $S_2>S_3$, . . and $S_{n+1}-S_n$ tends continually to zero. Hence the sums S_0, S_1, S_2, . . tend continually to a positive limit S in such wise that S_0, S_2, S_4, . . . are each of them greater and S_1, S_3, S_5, . . are each of them less than S; and we thus have S as the sum of the series. The series $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\ldots$ will serve as an example. The case just considered includes the apparently more general one where the series consists of alternate groups of positive and negative terms respectively; the terms of the same group may be united into a single term $\pm v_n$, and the original series will have a sum only if the resulting series $v_0-v_1+v_2\ldots$ has a sum, that is, if the positive partial sums v_0, v_1, v_2, . . decrease down to zero.

The terms at the beginning of a series may be irregular as regards their signs; but, when this is so, all the terms in question (assumed to be finite in number) may be united into a single term, which is of course finite, and instead of the original series only the remaining terms of the series need be considered. Every infinite series whatever is thus substantially included under the two forms,—terms all positive and terms alternately positive and negative.

11. In brief, the sum (if any) of the infinite series $u_0+u_1+u_2+\ldots$ is the finite limit (if any) of the successive sums u_0, u_0+u_1, $u_0+u_1+u_2$, . . . ; if there is no such limit, then there is no sum. Observe that the assumed order u_0, u_1, $u_2\ldots$ of the terms is part of and essential to the definition; the terms in any other order may have a different sum, or may have no sum. A series having a sum is said to be "convergent"; a series which has no sum is "divergent."

If a series of positive terms be convergent, the terms cannot, it is clear, continually increase, nor can they tend to a fixed limit; the series $1+1+1+\ldots$ is divergent. For the convergency of the series it is necessary (but, as has been shown, not sufficient) that the terms shall decrease to zero. So, if a series with alternately positive and negative terms be convergent, the absolute magnitudes cannot, it is clear, continually

increase. In reference to such a series Abel remarks, "Peut-on imaginer rien de plus horrible que de débiter $0 = 1^n - 2^n + 3^n - 4^n +$, etc., où n est un nombre entier positif?" Neither is it allowable that the absolute magnitudes shall tend to a fixed limit. The so-called "neutral" series $1-1+1-1\ldots$ is divergent: the successive sums do not tend to a determinate limit, but are alternately $+1$ and 0; it is necessary (and also sufficient) that the absolute magnitudes shall decrease to zero.

In the so-called semi-convergent series we have an equation of the form $S = U_0 - U_1 + U_2 - \ldots$, where the positive values $U_0, U_1, U_2, \ldots$ decrease to a minimum value, suppose U_p, and afterwards increase; the series is divergent and has no sum, and thus S is not the sum of the series. S is only a number or function calculable approximately by means of the series regarded as a finite series terminating with the term $\pm U_p$. The successive sums U_0, $U_0 - U_1$, $U_0 - U_1 + U_2$, .. up to that containing $\pm U_p$, give alternately superior and inferior limits of the number or function S.

12. The condition of convergency may be presented under a different form: let the series $u_0 + u_1 + u_2 + \ldots$ be convergent, then, taking m sufficiently large, the sum is the limit not only of $u_0 + u_1 + \ldots + u_m$ but also of $u_0 + u_1 \ldots + u_{m+r}$, where r is any number as large as we please. The difference of these two expressions must therefore be indefinitely small; by taking m sufficiently large the sum $u_{m+1} + u_{m+2} \ldots + u_{m+r}$ (where r is any number however large) can be made as small as we please; or, as this may also be stated, the sum of the infinite series $u_{m+1} + u_{m+2} + \ldots$ can be made as small as we please. If the terms are all positive (but not otherwise), we may take, instead of the entire series $u_{m+1} + u_{m+2} + \ldots$, any set of terms (not of necessity consecutive terms) subsequent to u_m; that is, for a convergent series of positive terms the sum of any set of terms subsequent to u_m can, by taking m sufficiently large, be made as small as we please.

13. It follows that in a convergent series of positive terms the terms may be grouped together in any manner so as to form a finite number of partial series which will be each of them convergent, and such that the sum of their sums will be the sum of the given series. For instance, if the given series be $u_0 + u_1 + u_2 + \ldots$, then the two series $u_0 + u_2 + u_4 + \ldots$ and $u_1 + u_3 + \ldots$ will each be convergent and the sum of their sums will be the sum of the original series.

14. Obviously the conclusion does not hold good in general for series of positive and negative terms; for instance, the series $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \ldots$ is convergent, but the two series $1 + \frac{1}{3} + \frac{1}{5} + \ldots$ and $-\frac{1}{2} - \frac{1}{4} \ldots$ are each divergent, and thus without a sum. In order that the conclusion may be applicable to a series of positive and negative terms the series must be "absolutely convergent," that is, it must be convergent when all the terms are made positive. This implies that the positive terms taken by themselves are a convergent series, and also that the negative terms taken by themselves are a convergent series. It is hardly necessary to remark that a convergent series of positive terms is absolutely convergent. The question of the convergency or divergency of a series of positive and negative terms is of less importance than the question whether it is or is not absolutely convergent. But in this latter question we regard the terms as all positive, and the question in effect relates to series containing positive terms only.

15. Consider, then, a series of positive terms $u_0 + u_1 + u_2 + \ldots$; if they are increasing—that is, if in the limit u_{n+1}/u_n be greater than 1—the series is divergent, but if less than 1 the series is convergent. This may be called a first criterion; but there is the doubtful case where the limit $= 1$. A second criterion was given by Cauchy and Raabe; but there is here again a doubtful case when the limit considered $= 1$. A succession of criteria was established by De Morgan, which it seems proper to give in the original form; but the equivalent criteria established by Bertrand are somewhat more convenient. In what follows lx is for shortness written to denote the logarithm of x, no matter to what base. De Morgan's form is as follows:

Writing $u_n = \frac{1}{\phi(n)}$, put $p_0 = \frac{x\phi' x}{\phi x}$; if for $x = \infty$ the limit a_0 of p_0 be greater than 1 the series is convergent, but if less than 1 it is divergent. If the limit $a_0 = 1$, seek for the limit of $p_1, = (p_0 - 1)lx$; if this limit a_1 be greater than 1 the series is convergent, but if less than 1 it is divergent. If the limit $a_1 = 1$, seek for the limit $p_2, = (p_1 - 1)llx$; if this limit a_2 be greater than 1 the series is convergent, but if less than 1 it is divergent. And so on indefinitely.

16. Bertrand's form is: If, in the limit for $n = \infty$, $l\frac{1}{u_n}\Big/ln$ be negative or less than 1 the series is divergent, but if greater than 1 it is convergent. If it $= 1$, then if $l\frac{1}{nu_n}\Big/lln$ be negative or less than 1 the series is divergent, but if greater than 1 it is convergent. If it $= 1$, then if $l\frac{1}{nu_n ln}\Big/llln$ be negative or less than 1 the series is divergent, but if greater than 1 it is convergent. And so on indefinitely.

The last-mentioned criteria follow at once from the theorem that the several series having the general terms $\frac{1}{n^a}$, $\frac{1}{n(ln)^a}$, $\frac{1}{nln(lln)^a}$, $\frac{1}{nlnlln(llln)^a}$, .. respectively are each of them convergent if a be greater than 1, but divergent if a be negative or less than 1 or $= 1$. In the simplest case, series with the general term $\frac{1}{n^a}$, the theorem may be proved nearly in the manner in which it is shown above (cf. § 9) that the harmonic series is divergent.

17. Two or more absolutely convergent series may be added together $\{u_0 + u_1 + u_2 \ldots\} + \{v_0 + v_1 + v_2 \ldots = \}(u_0 + v_0) + (u_1 + v_1) \ldots$; that is, the resulting series is absolutely convergent and has for its sum the sum of the two sums. And similarly two or more absolutely convergent series may be multiplied together $\{u_0 + u_1 + u_2 \ldots\} \times \{v_0 + v_1 + v_2 \ldots\} = u_0v_0 + (u_0v_1 + u_1v_0) + (u_0v_2 + u_1v_1 + u_2v_0) + \ldots$; that is, the resulting series is absolutely convergent and has for its sum the product of the two sums. But more properly the multiplication gives rise to a doubly infinite series:

$$\begin{matrix} u_0v_0, & u_0v_1, & u_0v_2 \ldots \\ u_1v_0, & u_1v_1, & v_1v_2 \\ \vdots & & \end{matrix}$$

—which is a kind of series which will be presently considered.

18. But it is in the first instance proper to consider a single series extending backwards and forwards to infinity, or say a back-and-forwards infinite series $\ldots u_{-2} + u_{-1} + u_0 + u_1 + u_2 \ldots$; such a series may be absolutely convergent, and the sum is then independent of the order of the terms, and in fact equal to the sum of the sums of the two series $u_0 + u_1 + u_2 \ldots$ and $u_{-1} + u_{-2} + u_{-3} \ldots$ respectively. But, if not absolutely convergent, the expression has no definite meaning until it is explained in what manner the terms are intended to be grouped together; for instance, the expression may be used to denote the foregoing sum of two series, or to denote the series $u_0 + (u_1 + u_{-1}) + (u_2 + u_{-2}) + \ldots$ and the sum may have different values, or there may be no sum, accordingly. Thus, if the series be $\ldots -\frac{1}{2} - \frac{1}{1} + 0 + \frac{1}{1} + \frac{1}{2} + \ldots$, in the former meaning the two series $0 + \frac{1}{1} + \frac{1}{2} + \ldots$ and $-\frac{1}{1} - \frac{1}{2} - \ldots$ are each divergent, and there is not any sum. But in the latter meaning the series is $0 + 0 + 0 + \ldots$, which has a sum $= 0$. So, if the series be taken to denote the limit of $(u_0 + u_1 + u_2 \ldots + u_m) + (u_{-1} + u_{-2} \ldots + u_{-m'})$, where m, m' are each of them ultimately infinite, there may be a sum depending on the ratio $m : m'$, which sum consequently acquires a determinate value only when this ratio is given.

19. In a singly infinite series we have a general term u_n, where n is an integer positive in the case of an ordinary series, and positive or negative in the case of a back-and-forwards series. Similarly for a doubly infinite series we have a general term $u_{m,n}$, where m, n are integers which may be each of them positive, and the form of the series is then

$$\begin{matrix} u_{0,0}\ ,\ u_{0,1}\ ,\ u_{0,2}\ . . \\ u_{1,0}\ ,\ u_{1,1}\ ,\ u_{1,2} \\ \vdots \end{matrix}$$

or they may be each of them positive or negative. The latter is the more general supposition, and includes the former, since $u_{m,n}$ may $= 0$ for m or n each or either of them negative. To put a definite meaning on the notion of a sum, we may regard m, n as the rectangular coördinates of a point in a plane; that is, if m, n are each of them positive we attend only to the positive quadrant of the plane, but otherwise to the whole plane; and we have thus a doubly infinite system or lattice-work of points. We may imagine a boundary depending on a parameter T which for $T = \infty$ is at every point thereof at an infinite distance from the origin; for instance, the boundary may be the circle $x^2 + y^2 = T$, or the four sides of a rectangle, $x = \pm \alpha T$, $y = \pm \beta T$. Suppose the form is given and the value of T, and let the sum $\Sigma u_{m,n}$ be understood to denote the sum of those terms $u_{m,n}$ which correspond to points within the boundary, then, if as T increases without limit the sum in question continually approaches a determinate limit (dependent, it may be, on the form of the boundary), *for such form of boundary* the series is said to be convergent, and the sum of the doubly infinite series is the aforesaid limit of the sum $\Sigma u_{m,n}$. The condition of convergency may be otherwise stated: it must be possible to take T so large that the sum $\Sigma u_{m,n}$ for all terms $u_{m,n}$ which correspond to points outside the boundary shall be as small as we please.

It is easy to see that, if the terms $u_{m,n}$ be all of them positive, and the series be convergent for any particular form of boundary, it will be convergent for any other form of boundary, and the sum will be the same in each case. Thus, let the boundary be in the first instance the circle $x^2+y^2=T$; by taking T sufficiently large the sum $\Sigma u_{m,n}$ for points outside the circle may be made as small as we please. Consider any other form of boundary—for instance, an ellipse of given eccentricity,—and let such an ellipse be drawn including within it the circle $x^2+y^2=T$. Then the sum $\Sigma u_{m,n}$ for terms $u_{m,n}$ corresponding to points outside the ellipse will be smaller than the sum for points outside the circle, and the difference of the two sums—that is, the sum for points outside the circle and inside the ellipse—will also be less than that for points outside the circle, and can thus be made as small as we please. Hence finally the sum $\Sigma u_{m,n}$, whether restricted to terms $u_{m,n}$ corresponding to points inside the circle or to terms corresponding to points inside the ellipse, will have the same value, or the sum of the series is independent of the form of the boundary. Such a series, viz., a doubly infinite convergent series of positive terms, is said to be absolutely convergent; and similarly a doubly infinite series of positive and negative terms which is convergent when the terms are all taken as positive is absolutely convergent.

20. We have in the preceding theory the foundation of the theorem (§ 17) as to the product of two absolutely convergent series. The product is in the first instance expressed as a doubly infinite series; and, if we sum this for the boundary $x + y = T$, this is in effect a summation of the series $u_0v_0 + (u_0v_1 + u_1v_0) + . .$, which is the product of the two series. It may be further remarked that, starting with the doubly infinite series and summing for the rectangular boundary $x = \alpha T$, $y = \beta T$, we obtain the sum as the product of the sums of the two single series. For series not absolutely convergent the theorem is not true. A striking instance is given by Cauchy; the series $1 - \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} - \frac{1}{\sqrt{4}} + . .$ is convergent and has a calculable sum, but it can be shown without difficulty that its square, viz., the series $1 - \frac{2}{\sqrt{2}} + \left(\frac{2}{\sqrt{3}} + \frac{1}{2}\right) - . .$, is divergent.

21. The case where the terms of a series are imaginary comes under that where they are real. Suppose the general term is $p_n + q_n i$, then the series will have a sum, or will be convergent, if and only if the series having for its general term p_n and the series having for its general term q_n be each convergent; then the sum = sum of first series $+ i$ into sum of second series. The notion of absolute convergence will of course apply to each of the series separately; further, if the series having for its general term the modulus $\sqrt{p^2_n + q^2_n}$ be convergent (that is, absolutely convergent, since the terms are all positive), each of the component series will be absolutely convergent; but the condition is not necessary for the convergence, or the absolute convergence, of the two component series respectively.

22. In the series thus far considered the terms are actual numbers, or are at least regarded as constant; but we may have a series $u_0 + u_1 + u_2 + . .$ where the successive terms are functions of a parameter z; in particular we may have a series $a_0 + a_1z + a_2z^2 . .$ arranged in powers of z. It is in view of a complete theory *necessary* to consider z as having the imaginary value $x + iy = r(\cos\phi + i \sin\phi)$. The two component series will then have the general terms $a_n r^n \cos n\phi$ and $a_n r^n \sin n\phi$ respectively; accordingly each of these series will be absolutely convergent for any value whatever of ϕ, provided the series with the general term $a_n r_n$ be absolutely convergent. Moreover, the series, if thus absolutely convergent for any particular value R of r, will be absolutely convergent for any smaller value of r, that is, for any value of $x + iy$ having a modulus not exceeding R; or, representing as usual $x + iy$ by the point whose rectangular coördinates are x, y, the series will be absolutely convergent for any point whatever inside or on the circumference of the circle having the origin for centre and its radius $= R$. The origin is of course an arbitrary point. Or, what is the same thing, instead of a series in powers of z, we may consider a series in powers of $z - c$ (where c is a given imaginary value $= \alpha + \beta i$). Starting from the series, we may within the aforesaid limit of absolute convergency consider the series as the definition of a function of the variable z; in particular the series may be absolutely convergent for every finite value of the modulus, and we have then a function defined for every finite value whatever $x + iy$ of the variable. Conversely, starting from a given function of the variable, we may inquire under what conditions it admits of expansion in a series of powers of z (or $z - c$), and seek to determine the expansion of the function in a series of this form. But in all this, however, we are travelling out of the theory of series into the general theory of functions.

23. Considering the modulus r as a given quantity and the several powers of r as included in the coefficients, the component series are of the forms $a_0 + a_1 \cos\phi + a_2 \cos 2\phi + . .$ and $a_1 \sin\phi + a_2 \sin 2\phi + . .$ respectively. The theory of these trigonometrical or multiple sine and cosine series, and of the development, under proper conditions, of an arbitrary function in series of these forms, constitutes an important and interesting branch of analysis.

24. In the case of a real variable z, we may have a series $a_0 + a_1z + a_2z^2 . .$, where the series $a_0 + a_1 + a_2 . .$ is a divergent series of decreasing positive terms (or as a limiting case where this series is $1+1+1 . .$). For a value of z inferior but indefinitely near to ± 1, say $z = \pm (1 - \varepsilon)$, where ε is indefinitely small and positive, the series will be convergent and have a determinate sum $\phi(z)$, and we may write $\phi(\pm 1)$ to denote the limit

of $\phi(\pm(1-\varepsilon))$ as ε diminishes to zero; but unless the series be convergent for the value $z=\pm 1$ it cannot for this value have a sum, nor consequently a sum $=\phi(\pm 1)$. For instance, let the series be $z+\frac{z^2}{2}+\frac{z^3}{3}\ldots$, which for values of z between the limits ± 1 (both limits excluded) $=-\log(1-z)$. For $z=+1$ the series is divergent and has no sum; but for $z=1-\varepsilon$ as ε diminishes to zero we have $-\log\varepsilon$ and $(1-\varepsilon)+\frac{1}{2}(1-\varepsilon)^2\ldots$, each positive and increasing without limit; for $z=-1$ the series $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}\ldots$ is convergent, and we have *at the limit* $\log 2=1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}\ldots$ As a second example, consider the series $1+z+z^2\ldots$, which for values of z between the limits ± 1 (both limits excluded) $=\frac{1}{1-z}$. For $z=+1$, the series is divergent and has no sum; but for $z=1-\varepsilon$ as ε diminishes to zero we have $\frac{1}{\varepsilon}$ and $1+(1-\varepsilon)+(1-\varepsilon)^2\ldots$, each positive and increasing without limit; for $z=-1$ the series is divergent and has no sum; the equation

$$\frac{1}{2-\varepsilon}=1-(1-\varepsilon)+(1-\varepsilon)^2\ldots$$

is true for any positive value of ε however small, but *not* for the value $\varepsilon=0$.

The following memoirs and works may be consulted;—Cauchy, *Cours d' Analyse de l' École Polytechnique*—part i., *Analyse Algébrique*, 8vo, Paris, 1821; Abel, "Untersuchungen über die Reihe $1+\frac{m}{1}x+\frac{m(m-1)}{1.2}x^2\ldots$," in Crelle's *Journ. de Math.*, vol. i. (1826) pp. 211–239, and *Œuvres* (French trans.), vol. i.; De Morgan, *Treatise on the Differential and Integral Calculus*, 8vo, London, 1842; Id., "On Divergent Series and various Points of Analysis connected with them" (1844), in *Camb. Phil. Trans.*, vol. viii. (1849), and other memoirs in *Camb. Phil. Trans.*; Bertrand, "Règles sur la Convergence des Séries," in *Liouv. Journ. de Math.*, vol. vii. (1842) pp. 35–54; Cayley, "On the Inverse Elliptic Functions," *Camb. Math. Journ.*, vol. iv. (1845) pp. 257–277, and "Mémoire sur les Fonctions doublement périodiques," in *Liouv. Journ. de Math.*, vol. x. (1845) pp. 385–420 (as to the boundary for a doubly infinite series); Riemann, "Ueber die Darstellbarkeit einer Function durch eine trigonometrische Reihe," in *Gött. Abh.*, vol. xiii. (1854), and *Werke*, Leipsic, 1876, pp. 213–253 (contains an account of preceding researches by Euler, D' Alembert, Fourier, Lejeune-Dirichlet, etc.); Catalan, *Traité Élémentaire des Séries*, 8vo, Paris, 1860; Boole, *Treatise on the Calculus of Finite Differences*, 2d ed. by Moulton, 8vo, London, 1872. (A. C.)

SERINGAPATAM, formerly the capital of Mysore, India, is situated on an island of the same name in the Káveri (Cauvery) river in 12° 25′ 33″ N. lat. and 76° 43′ 8′ E. long. It is chiefly noted for its fortress, which figured so prominently in Indian history at the close of the 18th century. This formidable stronghold of Tipu Sultan thrice sustained a siege from the British, but it was finally stormed in 1799; and after its capture the island was ceded to the British. The island of Seringapatam is about 3 miles in length from east to west and 1 in breadth, and yields valuable crops of rice and sugar-cane. The fort occupies the western side of the island, immediately overhanging the river. Seringapatam is said to have been founded in 1454 by a descendant of one of the local officers appointed by Rámánuja, the Vishnuite apostle, who named it the city of Srí Ranga or Vishnu. At the eastern or lower end of the island is the Lal Bagh or "red garden," containing the mausoleum built by Tipu Sultan for his father Hyder Ali, in which Tipu himself also lies. In 1881 the population of the town of Seringapatam was 11,734 (males 5579, females 6155).

SERJEANT-AT-LAW is the name given to one who holds an ancient and honorable rank at the English or Irish bar. The word is a corruption of *serviens ad legem*, as distinguished from *apprenticius ad legem*, or utter barrister, who probably originally obtained his knowledge of law by serving a kind of apprenticeship to a serjeant. When the order of serjeants was instituted is unknown, but it certainly dates from a very remote period. The authority of serjeant counters or countors (*i. e.*, pleaders, those who frame counts in pleading) is treated in the *Mirror of Justices*, and they are named in 3 Edw. I. c. 29. They may possibly have been the representatives of the *conteurs* mentioned in the great customary of Normandy. The position of the serjeant had become assured when Chaucer wrote. One of the characters in the *Canterbury Tales* is

> "A serjeant of the law, wary and wise,
> That often had y-been at the parvis."[1]

Serjeants (except king's serjeants) were created by writ of summons under the great seal, and wore a special and distinctive dress, the chief feature of which was the coif, a white lawn or silk skull-cap, now represented by a round piece of black silk at the top of the wig. They enjoyed a social precedence after knights bachelors and before companions of the Bath and other orders. In this they differed from queen's counsel, who have simply professional as distinguished from social rank. Socially the serjeant had precedence, professionally the queen's counsel, unless indeed, as was often the case, a patent of precedence was granted to the former. Till past the middle of the 19th century, a limited number of the serjeants were called "king's (queen's) serjeants." They were appointed by patent and summoned to parliament. Until 1814 the two senior king's serjeants had precedence of even the attorney-general and solicitor-general. It was the custom for serjeants on their appointment to give gold rings with mottoes to their colleagues. Down to 1845 the order enjoyed a very valuable monopoly of practice. The serjeants had the right of exclusive audience as leading counsel in the Court of Common Pleas. In 1834 a royal mandate of William IV. attempted to abolish this privilege, but in 1840 the judicial committee of the privy council declared the mandate informal and invalid. The monopoly was finally abolished in 1845 by Act of Parliament (9 and 10 Vict. c. 54). For at least 600 years the judges of the superior courts of common law were always serjeants. If a judge was appointed who was not a serjeant at the time of his appointment, he was formally created one immediately before his elevation to the bench. By the Judicature Act, 1873, sect. 8, no person appointed a judge of the High Court of Justice or the Court of Appeal is required to take or have taken the degree of serjeant-at-law. The serjeants had their own inn of court down to a very recent date. Serjeants' Inn was formerly in two divisions, one in Fleet Street and one in Chancery Lane. In 1758 the members of the former joined the latter. In 1877 the latter was dissolved, the inn sold to one of the members, and the proceeds divided among the existing serjeants. The extinction of the order is now only a question of time, no serjeant having been created since 1868. It is, however, still within the discretion of the crown to create fresh serjeants if ever it should be deemed advisable to do so. In Ireland the order still exists. The three serjeants at the Irish bar have precedence next after the law officers of the crown.

See *Serviens ad Legem*, by Mr. Serjeant Manning; *The Order of the Coif*, by Mr. Serjeant Pulling.

SERJEANTY, a form of tenure. See REAL ESTATE.

SERPENT, a musical instrument. See OPHICLEIDE, vol. xvii. p. 797.

SERPENTINE, a compact crypto-crystalline or fibrous mineral substance, occurring in rock-masses which commonly present dark green colors, variously mottled and fancifully compared to the markings on certain serpents, whence the name "serpentine." For a like reason it is sometimes called "ophite," while

[1] The parvis was the porch of old St. Paul's, where each serjeant had his particular pillar at which he held interviews with his clients.

Italian sculptors have termed it "ranocchia," in allusion to its resemblance to the skin of a frog. In consequence of its variegated tints, the stone is frequently cut and polished for ornamental purposes, and is hence popularly called a marble. From true marble, however, it differs in chemical composition, being essentially a hydrated silicate of magnesium, usually associated with certain metallic oxides (such as those of iron, nickel, and chromium) which confer upon the stone its characteristic tints. In some localities serpentine is found in masses which are evidently intrusive among other rocks, while elsewhere it occurs interbedded, usually in lenticular masses, associated with gneiss and crystalline schists. It is noteworthy that the serpentine is frequently crushed and brecciated, exhibiting polished slip-faces which are sometimes striated. The surface of an exposed mass of serpentine is generally barren, whence bosses of the rock are known in the Alps as "monts morts," The origin of serpentine has been a subject of much dispute. It was pointed out by Sandberger and Tschermak that the alteration of olivine may give rise to this product, and pseudomorphs of serpentine after chrysolite are well known to mineralogists. Professor Bonney and many other geologists regard serpentine as being generally an altered eruptive rock, due to the hydration of peridotites, such as lherzolite; probably it may also result from the decomposition of olivine-gabbro and other rocks rich in magnesian silicates. Augite and hornblende may become altered to serpentine. On the contrary, Dr. Sterry Hunt and certain other chemical geologists believe that serpentine has generally been formed as an aqueous sediment, probably precipitated by the reaction of sulphate or chloride of magnesium upon the silicate of lime or alkaline silicates derived from the disintegration of crystalline rocks and found in solution in many natural waters. Serpentine is a rock of rather limited occurrence. Its principal localities in England are Cornwall, especially in the Lizard district, where it occupies a considerable area. The famous scenery of Kynance Cove owes much of its beauty to the vivid colors and brilliant surface of the serpentine. The rock is worked into vases, columns, mantelpieces, etc., and of late years has been used to a limited extent for the decoration of shop-fronts in London. The beauty of the Lizard rock is heightened by the white veins of steatite which traverse it, and in some cases by disseminated crystals of bastite, which glisten with metallic lustre. Much of the Lizard serpentine is of rich red and brown color. Green serpentine is found near Holyhead in Anglesea. A singularly beautiful variety of mottled red and green tints, with veins of steatite, occurs near Portsoy in Banffshire, Scotland. It is also found with chrome iron ore in the Shetland Islands. The green serpentine of Galway occurs in intimate association with crystalline limestone, forming the rock known as "ophicalcite" or "serpentinous marble." Such an association is by no means uncommon; but, though the beauty of the serpentine may thus be enhanced, its durability seems to be impaired. On exposure to the weather the carbonate of calcium decomposes more readily than the silicate of magnesium, and hence the stone soon presents a rough eroded surface. The Galway rock comes into the market under the name of "Irish green" or "Connemara marble." Ophicalcites also occur in Ayrshire, Scotland, and in various parts of the Scottish Highlands; and the green pebbles found in Iona belong to this type of rock.

On the Continent serpentines are largely worked at Zöblitz and at Waldheim in Saxony. The famous rock of Zöblitz, mentioned by Agricola, is known to have been wrought for between three and four centuries, and is still extensively explored by open quarries and by subterranean galleries. The rock usually presents various shades of green and brown, red being very rare; but its most interesting feature is the frequent presence of pyrope, or Bohemian garnet, which occurs scattered through the rock in dark red grains, that decomposes on weathering to a green chloritic product. Very little of the Zöblitz serpentine comes to England, but it is common throughout Germany, and a good deal is sent to Russia and even to the United States. It has been used in the construction of the mausoleum of Prince Albert at Frogmore, and for Abraham Lincoln's monument at Springfield, Illinois. The best known of the Italian serpentines is the "verde Prato," which has been quarried for centuries at Monteferrato, near Prato in Tuscany. According to Capacci this serpentine is probably of Eocene age. It has been largely used as a decorative stone in ecclesiastical architecture in Prato, Pistoia, and Florence. A good deal of serpentine is found near Genoa and Levanto. The "verde di Pegli" is obtained from Pegli, not far from Genoa, while the "verde di Genova" is a brecciated serpentinous limestone from Pietra Lavezzara. Serpentine also occurs at various other points of the Apennines, in Elba, and in Corsica. The term "ophiolite" has been vaguely used to include not only serpentines but many of the rocks associated with the Italian serpentines. In like manner the term "gabbro," derived from a locality near Leghorn, was at one time used as a general name for serpentine and its associates, though now usually restricted to a rock composed essentially of plagioclase and diallage. It is notable that this true gabbro is often found in company with serpentine.

Serpentine is found in numerous localties in the Alps and in France. An elegant variety is quarried at Épinal in the Vosges, and a beautiful ophicalcite is worked at St. Véran and Maurins, in the department of Hautes-Alpes. The serpentine of the Ronda Mountains in Spain has been described by Mr. J. Macpherson. In North America serpentine is so extensively distributed that only a few localities can be mentioned. It is found at Syracuse in New York; on Manhattan and Staten Islands; at Hoboken in New Jersey; at Newport, Rhode Island; at Newburyport, Massachusetts; at Westchester, Chester county, and at Texas, Lancaster county, in Pennsylvania. It also occurs between Clear Lake and New Idria in California. A fine ophicalcite has been obtained from near Milford and New Haven in Connecticut, and a beautiful variety has been worked at Port Henry, Essex county, New York (Dana). The Canadian eozoon occurs in a serpentinous limestone.

See GEOLOGY, vol. x. pp. 203, 207; MARBLE, vol. xv. p. 536; and MINERALOGY, vol. xvi. p. 432. The literature of the Italian and Saxon serpentines is rather voluminous. Of recent English writings on serpentine reference may be made to Bonney, in *Quart. Journ. Geol. Soc.*, London, xxxiii. p. 884, xxxiv. p. 769, xxxvii. p. 40, xxxix. p. 21, and in *Geol. Mag.* [2], vi. p. 362 [3], i. p. 406; and to Collins, *Quart. Journ. Geol. Soc.*, xl. p. 458, and *Geol. Mag.* [3], ii. p. 298. Sterry Hunt has written an elaborate paper in *Proc. Roy. Soc. Canada*, 1883, sect. iv. pp. 165-215. See also Teall, *British Petrography*, 1886, and Becker, in *Amer. Journ. of Science*, May, 1886. (F. W. R*.)

SERPENTS. See SNAKES.

SERPUKHOFF, a district town of Russia, in the government of Moscow, 61 miles south of the city of Moscow, with which it is connected by rail. Built on high cliffs on both banks of the river Nara, 3 miles above its junction with the Oka, Serpukhoff has of late become an important manufacturing and commercial town. The aggregate production of its manufactories (cotton and woollen stuffs, paper, leather), which employ about 4000 hands, in 1880 was valued at about £300,000 [$1,458,000]. The surrounding district has several large cotton and woollen factories, with a yearly output worth about £1,000,000 [$4,860,000]. Petty trades are also much developed in the neighborhood,—textile fabrics, furniture, and earthenware and porcelain being produced by the peasantry. The manufactured goods of Serpukhoff are sent—mostly by rail—to the fairs of Nijni-Novgorod and the Ukraine, while large

amounts of grain, hemp, and timber, brought from the east on the Oka, are discharged at Serpukhoff and sent on to Moscow and St. Petersburg. The goods traffic by rail and river showed in 1880 an aggregate of 5,400,000 cwts. (exclusive of timber floated down the Oka). Notwithstanding its recent prosperity and the sums bequeathed to the municipality by wealthy merchants, Serpukhoff improves but slowly. The cathedral (1380) was rebuilt in the 18th century; of the old fortress, situated on a promontory formed by a bend of the Nara, a few heaps of stones are the only remains. The population in 1884 was 22,420.

Serpukhoff is one of the oldest towns of the principality of Moscow; it is mentioned in the will of Ivan Daislovich (1328), at which time it was a nearly independent principality under the protectorate of Moscow. Its fortress, protecting Moscow on the south, was often attacked by the Tatars; Toktamish plundered it in 1382, and the Lithuanian prince Svidrigaiło in 1410. In 1556 the town was strongly fortified, so that fifteen years later it was able to resist the Mongol invasion. Its commercial importance dates from the 18th century.

SERTORIUS, Quintus. The life and career of the Roman Sertorius, a man of remarkable genius both as a general and as a statesman, may be said to be comprised between the years 105 and 72 B.C., a period of civil war and revolution in the Roman world, when every man of any mark had to be an adherent either of Sulla or of Marius. Sertorius, who came from a little Sabine village under the Apennines and was a self-made man, attached himself to the party of the latter, and served under him in 102 B.C. at the great battle of Aquæ Sextiæ (Aix), in which the Teutones were decisively defeated. Three years before he had witnessed the rout of a Roman army by the Cimbri on the Rhone. In 97 he was serving in Spain and thus had a good opportunity of making himself acquainted with the country with which his fame is chiefly associated. In 91 he was quæstor in Cisalpine Gaul, and on his return to Rome he met with such a hearty welcome that he would have been elected to the tribuneship but for the decided opposition of Sulla. He now declared himself for Marius and the democratic party, though of Marius himself as a man he had the worst opinion. He must have been a consenting party to those hideous massacres of Marius and Cinna in 87, though he seems to have done what he could to mitigate their horrors by putting a stop to the outrages perpetrated by the scum of Marius's soldiery. On Sulla's return from the East and the war with Mithradates in 83, Sertorius left Rome for Spain, where he represented the Marian or democratic party, but, it would appear, without receiving any definite commission or appointment. Here he passed the remainder of his life, with the exception of some cruises in the Mediterranean in conjunction with Cilician pirates, and of a campaign in Mauretania, in which he defeated one of Sulla's generals and captured Tingis (Tangier). This success recommended him to the Spaniards, more particularly to the Lusitanian tribes in the west, whom Roman generals and governors of Sulla's party had plundered and oppressed. Brave and kindly and gifted with a rough telling eloquence, Sertorius was just the man to impress Spaniards favorably, and the native militia, which he organized, spoke of him as the "new Hannibal." Many Roman refugees and deserters joined him, and with these and his Spanish volunteers he completely defeated one of Sulla's generals and drove Metellus, who had been specially sent against him from Rome, out of Lusitania, or Further Spain as the Romans called it. Sertorius owed much of his success to his statesmanlike ability, and it seems that he aspired to be in Spain what the great Agricola afterwards was in Britain. His object was to build up a stable government in the country with the consent and coöperation of the people, whom he wished to civilize after the Latin model. He established a senate of 300 members, drawn from Roman emigrants, with probably a sprinkling of the best Spaniards. For the children of the chief native families he provided a school at Osca (Huesca), where they received a Roman education and even adopted the dress of Roman youths. Strict and severe as he was with his soldiers, he was particularly considerate to the people generally and made their burdens as light as possible. It seems clear that he had a peculiar gift for evoking the enthusiasm of rude tribes, and we can well understand how the famous white fawn, which was his constant companion, may have promoted his popularity. For six years he may be said to have really ruled Spain. In 77 he was joined by Perpenna, one of the officers of Lepidus, from Rome, with a following of Roman nobles, and in the same year the great Pompey, then quite a young man and merely a knight, was sent by the senate to take command in Spain and with Metellus to crush Sertorius. The war was waged with varying success, but on the whole Sertorius proved himself more than a match for his adversaries, utterly defeating their united forces on one occasion near Saguntum. Pompey wrote to Rome for reinforcements, without which, he said, he and Metellus would be driven out of Spain. Rome's position was very critical, the more so as Sertorius was in league with the pirates in the Mediterranean, was negotiating with the formidable Mithradates, and was in communication with the insurgent slaves in Italy. But owing to jealousies among the Roman officers who served under him and the Spaniards of higher rank he could not maintain his position, and his influence over the native tribes slipped away from him, though he won victories to the last. In 72 he was assassinated at a banquet, Perpenna, it seems, being the chief instigator of the deed.

What we know of Sertorius is mainly drawn from Plutarch's *Lives*, from Appian, and from the fragments of Sallust. There is a good life of him by G. Long in Smith's *Class. Dict.*

SERVANT, See Master and Servant.

SERVETUS, Michael, or Miguel Serveto (1511–1553), physician and polemic, was born in 1511[1] at Tudela in Navarre (according to his Vienne deposition), his father being Hernando Villanueva, a notary of good family in Aragon. His surname is given by himself as Serveto in his earliest works "per Michaelem Serueto, alias Reues." Later he Latinized it into Servetus, and even when writing in French (1553) he signs "Michel Seruetus."[2] It is not certain that he was related to his contemporary Andrès Serveto of Aniñon, the Bologna jurist; but it is probable that he was of the same family as the Spanish ecclesiastic Marco Antonio Serveto de Reves (d. 1598), born at Villanueva de Sigena in the diocese of Huesca (Latassa, *Biblioteca Nueva*, 1798, i. 609). Servetus, who at Geneva makes "Villeneufve" his birthplace, fixes it in the adjoining diocese of Lerida, in which there are three villages named Vilanova. Having apparently had his early training at the university of Saragossa, he was sent by his father to study law at Toulouse, where he first became acquainted with the Bible (1528). From 1525 he had found a patron in Juan de Quintaña (d. 1534), a Franciscan promoted in 1530 to be confessor to Charles V. In the train of Quintaña he witnessed at Bologna the coronation of Charles in February, 1530, visited Augsburg, and perhaps saw Luther at Coburg. The spectacle of the adoration of the pope at Bologna had strongly impressed his mind in an anti-papal direction. He left Quintaña, and, after visiting Lyons and Geneva, repaired to Œcolampadius at Basel, whence he pushed on to Bucer and Capito at Strasburg. A crude, but

[1] This date rests upon his own testimony as to his age (both at Vienne and Geneva) and that of Calvin. An isolated passage of his Geneva testimony may be adduced in support of 1509.

[2] The form "Servet" first appears in a letter of Œcolampadius to the senate of Basel (1531), and is never used by himself. "Servede" is an imaginary form.

very original and earnest theological essay, *De Trinitatis Erroribus*, printed at Hagenau in 1531, attracted considerable attention; Melanchthon writes "Servetum multum lego." It was followed in 1532 by a revised presentation of his argument. We next find Servetus at Lyons, in 1535, as an editor of scientific works for the printing firm of Trechsel, under the name of Michel de Villeneufve or Michel Villanovanus, which he used without interruption till the year of his death. Here he found a friend in Dr. Symphorien Champier (Campegius) (1472–1539), whose profession he resolved to follow. Accordingly he went (1536) to Paris, where he studied medicine under Johann Günther, Jacques Dubois and Jean Fernel. It was in 1536, when Calvin was on a hurried and final visit to France, that he first met Servetus at Paris, and, as he himself says, proposed to set him right in theological matters.[1] As assistant to Günther, Servetus succeeded the famous anatomist Vesalius; Günther, who pays the highest tribute to his general culture, describes him as specially skilled in dissection and "vix ulli secundus" in knowledge of Galen. He graduated in arts and asserts that he also graduated in medicine, published a set of lectures on syrups (the most popular of his works), lectured on geometry and astrology, and defended by counsel a suit brought against him (March, 1538) by the medical faculty on the ground of his astrological lectures. In June, 1538, we find him at the university of Louvain (where he was inscribed on the roll of students as Michael Villanova on 14th December, 1537), studying theology and Hebrew, explaining to his father (then residing at San Gil) his removal from Paris, early in September, 1537, as a consequence of the death (8th August) of his master (el señor mi maestro), and proposing to return to Paris as soon as peace was proclaimed. After this he practised medicine for a short time at Avignon, and for a longer period at Charlieu (where he contemplated marriage, but was deterred by a physical impediment). In September, 1540, he entered himself for further study in the medical school at Montpelier. In 1541 he resumed editorial work for the Lyons booksellers, to whose neighborhood he had returned.

Among the attendants upon his Paris lectures had been a distinguished ecclesiastic, Pierre Paulmier, since 1528 archbishop of Vienne. Paulmier invited Servetus to Vienne as his confidential physician. He acted in this capacity for twelve years (1541–53), and made money. Outwardly he conformed to Roman Catholic worship; in private he pursued his theological speculations. It is probable that in 1541 he had been rebaptized. He opened a correspondence with Calvin, and late in 1545, or very early in 1546, he forwarded to Calvin the manuscript of a revised and enlarged edition of his theological tracts, and expressed a wish to visit him at Geneva. Calvin replied on 23d February, 1546, in a letter which is lost, but in which, he says, he expressed himself "plus durement que ma coustume ne porte." On the same day he wrote to Guillaume Farel, "si venerit, modo valeat mea autoritas, vivum exire nunquam patiar," and to Pierre Viret in the same terms. Servetus had fair warning that if he went to Geneva it was at his peril. In his letter to Abel Pouppin (in or about 1547), after stating that he had failed to recover his manuscript from Calvin, he says, "mihi ob eam rem moriendum esse certo scio." The volume of theological tracts, again recast, was declined by a Basel publisher in April, 1552, but an edition of 1000 copies was secretly printed at Vienne. It was finished on 3d January, 1553; the bulk of the impression was privately consigned to Lyons and Frankfort, for the Easter market. But on 26th February a letter, enclosing a sheet of the printed book, and revealing the secret of its authorship, was written from Geneva by Guillaume H. C. de Trye, formerly *échevin* of Lyons, to his cousin Antoine Arneys in that city. This letter bears no sign of dictation by Calvin; the history of De Trye shows that it may have been instigated in part by personal ill-feeling towards the Lyons booksellers. But Calvin furnished (reluctantly, according to De Trye) the samples of Servetus's handwriting enclosed in a subsequent letter, for the express purpose of securing his conviction. The inquisitor-general at Lyons, Matthieu Ory, set to work on 12th March; Servetus was interrogated on 16th March and arrested on 4th April. Under examination his defence was that, in correspondence with Calvin, he had assumed the character of Servetus for purposes of discussion. At 4 A.M. on 7th April he escaped from his prison, evidently by connivance. He took the road for Spain, but turned back in fear of arrest. How he spent the next four months is not known; Calvin believed he was wandering in Italy; the idea that he lay concealed in Geneva was first started by Spon. On Saturday, 12th August, he rode into Louyset, a village on the French side of Geneva. Next morning he walked into Geneva, and ordered a boat, to take him towards Zurich on his way for Naples. He was recognized that day at church and immediately arrested. The process against him lasted from 14th August to 26th October, when sentence "estre brusle tout vyfz" was passed, and carried out next day at Champel (27th October, 1553). Calvin would have had him beheaded. Meanwhile the civil tribunal at Vienne had ordered (17th June) that he be fined and burned alive; the sentence of the ecclesiastical tribunal at Vienne was delayed till 23d December. Jacques Charmier, a priest in Servetus's confidence, was condemned to three years' imprisonment at Vienne. The life of Servetus is full of puzzles; his writings give the impression not only of quick genius but also of transparent sincerity; they throw, however, little light on the mysterious parts of his story. Don Pedro Gonzalez de Velasco (see his *Miguel Servet*, 1880) has placed a statue of Servetus in the porch of the Instituto Antropologico at Madrid.

The opinions of Servetus, marked by strong individuality, are not easily described in the terms of any current system. His anabaptism, with his denial of the tripersonality of the Godhead and of the eternity of the Son, made his views abhorrent to Catholics and Protestants alike; while his intense Biblicism, his passionate devotion to the person of Christ, and the essentially Christocentric character of his view of the universe give him an almost unique place in the history of religious thought. He is sometimes classed with the Arians; but he indorses in his own way the homoousian formula, and speaks contemptuously of Arius as "Christi gloriæ incapacissimus." He has had many critics, some apologists (*e.g.*, Postel and Lincurius), and few followers. The fifteen condemnatory clauses, introducing the sentence of Servetus at Geneva, set forth in detail that he had been found guilty of heresies, expressed in blasphemous language, against the true foundation of the Christian religion. It is curious that one instance of his injurious language is his employment of the term "trinitaires" to denote "ceux qui croyent en la Trinite." No law, current in Geneva, has ever been adduced as enacting the capital sentence. Claude Rigot, the procureur-général, examined Servetus with a view to show that his legal education must have familiarized him with the provisions of the code of Justinian to this effect; but in 1535 all the old laws on the subject of religion had been set aside at Geneva; the only civil penalty for religion, retained by the edicts of 1543, was banishment. The Swiss churches, while agreeing to condemn Servetus, give no hint of capital punishment in their letters of advice. The extinct law seems to have been arbitrarily revived for the occasion. A valuable controversy followed, on the question of executing heretics, in which Beza (for), Mino Celsi (against), and several caustic anonymous writers took part.

The works of Servetus are not so rare as is often supposed, but the most common are his earliest, in which he approaches nearer to the position afterwards taken by F. Sociuus than he does in his more matured publications. The following is an enumeration of them in the order of their appearance. (1) *De Trinitatis Erroribus Libri Septem*, 1531, 16mo. (2) *Dialogorum de Trinitate Libri Duo*, 1532, 16mo; four chapters are added on justification and kindred topics. These two books have been twice reprinted and

[1] Beza incorrectly makes Servetus the challenger and the date 1534.

manuscript copies are common; a Dutch version, by Reynier Telle, was published in 1620. (3) *Claudii Ptolomæi Alexandrini Geographicæ Enarrationis Libri Octo: ex Bilibaldi Pirckheymeri translatione, sed ad Græca et prisca exemplaria a Michaele Villanovano jam primum recogniti. Adjecta insuper ab eodem scholia*, etc., Lyons, (Melchior & Caspar Trechsel), 1535, fol.; 2d ed., Lyons (Hugo à Porta), 1541, *i.e.*, 1542; printed by Caspar Trechsel at Vienne, fol.; on this work Tollin founds his high estimate of Servetus as a comparative geographer; the passage incriminated on his trial as attacking the authority of Moses is an extract from Lorenz Friese. (4) *Brevissima Apologia pro Symphoriano Campegio in Leonardum Fuchsium*, 1536, 12mo; no extant copy is known; Tollin has reprinted an extract from it. (5) *Syruporum Universa Ratio*, etc., Paris, 1537, 16mo; there were four subsequent editions, the last being Venice, 1548 (six lectures on digestion, the composition and use of syrups being treated in the fifth lecture). (6) *In quendam Medicum Apologetica Disceptatio pro Astrologia*, Paris, 1538, 16mo; reprinted, Berlin, 1880; the *medicus* is Jean Tagault, who had interrupted the lectures of Servetus on astronomy, under which he included meteorology. (7) *Biblia Sacra ex Santis Pagnini Tralatione . . . recognita, et scholiis illustrata*, etc., Lyons (Hugo à Porta), 1542, fol., remarkable for its theory of prophecy, explained in the preface and illustrated in the notes. (8) D'Artigny says that Servetus "fit les argumens" to a Spanish version of the *Summa* of Aquinas; but nothing is known of this or of the "divers traités de grammaire" which he translated from Latin into Spanish. (9) *Christianismi Restitutio*, etc., 1553, 8vo (perfect copies in Vienna and Paris, an imperfect copy in Edinburgh), partly reprinted, London, 1723; 4to (copies in London and Paris), reprinted 1790; 8vo, by Rau at Nuremberg for de Murr, from the Vienna copy; manuscript copies are rare; the Paris library has a manuscript copy of an earlier recension of several books, including the often-quoted description of the pulmonary circulation. This work is often called anonymous, but the initials M. S. V. are given at the end and the full name at p. 199; the volume is not a single treatise but an assemblage of theological tracts written in a nervous and epigrammatic style and with great command of very various learning; the *Apologia* addressed to Melanchthon, with which it concludes, is in the writer's best manner. Two treatises, *Desiderius* (*ante* 1542) and de *Tribus Impostoribus* (1598), have been erroneously assigned to Servetus. Of his few remaining letters most will be found in Mosheim.

The literature relating to Servetus is very large, but the following are some of the most important pieces. Calvin's *Defensio Orthodoxæ Fidei*, etc., 1554, 4to (also in French, *Déclaration pour maintenir*, etc., 16mo, same date), is the source of many prevalent misconceptions respecting the opinions of Servetus and his attitude on his trial. De la Roche's *Historical Account*, etc., in *Mem. of Lit.*, 1711–12 (reproduced in French, *Biblioth. Angl.*, Amsterdam, 1717, 18mo), was followed by *An Impartial History*, etc., 1724, 8vo (said to be by Nathaniel Hodges, a Baptist minister, afterwards knighted). Allwoerden's *Historia*, etc., 1728, 4to (materials furnished by Mosheim), is superseded by Mosheim's *Anderweitiger Versuch*, etc., 1748, 4to, with its appendix, *Neue Nachrichten*, 1750, 4to, issued after the publication of the records of the Vienne trial by D'Artigny, in *Nouveaux Mémoires d'Hist.*, etc., vol. ii., 1749, 12mo. Chaufepié's valuable article in *Nouv. Dict. Historique*, vol. iv., 1756, fol. (translated separately by Rev. James Yair, 1771, 8vo), makes no use of Mosheim's later researches. Trechsel, in *Die prot. Antitrinitarier vor F. Socin*, etc., bk. i., 1839, 8vo, uses all available materials up to date. Since then the investigations of H. Tollin (published in a series of some forty separate articles in various journals from 1874 to 1885) have thrown light on every portion of the subject. The records of the Geneva trial, first published by De la Roche, and reproduced in Rilliet's *Relation*, etc., 1844, 8vo, and elsewhere, are best given in vol. viii. (1870) of the edition of Calvin's works by Baum, Cunitz, and Reuss; Roget, in *Hist. du Peuple de Genève*, vol. iv., 1877, has a good account of both trials. The passage describing the pulmonary circulation is first noticed by W. Wotton, in *Reflections upon Ancient and Mod. Learning*, 1694, and has given rise to a literature of its own; see especially Tollin's *Die Entdeckung des Blutkreislaufs*, etc., 1876; Huxley, in *Fortnightly Rev.*, February, 1878; and Tollin's *Kritische Bemerkungen über Harvey und seine Vorgänger*, 1882. Other physiological speculations of Servetus are noted by Sigmond (*The Unnoticed Theories of Servetus*, 1826): but it has escaped Sigmond that Servetus had an idea of the composition of water and of air. As a thinker, Servetus is claimed on superficial grounds by Unitarians (see Wallace, *Antitrin. Biog.*, 1850, i. 420), who have written several accounts of him, of which R. Wright's *Apology*, etc., 1807, 8vo., is the worst, and J. S. Porter's *Servetus and Calvin*, etc., 1854, 8vo., perhaps the best. Saisset, in *Rev. des Deux Mondes*, 1848, treats Servetus as a pantheist; he is followed by Willis, in his *Servetus and Calvin*, 1877, 8vo, a most unsatisfactory book (comp. *Theol. Rev.*, April and July, 1878). Tollin's *Das Lehrsystem Michael Servet's*, 3 vols., 1876–78, 8vo., and Pünjer's compendium *De Michaelis Serveti Doctrina*, etc., 1876, 8vo, are valuable digests of his opinions, from different points of view. Of Servetus's personal character the best vindication is Tollin's *Charakterbild Michael Servet's*, 1876, 8vo (in French with additions by Dardier, *Portrait Caractère*, 1879, 8vo). His story has been dramatized by Max Ring, *Die Genfer* (1850), by José Echegaray, *La Muerte en los Labios* (1880), and by Albert Hamann, *Servet* (1881). The recent discovery at the Record Office, London (U. 140) and the British Museum (Cotton MSS., Galba B. x.) of intercepted letters from Servetus at Louvain in 1538 adds considerably to our information about his family and early friends, but introduces new problems as to the details of his fitful career. (A. GO.)

SERVIA, a kingdom belonging to the Balkan peninsula of Europe, lying between Bosnia on the west and Bulgaria and Roumania on the east, and between the Turkish province of Albania on the south and the Austrian Military Frontier on the north. From Bosnia it is separated by the Drina, from Austrian and Roumanian territory by the Danube and the Save, and from Bulgaria partly by the Timok. Some parts of the southern frontier are indicated by mountains, but elsewhere there are no natural boundaries. In shape Servia is an irregular trapezium, situated between about 42° 30′ and 45° N. lat. and 19° and 22° 30′ E. long. The area is about 18,760 square miles, and the population (1,667,159 in 1874) was estimated at the end of 1884 to be 1,902,419, thus giving a density of about 100 to the square mile. This low density, only about one-third of that of the United Kingdom, is explained by the nature of the surface, the inland position, the defective communications with the exterior, and the absence of manufacturing industries. Plate I.

Orography.

The surface is for the most part mountainous or hilly, though there are no well-defined mountain ranges of any extent. The highest summits lie near the middle of the southern frontier, where Mount Kopaonik attains the height of nearly 7000 feet. Towards the Bosnian frontier the mountains are pretty closely massed together, and some of the summits approach 4000 feet; this height is exceeded on the eastern side of the country, where the mountains, forming a continuation of the Carpathians, are in many places more rugged and precipitous than anywhere else in the kingdom. The Rudnik Mountains, which begin immediately to the north of the Servian Morava, have their highest parts in the south and gradually sink towards the north from nearly 3000 to less than 2000 feet. Still lower are the elevations in the provinces in the extreme south acquired in 1878 under the treaty of Berlin. As a general rule the Servian highlands consist of detached groups of mountains and conical hills with gentle slopes rising from verdant valleys, and they are mostly covered to the top with forests, chiefly of oak and beech, the higher summits in the south also with conifers. But the plains, though numerous, are of no great extent, and occur chiefly along the banks of the rivers. Apart from frontier rivers, the most important stream is the Morava, which, rising on the western slopes of the Kara Dagh, a little beyond the Servian frontier, enters the country with a northeasterly course near the extreme southeast, and then turns north-northwest and flows almost in a straight line through the heart of the kingdom to the Danube. In the upper part of its course it is known as the Bulgarian Morava, and only after receiving the Servian Morava on the left is it known as the Morava simply or as the Great Morava. The only other important tributary is the Nishava, which it receives from the right at Nish. The valleys of all these rivers, especially those of the Bulgarian and the Great Morava, and of the Nishava, contain considerable areas of level or low-lying country well suited for the growth of corn, and the low grounds along the Save and the Danube from the Drina to the Morava are also well adpated for agriculture, though for the most part devoted only to pasture. Altogether no more than one-sixth of the surface is estimated to be occupied by cultivated fields and vineyards, while one-fifth is estimated to form pasture land and about an equal area woodland. Nearly one-half of the entire area is believed to be unproductive.

Besides the frontier streams on the north and west, the only river of any importance for navigation is the Morava, which is navigable for steamers of light

draught as high as Tiupriia about 60 miles from its mouth, but its valley is important as the main highway of the country, and all the more since the introduction of railways. Railways both to Constantinople and to Salonica are now (1886) in course of construction under a convention concluded with Austria in 1881. The section common to the two systems, that from Belgrade to Nish, 152 miles in length, was opened for traffic in September, 1884, and the line (76 miles) from Nish to Vranja was completed in March, 1886, but the connection with the Turkish railway from Salonica remains to be completed. At present, in consequence of the unsatisfactory communication with the south, only about 7 or 8 per cent. of the Servian imports enter by the southern frontier, 85 per cent. coming through Austria-Hungary. In the beginning of 1886 work had been begun on only one-half of the line from Nish to Pirot, on the other system.

Railways.

The geological structure of Servia is varied. In the south and west the sedimentary rocks most largely developed are of ancient, pre-Carboniferous date, interrupted by considerable patches of granite, serpentine, and other crystalline rocks. Beyond this belt there appear in the northwest Mesozoic limestones, such as occupy so extensive an area in the northwest of the Balkan peninsula generally, and the valleys opening in that quarter to the Drina have the same desolate aspect as belongs to these rocks in the rest of that region. In the extreme northeast the crystalline schists of the Carpathians extend to the south side of the Danube, and stretch parallel to the Morava in a band along its right bank. Elsewhere east of the Morava the prevailing rocks belong to the Cretaceous series, which enters Servia from Bulgaria. The heart of the country—the Shumadia, as it is called—is mainly occupied by rocks of Tertiary age, with intervening patches of older strata; and the Rudnik Mountains are traversed by metalliferous veins of syenite. The mineral wealth of Servia is considerable and varied, though far from being adequately developed. Gold, silver, iron, and lead are said to have been worked in the time of the Romans. Heaps of ancient slag from lead mines still exist in the neighborhood of Belgrade, and other old lead mines occur in the valley of the Toplitza. Gold dust is washed down by heavy rains in the valley of the Timok, where it is gathered by the peasants. In the syenite veins of the Rudnik Mountains ores of lead, zinc, copper, sulphur, and arsenic are present, but are not worked; and from the mines of Krupani in the northwest argentiferous lead, antimony, and other ores have been obtained. The principal mining centre east of the Morava is Maidanpek in the north, where there is a large iron-smelting establishment in the hands of an English company. Coal or lignite is met with in many places, including a number of points on the Servian railway. The largest deposit lies round Tiupriia, and measures about 19 miles in length by 7½ in breadth. All the minerals belong to the state, but permission to work them can be obtained on payment of a moderate royalty.

Geology.

Minerals.

The climate of Servia is on the whole mild, though subject to the extremes characteristic of inland Eastern countries. In summer the temperature may rise as high as 106° Fahr., while in winter it often sinks to 13° or even sometimes 20° below zero. The high-lying valleys in the south are colder than the rest of the country, not only on account of their greater elevation, but also because of their being exposed to the cold winds from the north and northeast. Accordingly, the chief products of the soil are such as thrive under a warm summer and are unaffected by a cold winter. Both maize and wine are grown, but the olive is excluded by the severity of the cold season.

Climate.

Maize is the principal object of agriculture, the average annual crop being estimated at upwards of 5,000,000 bushels, wheat coming next with an average crop of less than 4,000,000 bushels. Besides cereals, flax, hemp, and tobacco are grown, but the attempts made to cultivate cotton have proved unsuccessful. The chief wine-growing locality is in the northeast round Negotin. Inefficient as are the implements and backward the methods of agriculture, grain makes up a considerable portion of the exports, owing to the scantiness of the population and the deficiency of other industries, and it is expected that this export will be greatly increased on the completion of the railway system to the southern seaports. The grain chiefly exported is wheat,—maize supplying, as among all the Slavs of the Balkan peninsula, the chief food of the people. Hitherto live-stock has formed the largest item in the exports, sometimes amounting to over one-half. Among these pigs, which are fed in immense numbers on the mast of the forests, take the first place. Of late years their number has greatly declined, largely in consequence of American competition; but relatively to population Servia still maintains a much greater number than any other country of Europe; and the same is true of sheep, which are here relatively more than twice as numerous as in Spain. Cattle also are numerous, but are reared solely as beasts of draught and for export. Bees are very generally kept,—the honey being consumed in the country, the wax exported. The rearing of silkworms is spreading, especially since cocoons and eggs have begun to be exported to Italy. Orchards are very extensive, and all kinds of fruit belonging to central Europe are grown in abundance,—above all, the plum, from which is distilled the favorite national spirit, *slivovitza*. The average annual value of the exports is a little over £1 [$4.86] per head of population. After live animals and grain come hides and prunes. Among the imports the chief items are sugar, salt (wholly absent in Servia), cotton goods, and other textiles. Import duties being high, a considerable amount must always be allowed for smuggled goods. Though the great bulk of the imports enter the country by the Austrian frontier, an increasingly large proportion comes originally from beyond Austria-Hungary. Thus in 1879, of the total quantity of imports across the Austrian frontier, 76 per cent. were of Austrian-Hungarian origin, in 1880 73 per cent., in 1881 65 per cent., leaving 24, 27, and 35 per cent. respectively for countries beyond. Among the latter Germany comes next after Austria-Hungary and then England. Colonial wares (sugar, coffee, etc.) are now imported cheaper by way of Hamburg than by way of Trieste.

Products.

Exports and imports.

The natural increase of population in Servia is pretty rapid, the annual birth-rate being among the highest in Europe, while the death-rate, though high, is exceeded in several other countries. During the years 1879–84 the average annual number of births was 76,962, of deaths 47,181, the excess of births over deaths 29,781, which figures compared with a total population intermediate between that at the end of 1874 and that at the end of 1884 give a birth-rate of upwards of 43 per thousand, a death-rate of less than 27 per thousand, and an annual excess of births over deaths of nearly 17 per thousand. The average proportion of male to female births is 106 : 100. The people are mainly Serbs, though the proportions have been modified by the increase of territory under the treaty of Berlin. This territory, at one time occupied by Servians, had been to a large extent deserted by them in consequence of the oppressive Turkish yoke, and their place had been taken by Mohammedan Albanians west of the Morava and by Bulgarians in the valley of the Nishava. Most of the Albanians, however, quitted their homes at the time of annexation, and Servians are now returning to their former seats. Previous to the treaty of Berlin the principal element of the population next after the Servians consisted of Roumanians, of whom there were about 130,000. The Servian Church forms a branch of the Oriental Greek Church with a perfectly independent administration. The highest ecclesiastical authority is exercised by the national synod. Elementary education is in a very backward state, but recently a law has been passed to remedy this defect, by making education obligatory on all children between six and thirteen and laying the duty of providing accommodation, books, and teachers upon school districts. At Belgrade there is a high school or university with faculties of philosophy, law, and technics.

Population.

The agricultural population are scattered among a great number of villages, most of which consist of single isolated homesteads. Each homestead is occupied by a group of families connected by blood and acknowledging one head, the *stareshina*, who is usually the patriarch of the community, but is often chosen by the rest of the members on account of his prudence and ability. He regulates the work and distributes the proceeds of the labor of the entire

homestead, and his ruling is followed without question. The land cultivated by a family or group of families is always their own property. The buildings belonging to the homesteads are enclosed within an immense palisade, inside which a large expanse of fields is mostly planted with plum, damson, and other fruit-trees, surrounding the houses of the occupiers. In the midst of these is the house of the stareshina, which contains the common kitchen, eating hall, and family hall of the entire homestead. In this last all the members assemble in the evening for conversation and amusement, the women spinning, while the children play. The people take delight in listening to the recitation of the poetical rhapsodies in which the Servian literature is remarkably rich. The houses are mostly very small wooden structures, serving for little else but sleeping places. But that of the stareshina is often of brick, and is invariably of better construction than the rest.

Government.

Since 6th March, 1882, the government has been a constitutional monarchy. The legislative body is called the *skupshtina*, and in 1884 consisted of 178 members, three-fourths of whom are elected by the people, the remainder being nominated by the king. A new skupshtina is elected every three years. For the settlement of special questions of great moment an extraordinary skupshtina or great national assembly is elected, in which there are four times as many members, all elected, as in the ordinary skupshtina. There is also a permanent council of state of 15 members, who have the task of drawing up proposals for legislation, hearing complaints regarding the decisions of ministers, and performing other functions. For administrative purposes the kingdom is divided into twenty-two circles, beside the city of Belgrade. In the budget for 1883–84 the revenue and expenditure were each estimated at nearly £1,500,000 [$7,290,000], and for 1884–85 at about £1,840,000 [$8,942,400]. The national debt at the end of 1884 was about £7,000,000 [$34,020,000]. An additional debt of about £1,000,000 [$4,860,000] was contracted during the Servo-Bulgarian war of 1885–86.

Army.

The Servian army is divided into three classes. The first class, embracing men between 25 and 30 years of age, constitutes the standing army, which numbers 18,000 on a peace footing and about 100,000 on a war footing. The first two years are served with the colors and the remainder of the term in the reserve. The second class contains men between 30 and 37 who have served in the standing army. The third class, which is only called out in extraordinary emergencies, is composed of men between 37 and 50. The total military strength of Servia for cases of emergency is estimated to be about 210,000 men.

The capital of Servia is Belgrade, at the junction of the Danube and the Save. It is the only town with more than 15,000 inhabitants. Next in size is Nish, in the territory added by the treaty of Berlin, where the valley of the Nishava opens into that of the Bulgarian Morava. The other chief towns are Kragushevatz in the centre of the Shumadia, the former capital of the country, Shabatz on the Save, Semendria on the Danube, Krushevatz, Alexinatz (the centre of the flax and hemp growing district), Ushitze, Posharevatz, Vranja, and Leskovatz.

See Rev. W. Denton, *Servia and the Servians*, London, 1862; Kanitz, *Serbien: historische-ethnographische Reisestudien*, Leipsic, 1868; Balme, *La Principauté de Serbie*, Paris, 1880. (G. G. C.)

History.

The original home of the Croats and Serbs, who are identical in race and language, was the country adjoining the Carpathian range. Their speech shows them to belong to the eastern division of the Slavonic family (see Slavs). The generally accepted derivation of the name *Chrobat, Croat*, is from the original designation of the Carpathians, *Chrbet*, "a ridge," an opinion supported by Schafarik and Professor Ljubić, author of a Croatian history. This view is rejected by Perwolf[1] and also by Penka,[2] but apparently on insufficient grounds. The last-named connects the word with the same root as that from which "Slav" is derived (*slu-ti, klu, kru*) and makes it signify the "vassals," those who follow a chief. The derivation suggested by Schafarik for "Serb" is the root *su*, "to produce;" thus the name would come to mean the people, just as *deutsch* is from *diot*, "people." He considers it to have been the original appellation of all the Slavs. This must be accepted as the best explanation hitherto given, though not altogether satisfactory. We find the name Σέρβοι in Ptolemy and *Sirbi* in Pliny.

The Serbs and Croats have no history till the year 638 A.D., at which period they left their original settlements and migrated into the ancient Illyricum and part of Mœsia. Whether any of this people had previously taken up their abode in the Balkan peninsula is by no means clear, and very different opinions have been held on the subject. The most probable account is that small Slavonic colonies were settled here and there as early as the 2d and 3d centuries, consisting mainly of prisoners taken in war; and we hear of two tribes, the Karpi and the Kostoboki, who are claimed by Schafarik with good reason as Slavs. Jireček considers that for two hundred years before the Slavs are heard of in history south of the Danube they were scattered as colonists in Mœsia, Thrace, Dardania, and Macedonia. Professor Drinoff finds mention of Slavonic colonies in Thrace in the *Itinerarium Hierosolymitanum* and *Itinerarium Antonini;* and, even if we do not give a complete adhesion to his views, there are many names of towns in Procopius (in the first half of the 6th century) which are undoubtedly Slavonic. The traces of the original inhabitants have disappeared, except in so far as the Albanians represent these peoples. It is generally believed that the word *meropch* or *neropch*, signifying a slave, found in the *Zakonik* of Dushan, refers to the Noropians, an old Thracian tribe.

Settlement of Serbs in Balkan peninsula.

Our authority for the Servian migration in the middle of the 7th century is the emperor Constantine Porphyrogenitus. According to the story, five Croatian princes, the brothers Clucas, Lobelus, Cosentzis, Muchlo, and Chrobatus, and two sisters, Tuga and Buga (*i.e.*, Calamity and Prosperity), came at this period from northern or Belo-Chrobatia, as it was called, the original home of the Croats in the Carpathian Mountains. The descendants of their people who remained in the territory are lost among the surrounding population. The services of these Croats were made use of by the emperor Heraclius, and they became a barrier against the Avars, whom they drove out of the country in which they settled. The territory which they occupied was divided by them into eleven *župas* or *gauen*. The people who inhabited the western portion kept the name of Croat, those in the eastern were called Serbs. We must now leave the Croats, as in this article we have only to do with the Serbs properly so called. The Croatian branch of the family, after being ruled by petty *bans*[3] (a word said to be of Avar origin), was annexed to the kingdom of Hungary, and after the 16th century followed the fortunes of the house of Hapsburg.

Early contests with Greeks.

For five centuries after their arrival in their new territories we hear nothing of the Serbs save an occasional very brief mention in the Byzantine chroniclers. The native annalists do not begin earlier than the 12th century. As in Croatia so among the Serbs, the smaller župans[4] gradually became merged into two or three great ones. The head župan of Servia, who resided in Desnica, called by Constantine Destinica, was at first the suzerain of all the other Servian župans, with the exception of the Pagani, concerning whose Latin name the emperor Constantine makes the very strange remark—*καὶ γὰρ Παγανοὶ κατὰ τὴν τῶν Σκλάβων γλῶσσαν ἀβάπτιστοι ἑρμηνεύονται.* After the land was harried by the Bulgarians we find the great župan of Dioclea (Doclea) supreme; he acquired the title of king, and received his insignia from the pope. Finally, Nemanya, the descendant of a župan family of Dioclea, founded a new dynasty in Rasa (mod. Novibazar), and united Servia and Bosnia into one strong empire. The names of the earlier princes, who are insignificant and do not help us to follow the thread of Servian history, need not be mentioned. We find them sometimes tributary to the Greek emperors and sometimes independent. They appear, moreover, to have been engaged in constant wars with the Bulgarians. About 1015 Vladimir was reigning; but he was assassinated by the Bulgarian czar John, who got possession of Servia, but died two years afterwards on an expedition against the Greeks. Together with Bulgaria, Servia fell under the power of the emperor, and its affairs were managed by a Greek governor. Stephen Voyislaff made an insurrection in 1040, expelled the governor, Theophilus Eroticus, and defeated the Greeks in 1043. His son and successor, Michael (1050–80), at first lived in peace with the Byzantines, but afterwards entered into diplomatic relations with the West, took the title of king (*rex*), and received his insignia from the pope (1078). He conquered Durazzo (Drać) in 1079, and reigned thirty years. His son, Constantine Bodin, subjugated the župans

[1] *Archiv für slavische Philologie*, vii. 591.
[2] *Origines Ariacæ*, p. 128, Vienna, 1883.

[3] [Ban is a Persian word introduced by the Avars into Europe. See *New English Dictionary of the Philological Society*.—Am. Ed.]

[4] The following rules for the pronunciation of the Croatian letters will be found useful: *c* = *ts*; *ć* = a sound between *ts* and *ch*, something like *tie* in the English word "daintier;" *č* = *ch* as in "church;" *j* = *y* as in "young;" *š* = *sh*, *ž* = *zh* or *j* in the French "jour."

of Bosnia and Rasa. About 1122 Ourosh, surnamed Bela, župan of Rasa, ascended the throne. From this time dates the power of Servia. His wife Anna was a German princess. Omitting three insiguificant rulers, we come to the famous Stephen Nemanya (1159–95), whose life has been written by his son Sava. He reigned thirty-six years, and was many times successful against the Greeks, but was not able to take Ragusa. He abandoned the government to his son Stephen in 1195 and became a mouk under the name of Simeon, dying in 1200 in the mouastery of Chilander on Mount Athos. Stephen was crowued by his youngest brother Sava, first archbishop of the country, with a crown which had been consecrated by the pope; hence his title *Prvovyenchani*, "the first-crowned,"—that is to say of the new dynasty, for the župans of Dioclea were already kings. He died in 1224 and was followed by his sons Radoslaff and Vladislaff in succession. The latter made an offensive and defensive alliance with Ragusa. He employed Germans to work the Servian mines; and we find them repeatedly mentioned in Servian documeuts under the name of Saxous, especially iu the *Zakonik* of Stephen Dushan. No traces, however, can be found of them at the present day. Vladislaff's court is said to have been very luxurious. He died childless about 1237 and was succeeded by his brother Stephen Urosh, whose territories were devastated in 1241 by the Mongols. He was afterwards driven from his throue by his son Dragutin and died in 1272. The latter, however, stung by conscience, abandoned the crown to his brother Milutiu and contented himself with Syrmia, where he died in 1317. The reign of Milutin was chiefly occupied with struggles against the Greeks; he was generally successful in his campaigns. But his domestic life was unhappy: he divorced three wives and caused his only son Stephen to be blinded from suspicion of his treachery. The operation, however, was imperfectly performed, and the youth recovered his sight. In 1314 Milutin fought on the side of the emperor Andronicus against the Turks, and in the same year forced the Ragusans to pay him tribute. After his brother Dragutin's death he seized his hereditary dominions, and recalling his son Stephen, whom he had banished to Constantinople, gave him Dioclea. In 1319 the Hungarians deprived him of Bosnia; two years later he died. His son Stephen was engaged in perpetual wars. Iu 1330 he defeated the Bulgarians at the brook Kamencha near Velbuzhd, when the Bulgarian czar Michael was slain. It was on this occasion that his son called Stephen Dushan first distingnished himself. In spite of the king's successes against the Greeks, he was destined to close his reign in the most lamentable manner: he was imprisoned and strangled by order of his own son at Zvechan in 1336. It is from this crime that Dushan gained his surname (*dushiti*, "to suffocate"). Concerning this prince, we are told by the ancient chroniclers that he was gigantic in stature and terrible in appearance. He conducted thirteen campaigns against the Greeks. In 1337 he took Strumitza and subjugated all Macedonia and Albania to Thessalonica, Kostur, and Janina, threatened Byzantium, and concluded a peace with the emperor Andronicus, who was shut up in Thessalonica. He now divided his kingdom into eight districts and arranged everything on the Byzantine model. He conquered the whole of Macedouia, and caused himself to be crowned emperor of Servia, his son Urosh as king (*kral*, *rex*), and the archbishop of the country as patriarch. In 1349, at a diet, he published his celebrated *Zakonik* or "Book of Laws" (see below). In 1356 he began a new campaign against the Greeks, his object being to seize Constantinople, to place the Greek crown upon his head, and drive the Turks out of Europe; but in the midst of his schemes he died at Deabolis in Albania on 18th December, 1356. His son Urosh was then but uineteen years of age, and, being sickly in body and weak in mind, he was unable to struggle against the revolted governors of his provinces, some of whom wished to make themselves iudependent. He was killed in a conflict with one of them in 1367, who ascended the throne under the name of Vukashin. This monarch was at first successful against the Turks, now already masters of considerable portions of the Byzantine empire; but he lost the decisive battle of Tænarus, and with it his life, in 1371. According to the chroniclers, the Serbs were surprised and many slain while sleepiug. Many also were drowned in the waters of the Maritza, "and there their bones lay and were never buried." The fate of Vukashin and his brother Goiko was uncertaiu. The empire of Dushan now began to fall to pieces and Servia was again without a ruler. Marco, the son of Vukashin, declared himself the successor of his father; but the line was unpopular with the Serbs, and at a diet at Peć (Ipek) in 1374 they elected a young noble, Lazar Greblianovich, a connection of the old princely house. He did not, however, take the title of either emperor or king, but only of *knez* or prince. Bosnia was separated from Servia and fell under the rule of a noble named Tvertko. Sultan Murad had already conquered the Bulgarian sovereign Shishman and now marched against Servia. On the 15th of June, 1389, the Serbs were completely defeated at the battle of Kosovo, the "field of black-birds." No event has been so much celebrated in the natioual songs as this. Many are the lays which tell of the treachery of Vuk Brankovich aud the glorious self-immolation of Milosh Obilich, who stabbed the conquerer on the battlefield. The silken shroud, embroidered with gold, with which his wife Militza covered the body of her husband is still preserved in the monastery of Vrdnik in Syrmia, and a tree which she planted is shown to travellers at Župa. According to one account Lazar was killed in the battle; according to others he was taken prisoner and executed before the eyes of the dying Murad. The bones of Lazar now rest at Ravanitza ou the Frushka Gora in Syrmia. We hear no more of independent Serb priuces; the country was now tributary to Turkey, and its rulers were styled despots. Stephen, the son of Lazar, was confirmed in this title by Bajazid, the successor of Murad. Militza died in a convent in 1406. Stephen died in 1427 childless, and was succeeded by George Brankovich, a man sixty years of age, whose reign was a troubled one. In 1437 he was compelled to fly to Hungary to avoid the wrath of Murad II., and did uot recover his territory till Hunyadi and Scanderbeg drove back the Turks in 1444. George fell, in the ninety-first year of his age, in battle with a Hungarian magnate named Michael Szilagyi on 24th December, 1457. His youngest son Lazar succeeded him after committing many crimes, but only survived his father five weeks. His widow, Helena Palæologus, gave the country to the pope in order to secure his assistance against the Turks. Upon this the sultan ravaged Servia in the most pitiless manner, burnt the churches and monasteries, and carried off 200,000 persons into captivity. Servia became in all respects a Turkish province, although we occasionally find the empty title of "despot" borne by some of the descendants of its princes. Great numbers of the Serbs subsequently migrated to Hungary. In 1689 some thousands under the command of the despot George Brankovich entered the imperial (German) army. In 1691 the Servian patriarch, Arsenius Chernoyevich, led about 36,000 families to settle in various parts of Hungary, chiefly in Syrmia and Slavonia. These *zadrugas*, as they are called, are not families in our sense of the word, consisting of parents and children, but communities of families according to the custom still found among the Croats of the Military Frontier. The number of the emigrants at that time would probably amount to 400,000 or 500,000 persons. Others followed them in 1738 and 1788. These Serbs have kept their religion and language in spite of the desperate efforts of the Government to Magyarize them. The last despot of Servia was George Brankovich, who died in captivity in Austria in 1711.

Stephen Dushan.

Contests with Turks.

Battle of Kosovo.

Servia tributary to Turkey.

In consequence of the splendid victories of Prince Eugeue, Austria acquired the greater part of Servia by the treaty of Posharevatz in 1718, but the Turks regained it by the peace of Belgrade in 1739. For upwards of four centuries the Serbs groaned under the Turkish yoke, until, in 1804, unable to eudure the oppression of the Turkish *dahis*, they broke out into rebelliou under George Petrovich, surnamed *Tsrni*, or "Black George" (in Turkish *Kara*). Kara George was born at Topola (Tapolja) in 1767; at first he merely aimed at conquering the dahis, but afterwards he attempted to drive the Turks out of Servia. This he succeeded in doing after many failures. In 1813, however, they reconquered the country, and George with his adherents was compelled to fly to Austria. He returned in 1817, but was treacherously murdered by order of Milosh Obrenovich, who had now become the Servian leader. We have no space here to sketch the struggles of Milosh to secure the iudependence of Servia. He was himself of peasant origin and in his youth had been a swineherd. The Turks had contrived to kill or drive out of the country all the Servian aristocracy, leaving only peasants to till the ground, feed swine (one of the great industries of the country), and pay the *harach*. Milosh was declared prince by the national assembly, and in 1830 secured the consent of the Porte to his enjoyment of the title with the succession reserved to his family. Turkey allowed Servia a quasi-independence, but held and garrisoned several fortresses. Milosh had so little forgotten his Turkish training that he made himself obnoxious to his subjects by his despotic acts. He was a man of simple, even coarse habits, as many of the anecdotes told of him testify. He was compelled to abdicate in 1839 in favor of his son Milan, who, however, was of too feeble a constitution to

Struggles for independence.

direct the government, and, dying soon afterwards, was succeeded by his younger brother Michael. He also abdicated in 1842 and the Serbs then elected Alexander, the son of Tsrni George, or, to give him his Servian patronymic, Karageorgevich. His rule lasted seventeen years; he was compelled to resign in 1859, and Milosh, now very old, was invited to come from Bucharest. He lived, however, only one year, dying in 1860, and left the throne to his son Michael, then aged forty, who was thus a second time elected prince of Servia. Michael was a man of refinement and had learned much during his exile. The condition of the country improved during his reign, and in 1862 he succeeded in getting the Turkish garrisons removed from Belgrade. The Moslem inhabitants have gradually withdrawn from the country, so that they are now represented by a very few families. Of the two mosques still remaining in Belgrade, one is devoted to their use, the other having been turned into a gas-work. While walking in his park, called Koshutniak or Topshidere, near Belgrade, Michael was assassinated by the emissaries of Alexander Karageorgevich on 10th June, 1868. He was succeeded by his second cousin, Milan,[a] grandson of Yephrem, a brother of Milosh. Milan was born in 1854; he became prince of Servia in 1872. In 1875 he married a Russian lady, Natalie de Keczko. In 1878 the Serbs declared war against Turkey, but their arms were unsuccessful, and they were only saved by the intervention of Russia. By the treaty of Berlin, July, 1878, the country received a large accession of territory, and the prince caused himself to be proclaimed king. Peace continued till the year 1885, and during this period the Serbs seemed to make considerable progress as a nation, in spite of the bitterness of political faction. In 1885, however, Servia made an ill-judged and selfish attack upon Bulgaria, which was ignominiously beaten off.

Literature.

For some account of the Servian language, see Slavs.

Under Servian literature the Dalmatian and Croatian in the limited sense of the term must be included. The latter, however, is somewhat meagre. This literature is divided into three periods—(1) from the earliest times to the fall of Servian independence at the battle of Kosovo, 1389; (2) from the rise of the importance of Ragusa in the 15th century till its decay towards the end of the 17th; (3) from the time of Dositei Obradovich to the present day.

First Period.—The earliest composition which has come down to us in the Servian or Illyrian language, to use a term in which we may include the Dalmatian Slavs, who are essentially the same people, is the production of an unknown priest of Dioclea (Doclea), now Duklya, a heap of ruins, but formerly a city of considerable importance on the river Moratza. His title in Latin is "Anonymus Presbyter Diocleus," or in Slavonic "Pop Dukljanin." He must have lived about the middle of the 12th century, as the chronicle compiled by him extends to the year 1161. It is a tedious production, and possesses only antiquariau interest; it is printed by Knkuljević Sakcinski[1] in the *Arkiv za Povestnicu Jugoslavensku* (Agram, 1851). The oldest documents of the Servian language in the narrower sense of the term are a letter of Kulin, the ban of Bosnia in 1189, and the letter of Simeon or Stephen Nemanya to the monastery of Chilander on Mount Athos. These productions are simply Palæoslavonic with a mixture of Serbisms. The history of early Servian literature has been thoroughly investigated by Schafarik in his *Serbische Lesekörner* (Pesth, 1853). We have only space to mention the more important productions. (1) The *Life of St. Simeon* by his son St. Sabbas or Sava, the first archbishop of Servia, was written about 1210. The early manuscripts have been lost and the oldest copy known only dates from the 17th century. Besides this work, Sava also compiled a *tipik* or collection of statutes for the monastery of Studenitza, of which he was hegoumen or abbot. He was the founder of the celebrated Chilander monastery. (2) The *History of St. Simeon and St. Sabbas* by Dometiau was compiled in 1264, and is preserved in a manuscript of the 14th century. There is a good edition by Danichich, to whom we are indebted for a valuable lexicon of Old Servian. (3) The *Rodosloff* or Lives of Servian kings and archbishops, compiled by Archbishop Daniel (died 1338), contains the lives of Kings Radoslaff, Vladislaff, Urosh, Dragutin, Queen Helena, Milutin, etc. After his death the work was continued by an anonymous writer. The style of these productions is dry and tasteless. They are written in Palæoslavonic mixed with Serbisms. Hilferding has commented with great severity on their bombastic and panegyrical style,—the most complimentary epithets being applied to many sovereigns whose careers were stained with crimes. (4) The *Life of Stephen*, surnamed "Dechanski," from the monastery Dechani which he founded, written by Gregory Tzamblak, hegoumen of the same monastery. (5) In 1359 we have the Code of Laws (*Zakonik*) of Stephen Dushan, which has been previously mentioned; it is the earliest specimen of Servian legislation, and has come down in several manuscripts, being first published by Raich in his *History* at the close of the 18th century. Since that time other editions have appeared, the two most important being those of Miklosich and Novakovich.

Early chronicles.

Second Period.—To this epoch, which may be said to commence with the 15th century, belong some of the Servian chronicles, the *Lyetopis Koprivnichki* and others,—dry and tedious compilations; the 15th century saw also the outburst of the literature of Ragusa (see below). The Servian ballads have obtained a European celebrity, and must have existed from very early times. Nicephorus Gregoras, who in 1325–26 came to Stephen Urosh IV. as ambassador from the Byzantine emperor Audronicus, noticed that some Serbs attached to his suite sang tragic songs celebrating the great exploits of their national heroes. As M. Pîpin remarks in his *History of Slavonic Literature*, this shows the existence of a national epic among the Serbs before the battle of Kosovo. In the description of an embassy sent from Vienna to Constantinople in 1551 a certain Kuripeshich, by birth a Slovene, speaks of hearing songs sung in honor of Milosh who slew Sultan Murad. The first attempt at collecting them was made by the Franciscan monk Andrew Kaćić-Miošić, a Dalmatian, who died in 1785. His work was published at Venice in 1756 under the title of *Razgovor Ugodni Naroda Slovinskoga* (Recreations of the Slavonic People). Some of the pieces included in this volume were written by Miošić himself, and he made many alterations in the old ones. This, however, was quite in the spirit of the age in which he lived. We find extracts from Servian ballads in some of the Dalmatian poets of the 16th century. In 1794 they were alluded to in the *Travels* of the abbé Fortis, and were finally collected by Vuk Stephanovich Karajich and published at Leipsic in 1824 under the title *Narodne Srpske Pyesme* (Popular Servian Songs). Some of them were afterwards translated into German by Theresa von Jacob and into English by Bowring and Lord Lytton. The versions of the last two possess but little merit. It would be impossible in a short notice like the present to discuss the contents of these remarkable ballads. To the majority of readers the cycle which treats of Knez Lazar and his fate at the battle of Kosovo will prove the most interesting. Besides historical persons introduced in the ballads, there is the half-mythical hero Marco Kralevich, who, like the Russian Ilya Murometz, has many of the characteristics of a supernatural being. His victories, chiefly over Turks and Magyars, are narrated in the most bombastic phraseology. At last he dies in battle; but the belief prevails that he remains concealed till he shall appear on some future occasion to rescue his people from their oppressors. Almost as mysterious as the hero himself is his horse Sharatz, who was presented to him by a *vila* or fairy. After the death of Vuk Stephanovich (1864) a supplementary volume was published by his widow, which her husband had left prepared for the press, *Srpske Narodne Pyesme iz Herzegovine* (Popular Servian Songs from Herzegovina, Vienna, 1866). A good collection of songs of the Montenegrins (Tsrnogortzi) was edited at Leipsic in 1857 by Milutinovich. There has also appeared a little volume of Servian national songs from Bosnia, collected by Bogolub Petranovich in 1867. Since then volumes of Servian popular poetry by Rayachevich and Ristich have appeared.

Servian ballads.

Ragusan era.

During this period Slavonic literature reached a high pitch of culture in the little city of Ragusa, called in Slavonic Dubrovnik. During the 15th, 16th, and 17th centuries this city, now in a state of decay, was a kind of Slavonic Athens. To the influence of Italian literature was added the culture introduced by the crowds of learned Greeks,—Chalcocondylas, Lascaris, and others,—who found refuge within its walls after the fall of Constantinople. Lyrics and the lyric drama seem to have been the general productions of the more noteworthy authors. The influence of Italian is perceptible throughout. The first writer of eminence was Hannibal Lucić, a very popular poet in his day, author of love-songs, a drama *Robinja* (The Female Slave), and translations published first by his son Anthony at Venice in 1556, and reprinted by Dr. Gaj at Agram in 1847. A very interesting poem by this author is his *Eulogy* of the city of Dubrovnik (Ragusa). Another writer of considerable reputation was Nicholas Vetranić-Cavčić (1482–1576), who afterwards became a mouk and lived as a hermit on one of the islands on the Dalmatian coast. He has left several

[1] In citing the names of those members of the Servo-Croatian race who use Latin letters the original orthography is preserved.

[a] [Divorced in 1888, abdicated the next year, succeeded by his son Alexander at the age of 13, under a regency for five years.—Am. Ed.]

plays and, besides translating the *Hecuba* of Euripides, wrote several mysteries, in the style of the religious plays once so popular throughout Europe; of these the *Sacrifice of Abraham* is the best. His poem entitled *Italy* is remarkable for the warm affection it expresses for the country of his education. Peter Hektorević (1486–1572) was a rich proprietor of the island of Zara, and is worth mentioning as having shown a taste for the national poetry of his country. He has introduced some songs in his *Ribanje i Ribarsko Prigovoranje* (Fishing and a Dialogue of Fishermen). Very celebrated in its time was the *Jegjupka* or Gypsy of Andrew Čubranović (1500–1559), who was originally a silversmith. His poem of the *Gypsy* is said to have been evoked in the following manner. Čubranović was on one occasion following a young lady and urging his suit when she turned round and said scornfully in Italian to her attendant, in the hearing of the poet, "Che vuole da me questo Zingaro?" ("What does this Gypsy want with me?"). The despised lover took up the word of reproach and wrote a poem in which he introduced a Gypsy prophesying to a company of ladies their various fortunes and concluding with an expostulation to the hard-hearted beauty for her obduracy. Schafarik speaks of this piece with great enthusiasm and calls it "a truly splendid flower in the garden of the Illyrian Muses." The Russian critic Pîpin supposes, with great probability, that the poem was written as a sort of masquerade for the carnival. It enjoyed considerable popularity and was frequently imitated. A similar story is said to have suggested the *Dervise* (Dervish) of Stjepo Gučetić, in which the author represents himself as a Turkish dervish. These two pieces are elegant productions in the Italian manner.

Nicholas Naljeskovic (1510–1587) was a native of Ragusa and author of several pastoral plays in the style then so much in vogue throughout Europe. Of the same description are the productions of Marino Držić (1520–1580, of whom his contemporaries praised "il puro, vago, e dolce canto." Mention may also be made of Dinko Ranjina and Mauro Orbini (d. 1614). Another celebrated poet was Domineo Zlatarić (1556–1607), who, besides translating the *Electra* of Sophocles, produced a version of the *Aminta* of Tasso and has left several minor pieces. The chief of the Ragusan poets, however, was Ivan Gundulić (sometimes called by his Italian name of Gondola). Very few facts are known of his life; but he died in 1658, aged fifty, having discharged several important public offices. His death, says Schafarik, was not too early for his fame but too early for literature and the glory and prosperity of his country. He himself published but little, and many of his writings perished in the earthquake in 1667, after which Ragusa never regained her former prosperity. The so-called Petrarchan school of Illyrian poetry languished after this and wasted its energy on elegant trifles. Dalmatian poets of the 18th and 19th centuries have not made any considerable figure. The *Osman* of Gundulić, on which his fame rests, is an epic in twelve books, and was written to celebrate the victory of the Poles under Chodkiewiez over the Turks and Tatars in 1622 at Chocim (Khotin). Schafarik praises Gundulic for the richness of his imagination, the lofty tone of his verse, and its perfectly constructed rhythm. We are willing to allow that *Osman* possesses considerable spirit and that the versification is melodious, but on the whole it seems a tedious poem. The short quatrains in which it is written lack the true epic dignity. Leaving the Dalmatians, the only writer worthy of mention among the Serbs is George Brankovich (1645–1711), the last despot, who compiled a *History of Servia till the end of the 17th Century*, which has been edited by Chedomil Miyatovich, ambassador from the court of Servia to St. James's (1886). From this period till the close of the 18th century there is no Servian literature: the spirit of the people seems to have been crushed out of them by Austrian persecutors on the one hand and by Turkish on the other. Till the reign of Milosh Obrenovich in the 19th century hardly a Servian printed book was to be seen. The works of Yuri Krizhanich, who, although a Serb, wrote in Russian, are mentioned under Russia (p. 105).

Third Period (*from* 1750).—The spark of nationality was still burning among the Serbs, in spite of their degradation, and men were found to fan it. Such a man was Raich (1720–1801), a thorough patriot. He was born in Slavonia, a province of Austria inhabited by Serbs, the son of poor parents, but he had all the enthusiasm for learning that animated the Russian Lomonosoff, whom he very much resembled. Thus we find him making his way on foot from his native town to Kieff, where he was received into the ecclesiastical seminary and devoted himself to theology. After spending three years at Kieff, he betook himself to Moscow. Meeting, on his return to his native country, with a cold reception from those whom he had expected to foster his studies, he went back to Russia, and while at Kieff resolved to write the history of the Servian nation. Knowing that the Slavonic monasteries in European Turkey contained many unpublished manuscripts (numbers of which have since perished in the wars which have devastated the country or have been destroyed by the Greeks), he visited Constantinople and many other parts of that empire in order to collect materials. On his return to Austria he took up his abode at Neusatz on the Danube (also long the headquarters of Schafarik), and worked at his history, which he finished in 1768, but it was not published till upwards of twenty years later. In 1772 he became a monk, and he died in 1801. The work of Raich, though interesting as a monument of learned industry, does not now possess much critical value. The style is harsh and a great deal of the ethnology (a science then in its infancy) unsound. Thus, among other strange statements, he holds the Bulgarians on the Volga to have been Slavs. After Raich we come upon two indefatigable Servian workers, Dositei Obradovich (1739–1811) and Vuk Stephanovich (1787–1864). Obradovich. The life of the former has been written by himself. He was a man of varied learning, and his career was marked by many curious adventures. After having visited nearly every part of Europe (including England, where he was received with great hospitality),[1] Obradovich returned to Servia and became tutor to the children of Tsrni George. He was a man sprung from the people, and an indefatigable and successful laborer for national education. The list of his compilations and translations is considerable. Acting on the wise principle that the language *as it is spoken* should be cultivated and not a jargon overloaded with archaic and supposed classical forms, he did good by destroying the influence of the Palæoslavonic among his countrymen. Before his death his services to his country were recognized by his appointment as member of the senate and superintendent of national education. The man, however, who was destined to bring the Servian language into the greatest prominence was Vuk (Wolf) Stephanovich Karajich, whose collection of songs was mentioned above. Vuk was an indefatigable scholar and patriot. Till his time the Servian language had been, so far as all foreigners were concerned, simply *rudis indigestaque moles*. He wrote a good grammar, which has formed the basis of all published since, and to this Jacob Grimm furnished a preface. To him also we owe a Servian dictionary and a collection of tales and proverbs. His supposed innovations in the Servian language with regard to the rejection of archaisms and the introduction of a new system of orthography raised up a host of enemies against him, so that not only was he forbidden to enter Servia but his books were excluded from the country. He died at the beginning of 1864, but permission to make use of his innovations was not given till four years afterwards. Vuk Stephanovich.

A complete enumeration of the Servian and Croatian authors of the 19th century would far exceed the limits of this article. But Matthias Anthony Relković (1732–1798) deserves mention, because he wrote in a dialect but little cultivated, viz., the Slavonian in the restricted sense, as applied to the Austrian province of that name. He published in 1761 a successful satire entitled *Satir iliti Divi Csovik* (Satire or the Clever man), at Dresden. A few names, each of which marks a definite feature of the literature, must suffice. Lucian Mushitzki (1777–1851), an archimandrite, afterwards bishop of Carlowitz, was highly esteemed by his countrymen as a poet. His odes are full of patriotic feeling. Yovan Hadchich (1799–1870) wrote under the *nom de plume* of Milosh Svetich. For some time he was an authority in Servian literature, but ultimately his influence waned. Simeon Milutinovich, a noted writer, whose life was full of strange adventures, composed an epic poem entitled *Serbianka*, which describes the chief incidents of the Servian war in 1812. It was published at Leipsic in 1826. We have previously alluded to his collection of Montenegrin songs. He is also the author of a tragedy on Milosh Obilich, who slew Sultan Murad. Milutinovich, who was a Bosnian, died in poverty in 1847. Yovan Popovich (1806–1856), a native of the Banat, was a writer of much industry and merit, and gained a considerable reputation by his plays, the subjects of which were taken from Servian history and were put upon the stage with considerable effect. Without being a great dramatic writer, he had the art of constructing pieces to which people would listen,—something like Sheridan Knowles. To this circle belongs also Minor writers.

[1] To show the opinion entertained of him in Britain it is only necessary to cite the inscription in a book presented to him by Dr. Fordyce, an eminent London physician of the time: "Dositheo Obradovic, Serbiano, viro linguis variis erudito, sanctissimis moribus morato," etc.

Yuri Maletich, author of *Spomenik Lukianom Mushitzkom* (A Memorial to Lucian Mushitzki), and also the *Apotheosis of Kara George*. In 1847 the well-known journal *Glasnik* (The Messenger) was founded, which has continued to the present time and contains many valuable papers on Servian history and literature. Schafarik had previously founded at Neusatz (Novi Sad) the *Matitza Srbska*, an excellent society for printing Servian books.

Croatian literature.

The Croats have also been active in modern times. The remarkable poem, *Death of the Agha Ismail Čengić*, by Ivan Mažuranić (born in 1813), is said to be so popular among the Serbs, as stimulating their hatred of the Turk, that it has been called "The Epos of Hate." Ismail was the descendant of an old Bosnian family who had turned Mussulmans to keep their estates when the country was first invaded. These renegades, as might be expected, are more fanatical than the Turks themselves. His exploits were chiefly directed against the Uskoks and the Montenegrins. The poem is composed in the same metre as that of the Servian ballads collected by Vuk. It is spirited, but has a savage air about it, engendered by the scenes described, the fierce border wars of long hereditary hatred. The account of the cruelties committed by the Turks while collecting the *harach* and the conclusion, where the body of the slain Agha is brought to the hermit, are dramatically conceived.

Servo-Croatian poetry.

The four most celebrated Servo-Croatian poets are Stanko Vraz, Preradović, Yovanovich, and Radichevich. Stanko Vraz (1810–1851) was by birth a Slovene; he joined, however, the Illyrian movement under Ljudevit Gaj and used the Servo-Croatian language. The attempt of Gaj to form a common literary language under the name of Illyrian by fusing the Servo-Croat and the Slovenish languages was not successful. Perhaps the only result, if it had been preserved in, would have been that the Slovens would have become completely Germanized, as a pedantic literary language would not have been understood by the peasants. Besides many graceful lyrics, Vraz also published collections of national songs. Some of his shorter pieces are very elegant and have a rich Oriental coloring. Peter Preradović (1818–1872), a native of the Military Frontier and a general in the Austrian army, is the author of many graceful lyrics, widely known throughout all Servian-speaking regions. A complete edition of his works appeared in 1873. Peter Yovanovich (born in 1801) is the author of many popular poems. But no one of the later generations of Servian authors has gained such a reputation as Branko Radichevich, who was born in the Austrian Banat in 1824, and ended his short life at Vienna in 1853. His popularity rests upon the patriotism shown in his writings and their spirited tone. Nor have the Servo-Croats lacked important workers in the fields of history and philology. Among these must be mentioned Dyuro Danichich (1825–1882), who was educated partly at Pesth and partly at Vienna, at the latter university becoming a pupil of Miklosich. He first made himself conspicuous by espousing the cause of Vuk Stephanovich Karajich in the dispute about Servian orthography. Besides contributing valuable papers to the *Glasnik*, he was the author of an Old Servian dictionary of great service to students. He edited, as previously mentioned, the memorials of Old Servian literature. At the time of his death he was engaged upon a great Servo-Croatian dictionary, a work which it is to be hoped, will be continued by some of his pupils. Ljudevit Gaj (1809–1872), who has already been mentioned, was a Croat and labored to bring about a national unity. His services were invaluable as an editor of the Old Dalmatian classics. Armin Pavić (still living) has written a good history of the Dalmatian drama (*Historija Dubrovačke Drame*, Agram, 1871). Stoyan Novakovich (born 1842), at one time minister of public instruction, besides contributing valuable articles in the *Glasnik*, has published an historical chrestomathy of the Servian language and an edition of the *Zakonik* of Stephen Dushan. Another worker in the same field was Chedomil Miyatovich, previously mentioned. One of the most indefatigable and patriotic of modern Croatian scholars is Ivan Kukuljević Sakcinski, who has edited, besides many early Croatian and Servian works, an admirable *Arkiv az Povestnicu Jugoslavensku* (Collection of Documents for South Slavonic History), of which several volumes have appeared, —a veritable storehouse of Slavonic history, archæology, and literature. He has found an excellent coadjutor in Dr. Francis Rački (born 1829), among whose works may be mentioned *Pismo Slovjensko* (Slavonic Writing, Agram, 1861), *Odlomci iz Državnoga prava Horvatskoga* (Fragments of Croatian Law, 1861), and many excellent historical articles in the journals *Pozor* (The Observer) and *Rad* (Labor).

After Miklosich, the most indefatigable worker in the field of Slavonic literature now living is the Croat Ignaz Vatroslaff Jagić (born 1835), formerly a professor at Berlin, who now occupies the chair of Slavonic philosophy at St. Petersburg, in the place of Sreznevski. He has published many valuable works on Slavonic philology, such as (in 1867) a *History of Servo-Croatian Literature*, also a reading-book with specimens of early Glagolitic and Cyrillic works (*Priměri Starohervatskoga Jezika*). He has also edited two of the oldest Slavonic codices, Marianus and Zographensis. Moreover, in 1875, he founded the well-known *Archiv für slavische Philologie*, which he still edits with the coöperation of many Slavists. Sime Ljubić is another worker in the field of Slavonic history and literature. To the excellent literary journals already mentioned may be added the *Starina*, published at Agram. Valuable works have been written by Balthasar Bogišvić on the house-communities of the southern Slavs and south Slavonic law generally. His labors have been made use of by Sir Henry Maine. One of the most celebrated of living Servian poets is Matthias Ban, the author of several poems and plays, which have been very favorably received.

Slavonic literature generally.

A few words may be added here on Montenegrin history and literature, the details of which are but scanty. On the death of Stephen Dushan, a certain prince Balsha became independent ruler of Zeta. Many fugitives betook themselves to the little retreat after the battle of Kosovo. Ivan Chernoyevich settled in Tzetinye (Cettinje) in 1485 and built a church and a monastery. In 1516 his son and successor retired to Venice, and Montenegro was governed by a national assembly and a vladika (prince bishop). The country was ruled by vladikas of various families till 1697. In that year the office became hereditary in the family of Petrovich of Negosh. Originally the ecclesiastical and civil functions were combined in the person of the vladika, but they were separated on the death of Peter II. in 1851. The latter was the author of some poems in the Servian language, the most celebrated being *Loucha Mikrokozma* (The Light of the Microcosm), which appeared at Belgrade in 1845. He was succeeded by his son Daniel, first prince of Montenegro, who, dying in 1860, was followed by his nephew Nicholas, the most memorable events of whose reign have been the war with Turkey and the increase of his territory by the treaty of Berlin. (W. R. M.)

Montenegro.

SERVITES (Servi Beatæ Mariæ Virginis). This religious order owes its origin to Bonfiglio Monaldi, a Florentine, who in 1233[1] withdrew along with six of his comrades to the Campo Marzo near the city for prayer and ascetic exercises in honor of the Virgin. Three years afterwards they removed to Monte Senario, where their numbers were considerably increased. The order at a very early period received from Bishop Ardingus of Florence the rule of St. Augustine, but did not obtain papal sanction until 1255. It rapidly spread into France, Germany, the Low Countries, Poland, and Hungary, and from Martin V. it received in 1424 the privileges of the mendicant orders. The Servite Tertiaries were founded about the same time by Giuliano Falconieri. Under Bernardino de Ricciolini arose the Hermit Servites (1593). The members of the order (Observants and Conventuals) are now found chiefly in Italy, Hungary, Austria, and Bavaria.

SERVIUS, the commentator on Virgil, is all but unknown to us, so far as personal information goes. From notices in the *Saturnalia* of Macrobius, where he appears as an interlocutor, we may infer that in or about 380, though still quite young, he was already distinguished as a "grammaticus," that is, as an expert in the criticism, explanation, and teaching of the classical literature of Rome. Servius therefore belongs to the latter half of the 4th and the earlier years of the 5th century, to the age of Symmachus and Claudian, of Jerome and Augustine. The allusions of Macrobius and a short letter from Symmachus to Servius leave no doubt that the grammarian formed one of that band of cultivated men, led by Symmachus, whose eyes were turned towards the pagan past and away from the Christian future, and who breathed into pagan culture its last transient sparks of life and vigor. The race of "grammatici" to which Servius belonged, and which had now run at Rome a course

[1] [Date 1223, in vol. xvi. p. 742, is preferable.—Am. Ed.]

of some 500 years, had done much evil to literature, had helped to corrupt, falsify, encumber, and even in some instances by abbreviations upon abbreviations to kill out the texts on which they worked; but on the whole they had done more good. They had helped to save what could be saved of education, culture, and history, and so had in the main contributed to the preservation of the ancient literature that has come down to us. Of all the "grammatici" none bears on his front more of the virtues and fewer of the vices of the race than Servius. But it must be noted that much which passes under the name of Servius in modern editions, and in modern quotations, most certainly did not proceed from his hand. The comments on Virgil to which his name has been attached come from three different sources. One class of MSS. contains a comparatively short commentary, definitely attributed to Servius. A second class (all going back to the 10th or 11th century) presents a much expanded commentary, in which the first is embedded; but these MSS. differ very much in the amount and character of the additions they make to the original, and none of them bear the name of Servius. The added matter is undoubtedly ancient, dating from a time but little removed from that of Servius, and is founded to a large extent on historical and antiquarian literature which is now lost. The third class of MSS., written for the most part in Italy and of later date, repeats the text of the first class, with numerous interpolated scholia of quite recent origin and little or no value.

The real Servian commentary (for so we must designate the text that we find in the first class of MSS.) practically gives the only complete extant edition of a classic author written before the destruction of the empire. It is constructed very much on the principle of a modern edition, but with very different ideas both as to the relative and the absolute value of the matters treated. Owing to the delicacy and originality of his veiled style, to the innumerable threads of ancient history, mythology, and antiquities shot through the texture of his poems, owing above all to the firm hold he early gained upon the Latin schools, Virgil had a continuous line of expounders stretching almost from his death to the destruction of the Roman government of the West. Servius built his edition in part on the extensive Virgilian literature of preceding times, much of which is known only from the fragments and facts he has preserved. The notices of Virgil's text, though seldom or never authoritative in face of the existing MSS., which go back to, or even beyond, the times of Servius, yet supply valuable information concerning the ancient recensions and textual criticism of Virgil. In the grammatical interpretation of his author's language, Servius does not rise above the stiff and overwrought subtleties of that day; while his etymologies, as is natural, violate every law of sound and sense. As a literary critic the shortcomings of Servius are great, if we judge him by a modern standard, but he shines if compared with his contemporaries. In particular, he deserves credit for setting his face against the prevalent allegorical methods of exposition. But the abiding value of his work lies in his preservation of facts in Roman history, religion, antiquities, and language which but for him might have perished. Not a little of the laborious erudition of Varro and other ancient scholars, to whom time has proved unkind, has survived in Servius's pages. The older MSS. sometimes add to the name Servius that of Magister (given to other distinguished grammarians at different times); the later Italian MSS. in some cases give his name as Maurus Servius Honoratus. Besides the Virgilian commentary, we have other works of Servius,—a collection of notes on the grammar (*Ars*) of Donatus; a treatise on metrical endings; the tract *De Centum Meteris* or *Centimeter*.

The most noted editions of the Virgilian commentary are by Fabricius (1551); P. Daniel, who first published the enlarged commentary (1600); and by Thilo and Hagen (Leipsic, 1878–84). The *Essai sur Servius* by E. Thomas (Paris, 1880) is an elaborate and valuable examination of all matters connected with Servius; many points are treated also by Ribbeck in his "Prolegomena" to Virgil, and by Thilo and Hagen as above. The smaller works of Servius are printed in Keil's *Grammatici Latini*.

SERVIUS TULLIUS, the sixth king of Rome, described in one account as originally a slave, is said to have married a daughter of Tarquin, and to have gained the throne by the contrivance of Tanaquil, his mother-in-law. Another legend represented him as a soldier of fortune originally named Mastarna, from Etruria, who attached himself to Cæles Vibenna, the founder of an Etruscan city on the Cælian Hill. Servius included within one circuit the five separately fortified hills which were then inhabited and added two more, thus completing the "Septimontium"; the space thus inclosed he divided into four "regiones," the Suburana, Esquilina, Collina, and Palatina (see Rome, vol. xx. p. 831). For his contributions to Roman law see Roman Law, vol. xx. p. 690 *sq.*, and for his reforms of the constitution see Rome, vol. xx. pp. 753–4. His legislation was extremely distasteful to the patrician order, and his reign of forty-four years was brought to a close by a conspiracy headed by his son in-law Tarquinius Superbus. The street in which Tullia drove her car over her father's body ever after bore the name of the "Vicus Sceleratus."

SESAME, the most important plant of the genus *Sesamum* (nat. ord. *Pedalineæ*), is that which is used throughout India and other tropical countries for the sake of the oil expressed from its seed. *S. indicum* is an herb 2 to 4 feet high, with the lower leaves on long stalks, broad, coarsely toothed or lobed. The upper leaves are opposite, lanceolate, and bear in their axils curved, tubular, two-lipped flowers, each about ¾ inch long, and pinkish or yellowish in color. The four stamens are of unequal length, with a trace of a fifth stamen, and the two-celled ovary ripens into a two-valved pod with numerous seeds. The plant has been cultivated in the tropics from time immemorial, and is supposed on philological grounds to have been disseminated from the islands of the Indian Archipelago, but at present it is not known with certainty in a wild state. The plant varies in the color of the flower, and especially in that of the seeds, which range from light yellow or whitish to black. Sesame oil, otherwise known as gingelly or til (not to be confounded with that derived from *Guizotia oleifera*, known under the same vernacular name), is very largely used for the same purposes as olive oil, and, although less widely known by name, is commercially a much more important oil; thus, apart from the almost universal use of the oil in India, from 50 to 80 millions of kilogrammes [*c.* 50,000–79,000 tons] of the seed are stated to have been introduced annually into France in 1870–72. The seed is also largely exported from Zanzibar and Formosa. The seeds and leaves also are used by the natives as demulcents and for other medicinal purposes. The soot obtained in burning the oil is said to constitute one of the ingredients in India or Chinese ink. The plant might be cultivated with advantage in almost all the tropical and semi-tropical colonies of Britain, but will not succeed in any part of Europe.

SESOSTRIS (Σέσωστρις, so Herodotus; Diodorus writes *Sesoosis;* other forms are *Sesonchosis*, *Sesosis*, *Sesothis*, etc.) is according to Greek historians the name of a king of Egypt who conquered the whole world, even Scythia, the lands of the Ganges, and Æthiopia, which were not subject to any of the later great empires. The conqueror in whose exploits these extravagant legends took their rise was Ramses II. (see Egypt, vol. vii. pp. 640–1); but the Greek accounts unite in his person all the greatest deeds of the ancient Pharaohs, and add much that is purely imaginary. In Manetho's lists Sesostris is identified

with a much older king, Usertesen II., perhaps because authentic tradition made him the conqueror of Æthiopia (see vol. vii. p. 637). When Herodotus says that he himself saw monuments of Sesostris in Palestine, he has been thought to refer to the figures of Ramses II. hewn in the rocks of Nahr-al-Kalb, near Beirút, but they do not agree well with his description (Hdt., ii. 102–106), which seems to point rather to Astarte pillars (*Asherim*). The monuments in Ionia of which he speaks still exist in the Karabel Pass. They are not Egyptian but so-called "Hittite," *i.e.*, probably Cappadocian. See Wright, *Empire of the Hittites*, last plate.

SESSA, a town of the kingdom of Italy, province of Terra di Lavoro, situated among hills on the site of the ancient *Suessa Aurunca*, on a small affluent of the Garigliano, is 17 miles east of Gaeta and half a mile from Sant' Agata. The hill on which Sessa is situated is a mass of volcanic tufa, in which have been discovered painted chambers erroneously supposed to have belonged to a city covered by a volcanic eruption. The town contains many ancient remains, particularly the ruins of Ponte Aurunca and of an amphitheatre. It is the see of a bishop, has an interesting basilica with three naves, a gymnasium, a technical school, and a seminary. The cathedral contains inscriptions, a mosaic pavement, and a good ambo decorated with mosaics resting on columns. In the principal street are memorial stones with inscriptions in honor of Charles V., surmounted by an old crucifix with a mosaic cross. Exclusive of the environs, the town has a population of 6130. The hills of Sessa are celebrated for their vines, the "Ager Falernus" of the Romans.

SESSION, Court of. See Scotland, p. 560 *supra*.

SETTLE, Elkanah (1648–1723), a minor poet and playwright of the Restoration period, immortalized by the ridicule of Dryden and Pope, was born at Dunstable in 1648. He is the "Doeg" of the second part of *Absalom and Achitophel*, and is treated by the satirist with somewhat more good-humored contempt than his companion in the pillory—Shadwell.

> Doeg, though without knowing how or why,
> Made still a blundering kind of melody;
> Spurr'd boldly on, and dash'd through thick and thin,
> Through sense and nonsense, never out nor in.

Dryden treats him as a sort of harmless fool, who "rhymed and rattled" along in perfect satisfaction with himself. For some time also he was taken by the public at his own valuation. At college he seems to have been regarded as a prodigy, and his juvenile verse was preferred to Dryden's. Coming to London, he began to produce tragedies. His *Empress of Morocco* (acted in 1673, when the author was twenty-five) was a signal success on the stage, and is said by Dennis to have been "the first play that was ever sold in England for two shillings, and the first that was ever printed with cuts." Puffed up by this success, Settle made haughty allusions in his preface, which excited the ire of his contemporaries; and Dryden coöperated with Crowne and Shadwell in writing sarcastic notes on *The Empress*. Settle's next collision with Dryden was also provoked by himself. He attempted a counterblast to Dryden's great satire in *Absalom Senior*, and was contemptuously demolished in return. Settle was then comparatively a young man, his age being thirty-five, but he had touched the height of his fame, and the remaining forty years of his life were not so successful. Dryden mockingly said of him that his ambition was to be "the master of a puppet-show," alluding to his duties in the office of city poet, in which he was one of the successors of Lodge, Middleton, Jonson, and Quarles; and to this he was literally reduced in his old age, keeping a booth at Bartholomew Fair, where he is said to have played the part of the dragon in green leather. He died in the Charterhouse in 1723.

SETTLEMENT, in law, is a mutual arrangement between living persons for regulating the present or future enjoyment of property. It also denotes the instrument by which such enjoyment is regulated. The prevailing notion of a settlement is the dealing with property in a manner different from that in which the law would have dealt with it apart from the settlement. Definitions of settlement for the purposes of the Acts are contained in the Acts of 1856, 1877, and 1882 (see below). They are, however, scarcely sufficient for a general definition. On the one hand they are too extensive, and include wills; on the other they are not comprehensive enough, as they apply only to real estate. They also include only cases of successive limitations, but the idea of succession does not in itself seem a necessary part of the conception of settlement, although no doubt most settlements contemplate successive enjoyment. Settlements may be either for valuable consideration or not: the latter are usually called voluntary, and are in law to some extent in the same position as revocable gifts; the former are really contracts, and in general their validity depends upon the law of contract. They may accordingly contain any provisions not contrary to law or public policy.[1]

The elements of the modern settlements are to be found in Roman law. The *vulgavis*, *pupillaris*, or *exemplavis substitutio* (consisting in the appointment of successive heirs in case of death, incapacity, or refusal of the heir first nominated) may have suggested the modern mode of giving enjoyment of property in succession. Such a *substitutio* could, however, only have been made by will, while the settlement of English law is, in the general acceptation of the term, exclusively an instrument *inter vivos*. The *dos* or *donatio propter nuptias* corresponds to a considerable extent with the marriage settlement, the instrument itself being represented by the *dotale instrumentum* or *pacta dotalia*. In the earliest period of Roman law no provision for the wife was required, for she passed under *manus* of her husband, and became in law his daughter, entitled as such to a share of his property at his death. In course of time the plebeian form of marriage by *usus*, according to which the wife did not become subject to *manus*, gradually superseded the older form, and it became necessary to make a provision for the wife by contract. Such provision from the wife's side was made by the *dos*, the property contributed by the wife or some one on her behalf towards the expenses of the new household. *Dos* might be given before or after marriage, or might be increased after marriage. It was a duty enforced by legislation to provide *dos* where the father possessed a sufficient fortune. *Dos* was of three kinds: *profectitia*, contributed by the father or other descendant on the male side; *adventitia*, by the wife herself or any person other than those who contributed *dos profectitia*; *receptitia*, by any person who contributed *dos adventitia*, subject to the stipulation that the property was to be returned to the person advancing it on dissolution of the marriage. The position of the husband gradually changed for the worse. From being owner, subject to an obligation to return the *dos* if the wife predeceased him, he became a trustee of the *corpus* of the property for the wife's family, retaining only the enjoyment of the income as long as the marriage continued. The contribution by the husband was called *donatio propter nuptias*.[2] The most striking point of difference between the Roman and English law is that under the former the children took no interest in the contributions made by the parents. Other modes of settling property in Roman law were the life interest or *usus*, the *fideicommissum*, and the prohibition of alienation of a *legatum*.

[1] In this English law allows greater freedom than French. By § 791 of the Code Napoléon, in a contract of marriage the succession to a living person cannot be renounced.

[2] See Hunter, *Roman Law*, p. 150; Maine, *Early History of Institutions*, lect. xi.

The oldest form of settlement in England was perhaps the gift in frankmarriage to the donees in frankmarriage, and the heirs between them two begotten (Littleton, § 17). This was simply a form of gift in special tail, which became up to the reign of Queen Elizabeth the most usual kind of settlement. The time at which the modern form of settlement of real estate came into use seems to be doubtful. There does not appear to be any trace of a limitation of an estate to an unborn child prior to 1556. In an instrument of that year such a limitation was effected by means of a feoffment to uses. The plan of granting the freehold to trustees to preserve contingent remainders[1] is said to have been invented by Lord Keeper Bridgman in the 17th century, the object being to preserve the estate from forfeiture for treason during the Commonwealth.[2] The settlement of chattels is no doubt of considerably later origin, and the principles were adopted by courts of equity from the corresponding law as to real estate.

At the present time the settlement in England is, so far as regards real estate, used for two inconsistent purposes,—to "make an eldest son," as it is called, and to avoid the results of the right of succession to real property of the eldest son by making provision for the younger children. The first result is generally obtained by a strict settlement, the latter by a marriage settlement, which is for valuable consideration if antenuptial, voluntary if post-nuptial. At the same time it should be remembered that these two kinds of settlement are not mutually exclusive; a marriage settlement may often take the form of a strict settlement and be in substance a resettlement of the family estate.

There are three possible varieties of the marriage settlement: (1) the dotal system (*régime dotal*), under which the husband generally has the usufruct but not the property in the *dos;* this is the system generally followed in countries where the Roman law prevails; (2) the system of community of goods (*communauté de biens*), by which the wife becomes a kind of partuer of the husband; this system, said to have been originally the custom of ancient Germany, is in vogue in France and Louisiana; (3) the system of separate property, by which (subject to contract) the wife's property is free from the control of her husbaud; this system prevails in the United Kingdom and the United States. An ordinary English marriage settlement of personalty is a deed to which the parties are the intended husband and wife and trustees nominated on their behalf. It generally contains the following clauses: a power to vary the investments of the settled property within limits; trusts of the income for the benefit of the husband and wife during their lives; trusts for the issue, usually accordiug to the appointment of the husband and wife or the survivor, and in default for sons attaining twenty-one aud for daughters attaining that age or marrying, equally, subject to a "hotchpot" clause, charging the children with the amount of any previous appointmeuts; a power of advaucement of the portions of children in anticipation; a trust for the maintenauce of iufant children after the death of the parents, with a direction for the accumulation of surplus income; ultimate trusts fixing the destination of the settled propcrty in dcfault of issue. The receipt and trustee clauses, at one time usual, have been rendered unnecessary by recent legislation. The Conveyancing Act, 1881, superseding Lord St. Leonards' Act of 1859 and Lord Cranworth's Act of 1860, gives power to appoint new trustees, and makes a trustee's receipt a sufficient discharge. Trustees were formerly much restricted in their investments, but various Acts of Parliament have now increased their powers of choice of investment (see TRUST). The settlement of real estate is still a matter of greater difficulty than that of personalty, though it has been considerably simplified by recent legislation. A short statutory form of settlement of real estate is provided by the Conveyanciug Act, 1881 (Fourth Schedule, Form iv.). The Act further enacts that a covenant by the settlor for further assurance is to be implied. This takes the place of those covenants usually inserted in settlements before the Act, which were the ordinary covenants for title. (See REAL ESTATE.) The Settled Land Act, 1882, gives statutory authority to certain provisions generally inserted by conveyaucers. The clauses must, however, still vary infinitely accordiug to the circumstances of particular cases. Where the settlement is of copyholds, the usual course is to surrender them to the use of trustees as joint tenants in fee upou such trusts as will effect the desired devolution of the property.

A strict settlement of real estate usually takes place on the coming of age or marriage of the eldest sou, if it be the iutention of the parties that the estate should continue undivided. The consideration for the settlement in the first case is usually an immediate allowance made to the son, in the second the marriage itself, a valuable consideration. It will appear on referring to the articles ENTAIL and REAL ESTATE that an estate cannot be entailed for a period exceeding a fixed number of existiug lives and an additional term of twenty-one years, but that if it be sought to bar the entail withiu that period the consent of the protector of the settlement must be obtaiued. The process of resettlement is thus described by Lord St. Leonards: "Where there are youuger childreu, the father is always auxious to have the estate resettled on them and their issue, in case of failure of issue of the first son. This he cannot accomplish without the concurrence of the son; and, as the son, upon his establishment in life in his father's lifetime, requires an immediate provision, the father generally secures to him a provision during their joiut lives as a cousideration for the resettlement of the estate in remainder upon the younger sons." The settlement usually takes the form of a life estate for the father, followed by a life estate for the son, with remainder in tail to the unborn child of the son, the contiuuance of the estate in the family being further secured by a series of cross-remaiuders. There is often a name and arms clause, under which, by means of a shifting use (see TRUST), every person succeeding to the settled estate as tenant in tail is forced to assume the name and arms of the settlor under penalty of forfeiture of his estate. Certain parts of the personalty of the settlor are often settled upon trusts to devolve with the real estate. In order to attain this end, the chattels are not simply subjected to the same limitatious as the real estate. If so subjected, they would vest absolutely in the first tenant in succession, as no estate can be limited in personalty (see PERSONAL ESTATE). A declaration is added that they shall not vest absolutely in any tenant uutil he shall attaiu twenty-one, and in case he should die under that age that they shall devolve as nearly as possible in the same way as the lands. By meaus of strict settlement the actual possessor of a settled estate at any given time is in general only a tenant for life. It is a rule of law that in a settlement of this nature there should be a full and complete communication of all material circumstances by the one party to the other.

It is only within a comparatively recent period that any dissatisfaction at the system of settlement has been felt. In 1829 the Real Property Commissioners saw no reason to recommeud any alteration of the law as it theu existed. To use the words of the First Report, p. 6, "Settlements bestow upon the present possessor of an estate the benefits of ownership, and secure the property to his posterity. The existing rule respecting perpetuities has happily hit the medium between the strict entails which prevail in the northern part of the island, and by which the property entailed is for ever abstracted from commerce,[3] and the total prohibition of substitutions[4] and the excessive restriction of the power of devising[5] established in some countries on the Continent of Europe. In England families are preserved, and purchasers always find a supply of land in the market." This optimistic view, it is scarcely necessary to say, is not the one generally accepted at present. The inconveniences inseparable in an economical point of view from the settlement of land have been proposed to be met in two ways,—(1) by a total prohibition of the creation of life estates (see LAND), and (2) by an extension of the powers of the limited owner. The latter is the one which has hitherto commended itself to the legislature of the United Kingdom.

Up to thirty years ago a settled estate in England or Ireland could be sold or leased only under the authority of a private Act of Parliament. The dealings of the limited

[1] The appointment of such trustees has been rendered unnecessary by 8 and 9 Vict. c. 106 and 40 and 41 Vict. c. 33.

[2] This sketch of the history of settlement is abridged from a paper by the late Mr. Joshua Williams, *Papers of the Juridical Society*, vol. i. p. 45.

[3] The law of Scotland was shortly afterwards altered by the Rutherford Act of 1848 (see ENTAIL).

[4] As by the Code Napoléon, § 896. By § 898 *substitutions vulgaires* are, however, practically allowed, the inconsistency with § 896 being avoided by affirming that these are not substitutions at all. In other countries the right of settlement or substitution has been much modified by legislation, mostly in the direction of limiting the authority of the settler. Thus in Austria no family settlement (*Familien-Fideicommiss*) can be created without the consent of the legislature. *Civil Code*, § 618.

[5] In France the proprietor may only devise half, a third, or a quarter of his estate, according to the number of his children.

owner with his property were practically confined to certain powers of raising money for draining conferred by 8 and 9 Vict. c. 56 and the Public and Private Drainage Acts (now repealed). The first general Act was the Leases and Sale of Settled Estates Act, 1856, which proceeded on the principles generally followed in the private Acts. The Act allowed the tenant for life to demise the premises (except the principal mansion house) for various terms, and to sell with the approval of the court. Several amending Acts were passed, and finally the law was consolidated and amended by the Settled Estates Act, 1877 (40 and 41 Vict. c. 18). Meanwhile the Improvement of Land Act, 1864 (which applies to the United Kingdom), and the Limited Owners' Residence Acts, 1870 and 1871, had been passed. The Act of 1864 allowed the owner of a settled estate to charge upon the land, by way of rent-charge, the expenses of certain improvements, such as drainage, irrigation, inclosing, reclamation, clearing, erection of laborers' cottages and farmhouse buildings, planting for shelter, construction of any buildings which will increase the value of the land for agricultural purposes, and construction of jetties or landing-places on the sea-coast or navigable rivers and lakes. This list of improvements has been since extended by the Settled Land Act, 1882. The Act of 1870 enabled the owners of settled estates to charge such estates with the expense of building mansions as residences. The building of such mansions is by the Act of 1871 an improvement within the meaning of the Act of 1864. The Settled Estates Act, 1877 (40 and 41 Vict. c. 18), allowed the tenant for life, or for a greater estate, of a settled estate, to demise settled land on an agricultural lease for a term not exceeding twenty-one years (in Ireland thirty-five years). The lease must not be without impeachment of waste. This is the only case in which the powers of the Act may be exercised without the leave of the court. The court may authorize leases of any settled estates or of any rights or privileges over or affecting any settled estates, subject to the conditions that—(1) the lease be made to take effect in possession at or within one year next after the making, and be for a term for an agricultural lease as above, for a mining lease not exceeding forty years, a repairing lease sixty years, a building lease ninety-nine years, with power for the court to grant for a longer term if in accordance with the custom of the district and beneficial to the inheritance; (2) the best rent must be reserved; (3) in a mineral lease three-fourths of the rent is to be invested (one-fourth where the limited owner is entitled to work the minerals for his own benefit); (4) the lease is not to authorize felling of trees except for the purpose of clearing for building; (5) the lease is to be by deed, and is to contain a condition for reëntry on non-payment of rent for twenty-eight days. The court may also authorize sales of settled estates and of timber, and dedication for streets, roads, squares, gardens, sewers, and other works. The application to the court (which in England is the Chancery Division or the Chancery of Lancashire, in Ireland the Chancery Division) is by petition in a summary way with the consent of the persons having any beneficial estate under the settlement, and all trustees having any estate on behalf of any unborn child. The court may dispense with consent under certain circumstances. No application is to be granted by the court where a similar application has been refused by parliament. Money received on sale under the Act is to be invested as the Act directs, for the benefit of the settled estate. In 1882 the powers of the limited owner were still further increased. In that year was passed the Settled Land Act, 1882 (45 and 46 Vict. c. 38), since amended by 47 and 48 Vict. c. 19. For this very valuable Act the statute book is indebted to the late Earl Cairns. It does not repeal the Act of 1877, but gives cumulative powers. The Act of 1877 must still be brought into action in certain cases to which the Act of 1882 does not apply. The broad distinction between the two Acts is that the powers given by the Act of 1877 are based entirely, except in agricultural leases, on judicial proceedings, while those given by the Act of 1882 may be exercised by the tenant for life at his option, generally without the consent of trustees or the court. The powers are those usually inserted in settlements of real estate, and are conferred upon every tenant for life beneficially entitled to possession. This includes a tenant in tail by Act of Parliament restrained from defeating an estate tail, but not a tenant in tail where the land in respect of which he is restrained was purchased with money provided by parliament,[1] a tenant in fee simple subject to an executory limitation, a person entitled to a base fee, a tenant for years determinable on a life, a tenant *pur autre vie*, a tenant in tail after possibility of issue extinct, a tenant by the curtesy, etc. A married woman may exercise the powers given by the Act in spite of any restraint on anticipation contained in the settlement. The Act does not apply to corporations, whether sole or aggregate. The chief powers given by the Act are those of selling and leasing. A tenant for life may sell settled land or any part of it, or any easement, right, or privilege over it, or the seignory of a manor, and may make exchange or partition. A sale must be for the best price, and an exchange or partition for the best consideration; the sale may be in one lot or several, and by auction or private contract. A reservation as to user or as to mines and minerals may be imposed. Settled land in England may not be exchanged for land out of England. A lease is not to exceed for building ninety-nine years, mining sixty, any other kind twenty-one. The regulations as to leases are in general correspondence with those of the Act of 1877. The time for which non-payment of rent gives a right of reëntry is thirty instead of twenty-eight days, and there are additional regulations as to building and mining leases. Where the tenant for life is impeachable for waste in respect of mines, three-fourths of the mining rent is to be set aside as capital money, in other cases one-fourth. The tenant for life may surrender and regrant leases. The principal mansion house and the demesnes thereof, and other lands usually occupied therewith, cannot be sold or leased without the consent of the trustees of the settlement or the order of the court. The Act provides for three kinds of sale: (1) by the tenant for life *mero motu*, the ordinary case; (2) with consent of trustees or the court, as in the case of the principal mansion and of the application of money paid for a lease or reversion; (3) by order of the court, as in the case of the variation of a building or mining lease according to the circumstances of the district, of parliamentary opposition for the protection or recovery of settled land, and of the sale or purchase of chattels as heirlooms to devolve with land.[2] Land acquired by purchase, exchange, or partition is to be settled as far as possible on the same trusts as the other settled property. Capital money is to be applied as the Act directs, generally for the benefit of the settled property. The tenant for life may enter into a contract for carrying into effect the purposes of this Act. A contract not to exercise the powers of the Act is void. As to procedure, an application to the Chancery Division is to be made by petition or summons. Jurisdiction is conferred upon county courts (in Ireland civil bill courts) in respect to land or personal chattels settled or to be settled, not exceeding in capital value £500 [$2430] or in annual value £30 [$145.80]. Rules of court have been framed for the purpose of carrying into effect the provisions of the Acts of 1877 and 1882. For more minute information than can be given in this place the Acts and rules themselves must be consulted.

The necessity for a settlement, as far as the wife's interests are concerned, has been diminished by the Married Women's Property Act, 1882 (45 and 46 Vict. c. 75). It is still, however, usual to have a settlement on marriage, especially where there is property of any considerable value. The Act contains a saving of existing settlements and a power to make future settlements with or without restriction against anticipation (not to be valid against a married woman's ante-nuptial debts). No settlement or agreement for a settlement is to have greater validity against a married woman's creditors than such settlement or agreement would have when made or entered into by a man. A future or reversionary interest in settled personalty is specially excepted from the operation of Malins's Act (20 and 21 Vict. c. 5), under which a married woman may by deed acknowledged dispose of her future or reversionary interest in unsettled personalty. The former law as to *equity to a settlement* seems to have been rendered obsolete by the Married Women's Property Act. The doctrine of equity formerly was in accordance with the maxim, "He who seeks equity must do equity,"—that, where a husband was forced to obtain the assistance of a court of equity to reach property to which he was entitled in right of his wife, equity would only aid him on condition of his settling a certain portion on his wife. Now that a husband cannot succeed to any property in right of his wife during her lifetime, the reason for the doctrine of equity to a settlement has disappeared.

As a rule a settlement can only be made by a person not under disability,—therefore apart from statute not by a lunatic, or a bankrupt, and generally not by an infant. But by the Infants' Settlement Act (18 and 19 Vict. c. 43) infant males of twenty or over or infant females of seventeen or over may with the approbation of the Chancery

[1] That is to say, the Act would apply to the estates tail of the marquis of Abergavenny or the earl of Shrewsbury, but not to Blenheim or Strathfieldsaye, purchased with public money for the dukes of Marlborough and Wellington (see REAL ESTATE).

[2] Land in this sense has quite recently been held to include an hereditary dignity, such as a baronetcy.

Division obtained by petition make a valid settlement or contract for a settlement of all or any part of their property. By the Acts of 1877 and 1882 the powers of the Acts may in certain cases be exercised by trustees of a settlement, trustees in bankruptcy, committees of lunatics, and guardians of infants.

Where the parties are not in a position to make an immediate settlement, articles for a settlement are sometimes entered into, but more rarely than formerly on account of the facilities offered by the Infants' Settlement Act. The court will enforce the execution of a settlement in accordance with the articles, and will reform one already made if not in accordance with them. The court will also enforce the specific performance of any contract on the faith of which a marriage has taken place, in spite of the provisions of § 4 of the Statute of Frauds (see FRAUD).[1] It should be noticed that marriage itself is not such a part performance of a contract as to give the court jurisdiction. An imperfect obligation arising from an informal ante-nuptial agreement can be made binding as between the parties by a post-nuptial settlement; but this will not protect such a settlement from being treated as a voluntary settlement against creditors.

A settlement or contract for settlement made in consideration of marriage or for other valuable consideration is as a rule irrevocable by the settlor and good against creditors. The only exception or apparent exception is the provision in the Bankruptcy Act, 1883 (46 and 47 Vict. c. 52, § 47 (2)), that any covenant or contract made in consideration of marriage for the future settlement on or for the settlor's wife or children of any money or property wherein he had not at the date of his marriage any estate or interest, and not being money or property of or in right of his wife, shall, on his becoming bankrupt before the property or money shall have been actually transferred or paid, be void against the trustee in bankruptcy. With regard to voluntary settlements, 13 Eliz. c. 5 avoids as against creditors conveyances of lands or chattels contrived to delay, hinder, or defraud creditors or others, with a proviso protecting estates or interests conveyed on good consideration and *bona fide* to persons not having notice of fraud. 46 and 47 Vict. c. 52, § 47 (1), enacts that any settlement of property, not being a settlement made before and in consideration of marriage or made in favor of a purchaser or incumbrancer in good faith and for valuable consideration, or a settlement made on or for the wife or children of the settlor of property which has accrued to the settlor after marriage in right of his wife, shall, if the settlor becomes bankrupt within two years after the date of the settlement, be void against the trustee in the bankruptcy, and shall, if the settlor becomes bankrupt within ten years, be void against the trustee unless the parties claiming under the settlement can prove that the settlor was at the time of making the settlement able to pay all his debts without the aid of the settled property, and that the interest of the settlor in such property had passed to the trustee of the settlement on the execution thereof. 27 Eliz. c. 4 was passed for the benefit of purchasers, as 13 Eliz. c. 5 was for that of creditors, but refers to real estate and chattels real only. It enacts that every conveyance of lands with intent to defraud purchasers shall be void as against such purchasers only, and that conveyances with power of revocation shall be void against subsequent purchasers. The Act has been construed to mean that a voluntary conveyance of real estate is void as against a subsequent purchaser, mortgagee, or lessee for value. With these exceptions a voluntary settlement is good as between the settlor and the objects of the settlement, and as between them and third persons. So far is this the case that the court will not assist a settlor to destroy the effect of a voluntary settlement by compelling specific performance against a subsequent purchaser. On the other hand the court will not enforce specific performance of a voluntary settlement, in spite of its being a contract under seal. Such an instrument, however, creates a debt and will be admitted to proof in a creditors' suit.[2]

Scotland.—A *disposition and settlement* is a mode of providing for the devolution of property after death, and so corresponds rather to the English will than the English settlement. The English marriage settlement is represented in Scotland by the *contract of marriage*, which, like the English settlement, may be ante- or post-nuptial. The main difference between the ante- and the post-nuptial contract is the extent to which the property the subject of the contract may be withdrawn from creditors. In the former case a preference or *jus crediti* is according to circumstances conferred on the wife or children; in the latter case the wife or children cannot compete with the creditors. A post-nuptial contract is also liable to revocation by the husband or wife. The Married Women's Property Act, 1881, while it makes the wife complete mistress of her property, at the same time does not exclude or abridge the power of settlement by ante-nuptial contract of marriage.

A contract of marriage may be made with or without the creation of trustees, the latter being the more usual form. If the contract settle hereditary property, it generally contains a narrative or inductive clause, containing the names of the parties with an obligation to celebrate the marriage, a disposition of the estate with its destination, provisions as to the wife and younger children, and a declaration that these provisions shall be in full of their legal claims, a conveyance by the wife of her whole means and estate to her husband or the trustees, an appointment of trustees to secure implement of provisions to the wife and children, a registration clause, and a testing clause. If the contract settle movables, it is, *mutatis mutandis*, in much the same form, with the addition of a clause excluding the *jus mariti* of a future husband of the wife (see *Juridical Styles*, vol. i. p. 174, vol. ii. p. 498). The Rutherford Act (11 and 12 Vict. c. 36) and the Entail Act, 1882 (45 and 46 Vict. c. 53), specially provide that settlements by marriage contract are not to be disappointed until the birth of a child, who by himself or his guardian consents to disentail, or until the marriage is dissolved, unless with the consent of the trustees of the contract. Improvements by limited owners were allowed by law much earlier than in England. 10 Geo. III. c. 51 enabled heirs of entail to charge the entailed estates with the sums of money laid out by them in building mansions. This principle was expressly adopted for England, as the preamble of the Act shows, by the Limited Owners' Residence Act, 1870. The Rutherford Act and other Acts empowered heirs of entail to excamb, to feu, to lease, to charge by bond and disposition in security, to sell, to grant family provisions, and to erect laborers' cottages. The Settled Estates Act and Settled Land Act do not apply to Scotland. Substitution, as in Roman law, can only be made by testamentary or *mortis causa* disposition. The Rutherford Act and the Entail Amendment Act, 1868 (31 and 32 Vict. c. 84), more strict than the law of England against perpetuities, forbid the creation of a life-rent interest in heritables or movables except in favor of a party in life at the date of the deed creating such interest.

United States.—Marriage Settlements are not in as common use as in England, no doubt owing to the fact that the principle of the Married Women's Property Act was the law of most of the States of the Union long before its adoption by England. In Louisiana, in the absence of stipulation to the contrary, community of goods is the rule. Settlements other than marriage settlements are practically unknown in the United States. Property cannot, as a general rule, be tied up to anything like the extent still admissible in England. In those States where entail is allowed the entail may be barred by simple means of alienation.

(J. W†.)

SETTLEMENT, ACT OF. By this Act, 12 and 13 Will. III. c. 2, passed in 1701 (followed by the parliament of Scotland in the Act of Union, 1707, c. 7), the crown was settled upon the Princess Sophia, electress and duchess dowager of Hanover, granddaughter of James I., and the heirs of her body, being Protestants. The Act contained in addition some important constitutional provisions. Those which are still law are as follows: (1) that whosoever shall hereafter come to the possession of this crown shall join in communion with the Church of England as by law established; (2) that in case the crown of this realm shall hereafter come to any person not being a native of this kingdom of England, this nation be not obliged to engage in any war for the defence of any dominions or territories which do not belong to the crown of England without the consent of parliament; (3) that after the limitation shall take effect no person born out of the kingdoms of England, Scotland, or Ireland, or the dominions thereunto belonging, although he be naturalized or made a denizen (except such as are born of English parents), shall be capable to be of the privy council or a member of either House of Parliament, or enjoy any office or place of trust, either civil or military, or to

[1] At one time the ecclesiastical courts went farther, and enforced specific performance of the ceremony of marriage itself. After a contract of marriage *per verba de præsenti* or *per verba de futuro*, a celebration *in facie ecclesiæ* might have been decreed. This jurisdiction of the ecclesiastical courts was finally abolished by 4 Geo. IV. c. 76.

[2] See Williams, *The Settlement of Real Estates;* Davidson, *Precedents of Conveyancing*, vol. iii.; Wolstenholme and Turner, *The Settled Land Act;* Middleton, *The Statutes Relating to Settled Estates.*

have any grant of lands, tenements, or hereditaments from the crown to himself, or to any other or others in trust for him;[1] (4) that after the limitation shall take effect judges' commissions be made *quamdiu se bene gesserint*,[2] and their salaries ascertained and established, but upon the address of both Houses of Parliament it may be lawful to remove them; (5) that no pardon under the great seal of England be pleadable to an impeachment by the Commons in parliament. The importance of the Act of Settlement appears from the fact that in all the Regency Acts it is specially mentioned as one of those Acts which the regent may not assent to repeal (see REGENT). To maintain or affirm the right of any person to the crown, contrary to the provisions of the Act of Settlement, is treason by 6th Anne, c. 7.

SETTLEMENT OF THE POOR. See POOR LAWS.

SÉTUBAL, called by the English St. Ubes, a port and commercial town in the province of Estremadura, Portugal, nearly 20 miles southeast of Lisbon, lining for about three-quarters of a mile the north shore of a harbor of the same name, 3 leagues long by half a league broad, and inferior only to that of Lisbon, at the end of a fertile valley of 6 miles long from Palmella, where the Sabo river discharges into the Bay of Sétubal, and on the Portuguese railway (Lisbon-Barreiro-Sétubal). It is overtopped on the west by the great red treeless range of Arrabida. In the sand-hills of a low-lying promontory in the bay, over against Sétubal, are the ruins of "Troia," uncovered in part by heavy rains in 1814, and again in 1850 by an antiquarian society. These ruins of "Troia," among which have been brought to view a beautiful Roman house and some 1600 Roman coins, refer, beyond almost all dispute, to Cetobriga, which flourished 300–400 A.D. In the neighborhood, on a mountain 1700 feet high, is the cloister Arrabida, with stalactite cavern, whither pious pilgrimages are made. There are five forts for the defence of the harbor, and that of St. Philip, built by Philip III., commands the town. Sétubal is an emporium of the Portuguese salt trade carried on principally with Scandinavian ports, the salt being deemed the finest for curing meat and fish. By reason of this advantage and the excellence of its oranges, the best in Portugal, and of its Muscatel grapes, it has much commercial importance, and is the fourth city in the kingdom. It also manufactures leather and does a considerable fishing trade. There are five churches, several convents, a theatre, a monument of the poet Bocage, who was born here, and an arsenal. Among its other public buildings are the Stapal, the Bomfin, which has a handsome fountain, the Fonte Nova, and the Annunciatá. Sétubal suffered severely, along with Lisbon, from the earthquake of 1755. The population was 14,798 in 1878.

SEVENOAKS, a market town of Kent, England, situated on high ground about a mile from the railway station, 25 miles southeast of London by the London, Chatham, and Dover Railway, and 20 by the South-Eastern Railway. It consists principally of two streets which converge at the south end, near which is the church of St. Nicholas, of the 13th, 14th, and 15th centuries, restored in 1878, and containing monuments of the Amherst family and a tablet to William Lambarde, the "Perambulator" of Kent (d. 1601), removed from the old parish church of Greenwich when that was demolished. At the grammar school founded in 1418 by Sir William Sevenoke, lord mayor of London, George Grote received his education. There is also a school founded by Lady Margaret Boswell, wife of Sir William Boswell, ambassador of Charles I. at The Hague, and almshouses founded by Sir William Sevenoke in connection with his school. The Walthamstow Hall for 100 children, daughters of Christian missionaries, erected at a cost of £22,000 [$106,920], was opened in 1882. Close to Sevenoaks is Knole Park, one of the finest old residences in England, which in the time of King John was possessed by the earl of Pembroke, and after passing to various owners was bought by Archbishop Bourchier (d. 1486), who rebuilt the house. He left the property to the see of Canterbury, and about the time of the dissolution it was given up by Cranmer to Henry VIII. By Elizabeth it was conferred first on the earl of Leicester and afterwards on Thomas Sackville, earl of Dorset, by whom it was in great part rebuilt and fitted up in regard to decoration and furniture very much as it at present exists. In the time of Elizabeth county assizes were held in the town. Of late years Sevenoaks has very much increased by the addition of villa residences for persons having their business in London. The population of the urban sanitary district (area 2028 acres) in 1871 was 4118, and in 1881 it was 6296.

SEVEN SLEEPERS OF EPHESUS, THE, according to the most common form of an old legend of Syrian origin, first referred to in Western literature by Gregory of Tours (*De Glor. Mart.*, c. 95), were seven Christian youths of Ephesus, who, to escape the rage of Decius, lived for some time in concealment in a cave. The enemy at last, however, discovered their hiding place, and caused great stones to be rolled to its mouth that they might die of hunger. The martyrs fell asleep in a mutual embrace. The occurrence had long been forgotten, when it fell out, in the thirtieth year of Theodosius II., 196 years afterwards, that a certain inhabitant of Ephesus, seeking shelter for his cattle, rediscovered the cave on Mount Cœlian, and, letting in the light, awoke the inmates, who sent one of their number down to buy food. Cautiously approaching the city, the lad was greatly astonished to find the cross displayed over the gates, and on entering to hear the name of Christ openly pronounced. By tendering coin of the time of Decius at a baker's shop he roused suspicion, and in his confusion being unable to explain how he had come by the money, he was taken before the authorities as a dishonest finder of hidden treasure. He was easily able to confirm the strange story he now had to tell by actually leading his accusers to the cavern where his six companions were found, youthful and rosy and beaming with a holy radiance. Theodosius, hearing what had happened, hastened to the spot in time to hear from their lips that God had wrought this wonder to confirm his faith in the resurrection of the dead. This message once delivered, they again fell asleep.

Gregory says he had the legend from the interpretation of "a certain Syrian;" in point of fact the story is very common in Syriac sources. It forms the subject of a homily of Jacob of Sarug (*ob.* 521 A.D.), which is given in the *Acta Sanctorum*. Another Syriac version is printed in Land's *Anecdota*, iii. 87 *sq.*; see also Barhebræus, *Chron. Eccles.*, i. 142 *sq.*, and compare Assemani, *Bib. Or.*, i. 335 *sq.* Some forms of the legend give eight sleepers,—*e.g.*, an ancient MS. of the 6th century now in the British Museum (*Cat. Syr. MSS.*, p. 1090). There are considerable variations as to their names. The legend rapidly attained a wide diffusion throughout Christendom; its currency in the East is testified by its acceptance by Mohammed (sur. xviii.), who calls them *Aṣḥāb al-Kahf*, "the men of the cave." According to Al-Birúní (*Chronology*, tr. by Sachau, p. 285) certain undecayed corpses of monks were shown in a cave as the sleepers of Ephesus in the 9th century. The seven sleepers are a favorite subject in early mediæval art.

SEVERN, THE, next to the Thames in length among the rivers of England, rises at Maes Hafren on the eastern side of Plinlimmon, on the south-south-west borders of Montgomeryshire, and flows in a nearly semicircular course of about 200 miles to the sea; the direct distance from its source to its mouth in the Bristol Channel is about 80 miles. By the Britons it was called Halfren, and its old Latin name was *Sabrina*. Through Montgomeryshire its course is at first

[1] This clause is virtually repealed by the Naturalization Act, 1870 (33 and 34 Vict. c. 14, § 7), as to persons obtaining a certificate of naturalization.

[2] Their commissions had previously been made *durante bene placito*.

in a southeasterly direction, and for the first 15 miles it flows over a rough precipitous bed. At Llanidloes, where the valley widens to a breadth of one or two miles and assumes a more fertile appearance, it bends towards the northeast, passing Newtown and Welshpool. On the borders of Shropshire it receives the Vyrnwy, and then turning in a southeasterly direction enters the broad rich plain of Shrewsbury, after which it bends southward past Ironbridge and Bridgnorth to Bewdley in Worcestershire. In Shropshire it receives a number of tributaries (see SHROPSHIRE). Still continuing its southerly course through Worcestershire it passes Stourport, where it receives the Stour (left), and Worcester, shortly after which it receives the Teme (right). It enters Gloucestershire at Tewkesbury, where it receives the Avon (left), after which, bending in a southwesterly direction, it passes the town of Gloucester, 18 miles below which the estuary widens out into the Bristol Channel, at the point where it receives from the left the Lower Avon or Bristol river, and from the right the Wye.

From Newtown its fall is 465 feet, the average fall per mile being about 2 feet 3 inches, but from Ironbridge to Gloucester, a distance of about 70 miles, the fall is only about 103 feet. Between Stourport and Gloucester the breadth is 150 feet, but below that town the breadth rapidly increases and the banks become bolder and more picturesque. Owing to the gradual decrease in the width and depth of the Bristol Channel the tide enters with great force, forming a tidal wave or bore about 9 feet in height, which at certain times causes great destruction, among the more serious inundations being those of 1606, 1687, 1703, and 1883. The total area drained by the Severn is about 4500 square miles. Its navigation extends to about 150 miles above its mouth; barges can ascend as far as Stourport, and large vessels to Gloucester. Owing to the difficulties of the navigation the Gloucester and Berkeley Ship Canal, 18 miles in length, was constructed, admitting vessels of 350 tons to Gloucester, the river only admitting vessels of 150 tons. The only other important port is Bristol, but there are a few smaller ports and fishing towns, while by means of canals the Severn has connection with some of the principal towns of England. With the Thames it is connected by the Stroudwater and Thames and Severn Canals; by various canals it has communication with the Trent and the rivers of the north; and the Hereford and Gloucester Canal connects those two cities. The Severn is a good salmon river, and is specially famous for its lampreys.

SEVERN, JOSEPH (1793–1879), portrait and subject painter, was born in 1793. During his earlier years he practiced portraiture as a miniaturist; and, having studied in the schools of the Royal Academy, he exhibited his first work in oil, Hermia and Helena, a subject from the *Midsummer Night's Dream*, in the Royal Academy Exhibition of 1819. In 1820 he gained the gold medal and a three years' travelling studentship for his Una and the Red Cross Knight in the Cave of Despair, a painting now in the possession of the representatives of the late Lord Houghton. He accompanied his friend Keats the poet to Italy, and nursed him till his death in 1821. In 1861 he was appointed British consul at Rome, a post which he held till 1872, and during a great part of the time he also acted as Italian consul. His most remarkable work is the Spectre Ship from the *Ancient Mariner*. He painted Cordelia Watching by the Bed of Lear, the Roman Beggar, Ariel, the Fountain, and Rienzi, executed a large altarpiece for the church of St. Paul at Rome, and produced many portraits, including one of Baron Bunsen and several of Keats. He died at Rome, August 3, 1879.

SEVERUS, LUCIUS SEPTIMIUS, the twenty-first emperor of Rome, reigned from 193 to 211 A.D. He was born in 146 at Leptis Magna, an African coast town in the district of Syrtes, whose ancient prosperity is still attested by its extensive ruins. In this region of Africa, despite its long possession by the Romans, the Punic tongue was still spoken by the people in general. Severus had to acquire Latin as a foreign language, and is said to have spoken it to the end of his days with a strong African accent. After he had arrived at the throne he dismissed abruptly from Rome a sister who had come to visit him, because he felt shame at her abominable Latin. Yet Severus and his dynasty were almost the only emperors of provincial descent who frankly cherished the province of their origin, while the province showed true loyalty to the only Roman emperor ever born on African soil, and to the successors who derived their title from him.

Of the origin of the Severi nothing is known: it is a natural but very doubtful conjecture that the L. Septimius Severus, a native of Africa, addressed by the poet Statius, was an ancestor of the emperor who bore the same name. The father of Severus was a Roman citizen of equestrian rank, and it may safely be affirmed that the family held a poor position when he was born, but had risen in importance by the time he reached manhood. Two of his uncles attained to consular rank. Fulvius Pius, the maternal grandfather of Severus, is often identified with the man of that name who was governor of Africa, and, after being condemned for corruption by Pertinax, was highly honored by Didius Julianus; but dates are strongly against the identification. Of the future emperor's education we learn nothing but its results. Spartianus declares him to have been "very learned in Latin and Greek literature," to have had a genuine zeal for study, and to have been fond of philosophy and rhetoric. But the learning of rulers is often seen through a magnifying medium, and we may better accept the statement of Dio Cassius that in the pursuit of education his eagerness was greater than his success, and that he was rather shrewd than facile. No doubt in his early years he acquired that love for jurisprudence which distinguished him as emperor. Of his youth we know only that it was entirely spent at Leptis. Beyond that there is merely one anecdotal fabrication giving an account of youthful wildness.

The removal of Severus from Leptis to Rome is attributed by his biographer to the desire for higher education, but was also no doubt due in some degree to ambition. From the emperor Marcus Aurelius he early obtained, by intercession of a consular uncle, the distinction of the broad purple stripe. At twenty-six, that is, almost at the earliest age allowed by law, Severus attained the quæstorship and a seat in the senate, and proceeded as *quaestor militaris* to the senatorial province of Bætica, in the Peninsula. While Severus was temporarily absent in Africa in consequence of the death of his father, the province of Bætica, disordered by invasion and internal commotion, was taken over by the emperor, who gave the senate Sardinia in exchange. On this Severus became military quæstor of Sardinia. His next office, probably in 174, was that of legate to the proconsul of Africa, and in the following year he was tribune of the plebs. This magistracy, though far different from what it had been in the days of the republic, was still one of dignity, and brought with it promotion to a higher grade in the senate. During the tribunate he married his first wife Marcia, whose name he passed over in his autobiography, though he erected statues of her after he became emperor. In 178 Severus became prætor, not by favor of the emperor, but by competition for the suffrages of the senators. Then, probably in the same year, he went to Spain as legate; after that (179) he commanded a legion in Syria. The death of Marcus Aurelius seems in some way to have interrupted his career; he was unemployed for several years, and devoted great part of his leisure to the study of literature, religion, and antiquities (so says Spartianus) at Athens. The year of Severus's first consulship cannot be determined with precision, but it falls within the space between 185 and 190. In this time also falls the marriage with Julia, afterwards famous as Julia Domna, whose acquaintance he had no doubt made when an officer in Syria. Her two sons Bassianus (known as Caracalla) and Geta were probably born in

188 and 189. Severus was governor in succession of Gallia Lugdunensis, Sicily, and Pannonia Superior. He was in command of three legions at Carnuntum, the capital of the province last named, when news reached him that Commodus had been murdered by his favorite concubine and his most trusted servants.

Up to this moment the career of Severus had been ordinary in its character. He had not raised himself above the usual official level. He had achieved no military distinction,—had indeed seen no warfare beyond the petty border frays of a frontier province. But the storm that now tried all official spirits found his alone powerful enough to brave it. Three imperial dynasties had now been ended by assassination. The Flavian line had enjoyed much shorter duration and much less prestige than the other two, and the circumstances of its fall had been peculiar in that it was probably planned in the interest of the senate and the senate certainly reaped the immediate fruits. But the crisis which arose on the death of Nero and the crisis which arose on the death of Commodus were strikingly alike. In both cases it was left to the army to determine by a struggle which of the divisional commanders should succeed to the command-in-chief, that is, to the imperial throne. In each case the contest began with an impulsion given to the commanders by the legionaries themselves. The soldiers of the great commands competed keenly for the honor and the material advantages to be won by placing their general in the seat of empire. The officer who refused to lead would have been deemed a traitor to his troops, and would have suffered the punishment of his treason.

There is a widespread impression that the Prætorian guards at all times held the Roman empire in their hands, but its erroneousness is demonstrated by the events of the year 193. For the first time in the course of imperial history the Prætorians presumed to nominate as emperor a man who had no legions at his back. This was Pertinax, who has been well styled the Galba of his time—upright and honorable to severity, and zealous for good government, but blindly optimist about the possibilities of reform in a feeble and corrupt age. After a three months' rule he was destroyed by the power that lifted him up. According to the well-known story, true rather in its outline than in its details, the Prætorians sold the throne to Didius Julianus. But at the end of two months both the Prætorians and their nominee were swept away by the real disposers of Roman rule, the provincial legions. Four groups of legions at the time were strong enough to aspire to determine the destiny of the empire,—those quartered in Britain, in Germany, in Pannonia, in Syria. Three of the groups actually took the decisive step, and Severus in Pannonia, Pescennius Niger in Syria, Clodius Albinus in Britain, received from their troops the title of Augustus. Severus far outdid his rivals in promptness and decision. By what means we do not know, he secured the aid of the legions in Germany and of those in Illyria. These, with the forces in Pannonia, made a combination sufficiently formidable to overawe Albinus for the moment. He probably deemed that his best chance lay in the exhaustion of his competitors by an internecine struggle. At all events he received with submission an offer made by Severus, no doubt well understood by both to be politic, insincere, and temporary. Severus sent a trusted officer, who confirmed Albinus in his power and bestowed upon him the title of Cæsar, making him the nominal heir-apparent to the throne.

Before the action of Severus was known in Rome, the senate and people had shown signs of turning to Pescennius Niger, that he might deliver them from the poor puppet Didius Julianus and avenge on the Prætorians the murder of Pertinax. Having secured the coöperation or neutrality of all the forces in the western part of the empire, Severus hastened to Rome. To win the sympathy of the capital he posed as the avenger and successor of Pertinax, whose name he even added to his own, and used to the end of his reign. The feeble defences of Julianus were broken down and the Prætorians disarmed and disbanded, without a blow being struck. A new body of household troops was enrolled and organized on quite different principles from the old. In face of the senate, as Dio tells us, Severus acted for the moment like "one of the good emperors in the olden days." After a magnificent entry into the city he joined the senate in execrating the memory of Commodus, and in punishing the murderers of Pertinax, whom he honored with the most splendid funeral rites. He also encouraged the senate to pass a decree directing that any emperor or subordinate of an emperor who should put a senator to death should be treated as a public enemy. But he ominously refrained from asking the senate to sanction his accession to the throne.

The rest of Severus's reign, as it is read in the ancient histories, is in the main occupied with wars, over which we shall rapidly pass. The power wielded by Pescennius Niger, who called himself emperor, and was supposed to control one half of the Roman world, proved to be more imposing than substantial. The magnificent promises of Oriental princes were falsified as usual in the hour of need. Niger himself, as described by Dio, was the very type of mediocrity, conspicuous for no faculties, good or bad. This very character had no doubt commended him to Commodus as suited for the important command in Syria, which might have proved a source of danger in abler hands. The contest between Severus and Niger was practically decided after two or three engagements, fought by Severus's officers. The last battle, which took place at Issus, ended in the defeat and death of Niger (194). After this the emperor spent two years in successful attacks upon the peoples bordering on Syria, particularly in Adiabene and Osrhoene. Byzantium, the first of Niger's possessions to be attacked, was the last to fall, after a glorious defence.

Late in 196 Severus turned westward, to reckon with Albinus, who was well aware that the reckoning was inevitable. He was better born and better educated than Severus, but in capacity far inferior. As Severus was nearing Italy he received the news that Albinus had been declared emperor by his soldiers. The first counter-stroke of Severus was to affiliate himself and his elder son to the Antonines by a sort of spurious and posthumous adoption. The prestige of the old name, even when gained in this illegitimate way, was probably worth a good deal. Bassianus, the elder son of Severus, thereafter known as Aurelius Antoninus, was named Cæsar in place of Albinus, and was thus marked out as successor to his father. Without interrupting the march of his forces, Severus contrived to make an excursion to Rome. Here he availed himself with much subtlety of the sympathy many senators were known to have felt for Niger. Though he was so far faithful to the decree passed by his own advice that he put no senator to death, yet he banished and impoverished many whose presence or influence seemed dangerous or inconvenient to his prospects. Of the sufferers probably few had ever seen or communicated with Niger.

The collision between the forces of Severus and Albinus was the most violent that had taken place between Roman troops since the mighty contest at Philippi. The decisive engagement was fought in February of the year 197, on the plain between the Rhone and the Saône, to the north of Lyons. Dio tells us that 150,000 men fought on each side. The fortunes of Severus were, to all appearance, at one stage of the battle as hopeless as those of Julius Cæsar were for some hours during the battle of Munda. The tide was turned by the same means in both cases—by the personal conduct and bravery of the commander.

By this crowning victory Severus was released from all need for disguise, and "poured forth on the civil population all the wrath which he had been storing up

for a long time" (Dio). He particularly frightened the senate by calling himself the son of Marcus and brother of Commodus, whom he had before insulted. And he read a speech in which he declared that the severity and cruelty of Sulla, Marius, and Augustus had proved to be safer policy than the clemency of Pompey and Julius Cæsar, which had wrought their ruin. He ended with an apology for Commodus and bitter reproaches against the senate for their sympathy with his assassins. Over sixty senators were arrested, on a charge of having adhered to Albinus, and half of them were put to death. In most instances the charge was merely a pretence to enable the emperor to crush out the forward and dangerous spirits in the senate. The murderers of Commodus were punished; Commodus himself was deified; and on the monuments from this time onward Severus figures as the brother of that reproduction of all the vice and cruelty of Nero with the refinement left out.

The next years (197–202) were devoted by Severus to one of the dominant ideas of the empire from its earliest days—war against the Parthians. The results to which Trajan and Verus had aspired were now fully attained, and Mesopotamia was definitely established as a Roman province. Part of the time was spent in the exploration of Egypt, in respect of which Dio takes opportunity to say that Severus was not the man to leave anything human or divine uninvestigated. The emperor returned to enjoy a well-earned triumph, commemorated to this day by the arch in Rome which bears his name. During the six years which followed (202–208) Severus resided at Rome and gave his attention to the organization of the empire. No doubt his vigorous influence was felt to its remotest corners, but our historians desert us at this point and leave us for the most part to the important but dim and defective conclusions to be drawn from the abundant monumental records of the reign. Only two or three events in the civil history of this period are fully narrated by the ancient writers. The first of these is the festival of the Decennalia, or rejoicings in the tenth year of the emperor's reign. Contemporaneous with this festival was the marriage of Aurelius Antoninus (Caracalla) with Plautilla, the daughter of Plautianus, commander of the reorganized Prætorian guards. This officer holds a conspicuous position in the ancient accounts of the reign, yet it is all but impossible to believe a good deal that we are told concerning him. Nevertheless, without a clear view of the career of Plautianus, it is difficult to grasp definitely some important features in the character of Severus, or to appreciate exactly the nature of his government. According to Dio and Herodian, Plautianus was allowed for years to exercise and abuse the whole power of the emperor, so far as it did not relate to the actual conduct of war. He was cruel, arrogant, and corrupt; and the whole empire groaned under his exactions. Geta, the brother of Severus, tried to open the emperor's eyes, but the license of Plautianus was merely restricted for a moment, to be bestowed again in full. Finally, in 203 this second Sejanus fell a victim to an intrigue set on foot by his own son-in-law Antoninus (Caracalla), the details of which were not clearly known even to contemporary writers. It is hard to see in what way we are to reconcile this history with the known facts of Severus's character and career, unless we assume that Plautianus was really the instrument of his master for the execution of his new policy towards the senate and the senatorial provinces. That Plautianus abused his authority and brought about his own fall is probable enough,—also that Severus had destined him at one time for the guardianship of his sons. Plautianus was succeeded in his office by two men, one of whom was the celebrated jurist Papinian.

Severus spent the last three years of his life (208–211) in Britain, amidst constant and not very successful warfare, which he is said to have provoked partly to strengthen the discipline and powers of the legions, partly to wean his sons from their evil courses by hard military service. He died at York in February of the year 211. There are vague traditions that his death was in some way hastened by Caracalla This prince had been, since about 197, nominally joint emperor with his father, so that no ceremony was needed for his recognition as monarch.

The natural gifts of Severus were of no high or unusual order. He had a clear head, promptitude, resolution, tenacity, and great organizing power, but no touch of genius. That he was cruel cannot be questioned, but his cruelty was of the calculating kind, and always clearly directed to some end. He threw the head of Niger over the ramparts of Byzantium, but merely as the best means of procuring a surrender of the stubbornly defended fortress. The head of Albinus he exhibited at Rome, but only as a warning to the capital to tamper no more with pretenders. The children of Niger were held as hostages and kindly treated so long as they might possibly afford a useful basis for negotiation with their father; when he was defeated they were killed, lest from among them should arise a claimant for the imperial power. Stern and barbarous punishment was always meted out by Severus to the conquered foe, but terror was deemed the best guarantee for peace. He felt no scruples of conscience or honor if he thought his interest at stake, but he was not wont to take an excited or exaggerated view of what his interest required. He used or destroyed men and institutions alike with cool judgment and a single eye to the main purpose of his life, the secure establishment of his dynasty. The few traces of aimless savagery which we find in the ancient narratives are probably the result of fear working on the imagination of the time.

As a soldier Severus was personally brave, but he can hardly be called a general, in spite of his successful campaigns. He was rather the organizer of victory than the actual author of it. The operations against Niger were carried out entirely by his officers. Dio even declares that the final battle with Albinus was the first at which Severus had ever been actually present. When a war was going on he was constantly travelling over the scene of it, planning it and instilling into the army his own pertinacious spirit, but the actual fighting was usually left to others. His treatment of the army is the most characteristic feature of his reign. He frankly broke with the decent conventions of the Augustan constitution, ignored the senate, and candidly based his rule upon force. The only title he ever laid to the throne was the *pronunciamiento* of the legions, whose adherence to his cause he commemorated even on the coinage of the realm. The legions voted him the adopted son of Marcus Aurelius; the legions associated with him Caracalla in the government of the empire. Severus strove earnestly to wed the army as a whole to the support of his dynasty. He increased enormously the material gains and the honorary distinctions of the service, so that he was charged with corrupting the troops. Yet it cannot be denied that, all things considered, he left the army of the empire more efficient than he found it. He increased the strength of it by three legions, and turned the Prætorians, heretofore a flabby body without military experience or instinct, into a chosen corps of veterans. Their ranks were filled by promotion from all the legions on service, whereas previously there had been special enlistment from Italy and one or two of the neighboring provinces. It was hoped that these picked men would form a force on which an emperor could rely in an emergency. But to meet the possibility of a legionary revolt in the provinces, one of the fundamental principles of the Augustan empire was abrogated: Italy became a province, and troops of the regular army were quartered in it under the direct command of the emperor. Further to obviate the risk of revolution, the great commands in the provinces were broken up, so that, excepting on the turbulent eastern frontier, it was not possible for a commander to dispose of troops numerous enough to render him dangerous to the government.

But, while the policy of Severus was primarily a family policy, he was by no means careless of the general security and welfare of the empire. Only in one instance, the destruction of Byzantium, did he weaken its defences for his own private ends—an error for which his successors paid dearly, when the Goths came to dominate the Euxine. The constantly troublesome Danubian regions received the special attention of the emperor, but all over the realm the status and privileges of communities and districts were recast in the way that seemed likely to conduce to their prosperity. The administration acquired more and more of a military character, in Italy as well as in the provinces. Retired military officers now filled many of the posts for-

merly reserved for civilians of equestrian rank. The prefect of the Prætorians received large civil and judicial powers, so that the investment of Papinian with the office was less unnatural than it at first sight seems. The alliance between Severus and the juriscousults had important consequences. While he gave them new importance in the body politic, and coöperated with them in the work of legal reform, they did him material service by working an absolutist view of the government into the texture of Roman law. Of the legal changes of the reign, important as they were, we can only mention a few details. The emperor himself was a devoted and upright judge, but he struck a great blow at the purity of the law by transferring the exercise of imperial jurisdiction from the forum to the palace. He sharpened in many respects the law of treason, put an end to the time-honored *quaestiones perpetuae*, altered largely that important section of the law which defined the rights of the fiscus, and developed further the social policy which Augustus had embodied in the *lex Julia de adulteriis* and the *lex Papia Poppaea*.

Severus boldly adopted as an official designation the autocratic title of *dominus*, which the better of his predecessors had renounced, and with which the worse had only toyed, as Domitian, whom Martial did not hesitate to call "his lord and his god." During Severus's reign the senate was absolutely powerless; he took all initiative into his hands. He broke down the distinction between the servants of the senate and the servants of the emperor. All nominations to office or function passed under his scrutiny. The estimation of the old consular and other republican titles was diminished. The growth of capacity in the senate was effectually checked by cutting off the tallest of the poppy-heads early in the reign. The senate became a mere registration office for the imperial determinations, and its members, as has been well said, a choir for drawling conventional hymns of praise in honor of the monarch. Even the nominal restoration of the senate's power at the time of Alexander Severus, and the accession of so-called "senatorial emperors" later on, did not efface the work of Septimius Severus, which was resumed and carried to its fulfilment by Diocletian.

It only remains to say a few words of the emperor's attitude towards literature, art, and religion. No period in the history of Latin literature is so barren as the reign of Severus. Many later periods—the age of Stilicho, for example—shine brilliantly by comparison. The only great Latin writers are the Christians Tertullian and Cyprian. The Greek literature of the period is richer, but not owing to any patronage of the emperor, except perhaps in the case of Dio Cassius, who, though no admirer of Severus, attributes to encouragement received from him the execution of the great historical work which has come down to our time. The numerous restorations of ancient buildings and the many new constructions carried out by Severus show that he was not insensible to the artistic glories of the past; and he is known to have paid much attention to works of art in foreign countries where his duties took him. But he was in no sense a patron or connoisseur of art. As to religion, if we may trust Dio, one of the most superstitious of historians, Severus was one of the most superstitious of monarchs. But apart from that it is difficult to say what was his influence on the religious currents of the time. He probably did a good deal to strengthen and extend the official cult of the imperial family, which had been greatly developed during the prosperous times of the Antonines. But what he thought of Christianity, Judaism, or the Oriental mysticism to which his wife Julia Domna gave such an impulse in the succeeding reign, it is impossible to say. We may best conclude that his religious sympathies were wide, since tradition has not painted him as the partisan of any one form of worship.

The energy and dominance of Severus's character and his capacity for rule may be deemed, without fancifulness, to be traceable in the numerous representations of his features which have survived to our days.

The authorities for this emperor's reign are fairly full and satisfactory, considering the general scantiness of the imperial records. Severus himself wrote an autobiography which was regarded as candid and trustworthy on the whole. The events of the reign were recorded by several contemporaries. The first place among these must be given to Dio Cassius, who stands to the empire in much the same relation as Livy to the republic. He became a senator in the year when Marcus Aurelius died (180) and retained that dignity for more than fifty years. He was well acquainted with Severus, and was near enough the centre of affairs to know the real nature of events, without being great enough to have personal motives for warping the record. Though this portion of Dio's history no longer exists in its original form, we have copious extracts from it, made by Xiphilinus, an ecclesiastic of the 11th century. The faults which have impaired the credit of Dio's great work in its earlier portions,—his lack of the critical faculty, his inexact knowledge of the earlier Roman institutions, his passion for signs from heaven,—could do little injury to the narrative of an eye-witness; and he must here make upon the attentive reader the impression of unusual freedom from the commonest vices of history,—passion, prejudice, and insincerity. His Greek, too, stands in agreeable contrast to the debased Latin of the "scriptores historiae Augustae." The Greek writer Herodian was also a contemporary of Severus, but the mere fact that we know nothing of his life is in itself enough to show that his opportunities were not so great as those of Dio. The reputation of Herodian, who was used as the main authority for the times of Severus by Tillemont and Gibbon, has not been proof against the criticism of recent scholars. His faults are those of rhetoric and exaggeration. His narrative is probably in many places not independent of Dio. The writers known as the "scriptores historiae Augustae" are also of considerable importance,—particularly in the lives of Didius Julianus, Severus, Pescennius Niger, and Caracalla, attributed to Ælius Spartianus; those of Clodius Albinus and Opilius Macrinus to Julius Capitolinus; those of Antoninus Diadumenus, Antoninus Heliogabalus, and Alexander Severus to Lampridius. The personal history of Severus and his family is known to us mainly through these writers. Their principal authority was most probably L. Marius Maximus, a younger contemporary of Septimius Severus, who wrote, in continuation of the work of Suetonius, the lives of eleven emperors from Trajan to Heliogabalus inclusive. If we may believe a few words about him dropped by Ammianus Marcellinus, he was a kind of prose Juvenal, whose uniformly dark pigments can hardly have sufficed to paint a true picture even of his own times. The very numerous inscriptions belonging to the age of Septimius Severus enable us to control at many points and largely to supplement the literary records of his reign, particularly as regards the details of his administration. The juridical works of Justinian's epoch embody much that throws light on the government of Severus.

The principal modern works relating to this emperor, after Tillemont and Gibbon, are—J. J. Schulte, *De Imperatore L. Septimio Severo*, Münster, 1867; Höfner, *Untersuchungen zur Geschichte des Kaisers L. Septimius Severus*, Giessen, 1875; *Untersuchungen zur römischen Kaisergeschichte*, ed. by M. Budinger; H. Schiller, *Geschichte der römischen Kaiserzeit*, Gotha, 1880–83; De Ceuleneer, *Essai sur la Vie et le Règne de Septime Sévère*, Brussels, 1880; Réville, *La Religion à Rome sous les Sévères*, Paris, 1886. Controversy about the many disputed matters pertaining to Severus has been intentionally avoided in what has been said above. (J. S. R.)

SEVERUS, Marcus Aurelius Alexander, Roman emperor from 222 to 235, was of Syrian parentage, and was born at Arca near the Syrian Tripolis (now 'Irḳa; Yáḳút, iii. 653; *cf.* Gen. x. 17) probably in the year 205. His father Gessius Marcianus held office more than once as an imperial procurator; his mother Julia Mamæa was the daughter of Julia Mæsa, the scheming and ambitious lady of Emesa who had succeeded in raising her grandson Elagabalus to the throne of the Cæsars; see the genealogical table in Heliogabalus. His original name was Alexius Bassianus, but he changed it in 221, when Mæsa persuaded Elagabalus to adopt his cousin as successor and create him Cæsar. In the next year Elagabalus was murdered, and Alexander was proclaimed by the Prætorians and accepted by the senate. He was then a mere lad, amiable, well-meaning, but somewhat weak, and entirely under the dominion of his mother, a woman of many virtues, who surrounded her son with wise counsellors, watched over the development of his character, and improved the tone of the administration, but on the other hand was inordinately jealous of her influence, and alienated the army by extreme parsimony, while neither she nor her son had a strong enough hand to keep tight the reins of military discipline. Mutinies became frequent in all parts of the empire: to one of them the life of the prætorian præfect Ulpian was sacrificed; another compelled the retirement of Dion Cassius from his command (see Dion). On the whole, however, the reign of Alexander Severus was prosperous till he was summoned to the East to face the new power of the Sásánians (see Persia, vol. xviii. p. 618). Of the war that followed we have very various accounts; Mommsen (vol. v. p. 420 *sq.*) leans to that which is least favorable to the Romans. At all events, though the Persians were checked for the time, the conduct of the Roman army showed an extraordinary lack of discipline. The emperor returned to Rome and celebrated a triumph (233), but next year he was called to face German invaders in Gaul, and there was slain with his mother in a mutiny which was probably led by Maximinus, and at any rate purchased him the throne. Whatever the personal virtues of Alexander were, and they have not lost by contrast with his successor's brutal tyranny, he was not of the stuff to rule a military empire.

SEVERUS, Sulpicius (*c.* 365–*c.* 425), early Chris-

tian writer. A native of Aquitania, he was thoroughly imbued with the culture of his country and time. The seven southern provinces of Gaul, between the Alps and the Loire, had long been completely Romanized. The very name "Gaul" was repudiated by the inhabitants, and confined to the natives of the ruder northern districts. The lifetime of Severus exactly coincided with the period of greatest literary development in Aquitania, then the truest or only true home of Latin letters and learning—their last place of refuge, from which Severus saw them driven before he closed his eyes on the world. Almost all that we know of his life comes from a few allusions in his own writings and some passages in the letters of his friend Paulinus, bishop of Nola. In his early days he was famous as a pleader in the courts, and his knowledge of Roman law is reflected in parts of his writings. He married a wealthy lady belonging to a consular family, who died young, leaving him no children. At this time Severus came under the powerful influence of St. Martin, bishop of Tours, by whom he was led to devote his wealth to the Christian poor, and his own powers to a life of good works and meditation. To use the words of his friend Paulinus, he broke with his father, followed Christ, and set the teachings of the "fishermen" far above all his "Tullian learning." He rose to no higher rank in the church than that of presbyter. His time was passed chiefly in the neighborhood of Toulouse, and such literary efforts as he permitted to himself were made in the interests of Christianity. In many respects no two men could be more unlike than Severus, the scholar and orator, well versed in the ways of the world, and Martin, the rough Pannonian bishop of Tours, ignorant of learning, suspicious of culture, the champion of the monastic life, the seer of visions, and the worker of miracles. Yet the spirit of the rugged saint subdued that of the polished scholar, and the works of Severus would have little importance now did they not reflect the ideas, influence, and aspirations of Martin, the foremost ecclesiastic of Gaul, and one of the most striking figures in the church of his day.

The chief work of Severus is the *Chronica*, a summary of sacred history from the beginning of the world to his own times, with the omission of the events recorded in the Gospels and the Acts, "lest the form of his brief work should detract from the honor due to those events." The book was in fact a text-book, and was actually used as such in the schools of Europe for about a century and a half after the *editio princeps* was published by Flacius Illyricus in 1556. Severus nowhere clearly points to the class of readers for whom his book is designed. He disclaims the intention of making his work a substitute for the actual narrative contained in the Bible. "Worldly historians" had been used by him, he says, to make clear the dates and the connection of events and for supplementing the sacred sources, and with the intent at one and the same time to instruct the unlearned and to "convince" the learned. Probably the "unlearned" are the mass of Christians, and the learned are the cultivated Christians and pagans alike, to whom the rude language of the sacred texts, whether in their Greek or their Latin form, would be distasteful. The literary structure of the narrative itself shows that Severus had in his mind principally readers on the same level of culture with himself. He was anxious to show that sacred history might be presented in a form which lovers of Sallust and Tacitus could appreciate and enjoy. The style is lucid and almost classical. Though phrases and even sentences from many classical authors are interwoven here and there, the narrative flows on easily, with no trace of the jolts and jerks which offend us in almost every line of a patchwork imitator of the classics like Sidonius. In order that his work might fairly stand beside that of the old Latin writers, Severus boldly ignored the allegorical methods of interpreting sacred history to which the heretics and the orthodox of the age were alike wedded. Possibly he was not unshaken in his adherence to the peculiar reading which nearly all men then gave to the maxim that "the letter killeth but the spirit maketh alive."

As an authority for times antecedent to his own, Severus is of little moment. At only a few points does he enable us to correct or supplement other records. Bernays has shown that he based his narrative of the destruction of Jerusalem by Titus on the account given by Tacitus in his "Histories," a portion of which has been lost. We are enabled thus to contrast Tacitus with Josephus, who warped his narrative to do honor to Titus. In his allusions to the Gentile rulers with whom the Jews came into contact from the time of the Maccabees onwards, Severus discloses some points which are not without importance. But the real interest of his work lies, first, in the incidental glimpses it affords all through of the history of his own time; next, and more particularly, in the information he has preserved concerning the struggle over the Priscillianist heresy, which disorganized and degraded the churches of Spain and Gaul, and particularly affected Aquitaine. The sympathies here betrayed by Severus are wholly those of St. Martin. The stout bishop had withstood to his face Maximus, who ruled for some years a large part of the western portion of the empire, though he never conquered Italy. He had reproached him with attacking and overthrowing his predecessors on the throne, and for his dealings with the church. Severus loses no opportunity presented by his narrative for laying stress on the crimes and follies of rulers and on their cruelty, though he once declares that, cruel as rulers could be, priests could be crueller still. This last statement has reference to the bishops who had left Maximus no peace till he had stained his hands with the blood of Priscillian and his followers. Martin, too, had denounced the worldliness and greed of the Gaulish bishops and clergy. Accordingly we find that Severus, in narrating the division of Canaan among the tribes, calls the special attention of ecclesiastics to the fact that no portion of the land was assigned to the tribe of Levi lest they should be hindered in their service of God. "Our clergy seem," he says, "not merely forgetful of the lesson but ignorant of it, such a passion for possessions has in our days fastened like a pestilence on their souls. They are greedy of property, and tend their estates and hoard their gold, and buy and sell and give their minds to gain. Those of them who are reputed to be of better principles, who neither hold property nor barter, sit and wait for gifts, and pollute all the grace of their lives by taking fees, while they almost make market of their holiness; but I have digressed farther than I intended, through vexation and weariness of the present age." We here catch an interesting glimpse of the circumstances which were winning over good men to monasticism in the West, though the evidence of an enthusiastic votary of the solitary life, such as Severus was, is probably not free from exaggeration. Severus also fully sympathized with the action of St. Martin touching Priscillianism. This mysterious Western offshoot of Gnosticism had no single feature about it which could soften the hostility of a character such as Martin's was, but he stanchly resisted the introduction of secular punishment for evil doctrine, and withdrew from communion with those bishops in Gaul, a large majority, who invoked the aid of Maximus against their erring brethren. In this connection it is interesting to note the account given by Severus of the synod held at Rimini in 359, when the question arose whether the bishops attending the assembly might lawfully receive money from the imperial treasury to recoup their travelling and other expenses. Severus evidently approves the action of the British and Gaulish bishops, who deemed it unbecoming that they should lie under pecuniary obligation to the emperor. His ideal of the church required that it should stand clear of and above the state.

After the *Chronica* the chief work of Severus is his *Life of Martin*, a contribution to popular Christian literature which did much to establish the great reputation which that wonder-working saint maintained throughout the Middle Ages. The book is not properly a biography, but a catalogue of miracles, told in all the simplicity of absolute belief. The power to work miraculous signs is assumed to be in direct proportion to holiness, and is by Severus valued merely as an evidence of holiness, which he is persuaded can only be attained through a life of isolation from the world. In the first of his dialogues Severus puts into the mouth of an interlocutor a most pleasing description of the life of cœnobites and solitaries in the deserts bordering on Egypt. The main evidence of the virtue attained by them lies in the voluntary subjection to them of the savage beasts among which they lived. But Severus was no indiscriminating adherent of monasticism. The same dialogue shows him to be alive to its dangers and defects. The second dialogue is a large appendix to the Life of Martin, and really supplies more information of his life as bishop and of his views than the work which bears the title *Vita S. Martini*. The two dialogues occasionally make interesting references to personages of the epoch. In Dial. 1, cc. 6, 7, we have a vivid picture of the controversies which raged at Alexandria over the works of Origen. The judgment of Severus himself is no doubt that which he puts in the mouth of his

interlocutor Postumianus: "I am astonished that one and the same man could have so far differed from himself that in the approved portion of his works he has no equal since the apostles, while in that portion for which he is justly blamed it is proved that no man has committed more unseemly errors." Three epistles complete the list of Severus's genuine works. He is said to have been led away in his old age by Pelagianism, but to have repented and inflicted long-enduring penance on himself.

The text of the *Chronica* rests on a single MS., one of the Palatine collection now in the Vatican; of the other works MSS. are abundant. Some spurious letters bear the name of Severus; also in a manuscript at Madrid is a work falsely professing to be an epitome of the *Chronica* of Severus, and going down to 511. The chief editions of the complete works of Severus are those by De Prato (Verona, 1741) and by Halm (forming vol. i. of the *Corpus Scriptorum Ecclesiasticorum Latinorum*, Vienna, 1866). There is a most admirable monograph on the *Chronica* by Bernays (Berlin, 1861). (J. S. R.)

SÉVIGNÉ, Marie de Rabutin-Chantal, Marquise de (1626–1696), the most charming of all letter-writers in all languages, was born at Paris on February 6, 1626, and died at the chateau of Grignan (Drôme), on April 18, 1696. The family of Rabutin (if not so illustrious as Bussy, Madame de Sévigné's notorious cousin, affected to consider it) was one of great age and distinction in Burgundy. It was traceable in documents to the 12th century, and the castle which gave it name still existed, though in ruins, in Madame de Sévigné's time. The family had been "gens d'épée" for the most part, though François de Rabutin, the author of valuable memoirs on the 6th decade of the 16th century, undoubtedly belonged to it. It is said that Bussy's silly vanity led him to exclude this François from the genealogy of his house because he had not occupied any high position. Marie's father, Celse Bénigne de Rabutin, Baron de Chantal, was the son of the celebrated "Sainte" Chantal, friend and disciple of St. Francis of Sales; her mother was Marie de Coulanges. Celse de Rabutin shared to the full the mania for duelling which was the curse of the gentlemen of France during the first half of the 17th century, and was frequently in danger both directly from his adversaries and indirectly from the law. He died, however, in a more legitimate manner, being killed during the English descent on the Isle of Rhé in July, 1627. His wife did not survive him many years, and Marie was left an orphan at the age of seven years and a few months. She then passed into the care of her grandparents on the mother's side; but they were both aged, and the survivor of them, Philippe de Coulanges, died in 1636, Marie being then ten years old. According to French custom a family council was held to select a guardian of the young heiress, for such she was to some extent. Her uncle Christophe de Coulanges, Abbé de Livry, was chosen. He was somewhat young for the guardianship of a girl, being only twenty-nine, but readers of his niece's letters know how well "Le Bien Bon"—for such is his name in Madame de Sévigné's little language—acquitted himself of the trust. He lived till within ten years of his ward's death, and long after his nominal functions were ended he was in all matters of business the good angel of the family, while for half a century his abbacy of Livry was the favorite residence, both of his niece and her daughter. Coulanges was much more of a man of business than of a man of letters, but either choice or the fashion of the time induced him to make of his niece a learned lady. Chapelain and Ménage are specially mentioned as her tutors, and Ménage at least fell in love with her, in which point he resembled the rest of the world, and was constant to his own habits in regard to his pupils. Tallemant des Réaux gives more than one instance of the cool and good-humored raillery with which she received his passion, and the earliest letters of hers that we possess are addressed to Ménage. Another literary friend of her youth was the poet Saint-Pavin. Among her own sex she was intimate with all the coterie of the Hôtel Rambouillet, and her special ally was Mademoiselle de la Vergne, afterwards Madame de la Fayette. In person she was extremely attractive, though the minute critics of the time (which was the palmy day of portraits in words) objected to her divers deviations from strictly regular beauty, such as eyes of different colors and sizes, a "square-ended" nose, and a somewhat heavy jaw. Her beautiful hair and complexion, however, were admitted even by these censors, as well as the extraordinary spirit and liveliness of her expression. Her long minority, under so careful a guardian as Coulanges, had also raised her fortune to the amount of 100,000 crowns [$57,000]—a large sum for the time, and one which with her birth and beauty might have allowed her to expect a very brilliant marriage. That which she finally made was certainly one of affection on her side rather than of interest. There had been some talk of her cousin Bussy, but very fortunately for her this came to nothing. She actually married Henri, Marquis de Sévigné, a Breton gentleman of a good family, and allied to the oldest houses of that province, but of no great estate. The marriage took place on August 4, 1644, and the pair went almost immediately to Sévigné's manor-house of Les Rochers, near Vitré, a place which Madame de Sévigné was in future years to immortalize. It was an unfortified chateau of no very great size, but picturesque enough, with the peaked turrets common in French architecture, and surrounded by a park and grounds of no large extent, but thickly wooded and communicating with other woods. The abundance of trees gave it the repute of being damp and somewhat gloomy. Fond, however, as Madame de Sévigné was of society, it may be suspected that the happiest days of her brief married life were spent there. For there at any rate her husband had less opportunity than in Paris of neglecting her, and of wasting her money and his own. Very little good is said of Henri de Sévigné by any of his contemporaries. He was one of the innumerable lovers of Ninon de l'Enclos, and made himself even more conspicuous with a certain Madame de Gondran, known in the nickname slang of the time as "La Belle Lolo." He was wildly extravagant. That his wife loved him and that he did not love her was generally admitted, and the frank if somewhat coxcomb-like accounts which Bussy Rabutin gives of his own attempt and failure to persuade her to retaliate on her husband are decisive as to her virtue. At last Sévigné's pleasant vices came home to him. He quarrelled with the Chevalier d'Albret about Madame de Gondran, fought with him and was mortally wounded on the 4th of February, 1651; he died two days afterwards. There is no reasonable doubt that his wife regretted him a great deal more than he deserved. On two different occasions she is said to have fainted in public at the sight once of his adversary and once of his second in the fatal duel; and whatever Madame de Sévigné was (and she had several faults) she was certainly not a hypocrite. Her husband had when living accused her of coldness,—the common excuse of libertine husbands,—but even he seems to have found fault only with her temperament, not with her heart. To close this part of the subject it may be said that though only six and twenty, and more beautiful than ever, she never married again despite frequent offers, and that no aspersion was ever thrown save in one instance on her fame. For the rest of her life, which was long, she gave herself up to her children. These were two in number, and they divided their mother's affections by no means equally. The eldest was a daughter, Françoise Marguerite de Sévigné, who was born on October 10, 1646, whether at Les Rochers or in Paris is not absolutely certain. The second, a son, Charles de Sévigné, was born at Les Rochers in the spring of 1648. To him Madame de Sévigné was an indulgent, a generous (though not altogether just), and in a way an affectionate mother. Her daughter, the future Madame de Grignan, she worshipped with an almost insane affection, which only its charming literary results and the delightful qualities which accompanied it in

the worshipper, though not in the worshipped, save from being ludicrous if not revolting. As it is, not one in a hundred of Madame de Sévigné's readers can find in his heart to be angry with her for her devotion to a very undivine divinity.

After her husband's death Madame de Sévigné passed the greater part of the year 1651 in retirement at Les Rochers. She had, however, no intention of renouncing the world, and she returned to Paris in November of that year, her affairs having been put in such order as Sévigné's extravagance permitted by the faithful Coulanges. For nearly ten years little of importance occurred in her life, which was passed at Paris in a house she occupied in the Place Royale (not as yet in the famous Hôtel Carnavalet), at Les Rochers, at Livry, or at her own estate of Bourbilly in the Mâconnais. She had, however, in 1658 a quarrel with her cousin Bussy, which had not unimportant results, and at the end of the time mentioned above she narrowly escaped being compromised in reputation, though not politically, at Fouquet's downfall. Notwithstanding Bussy's unamiable character and the early affair of the proposed marriage, and notwithstanding also his libertine conduct towards her, the cousins had always been friends; and the most amusing and characteristic part of Madame de Sévigné's correspondence, before the date of her daughter's marriage, is addressed to him. She had a very strong belief in family ties; she recognized in Bussy a kindred spirit, and she excused his faults as *Rabutinades* and *Rabutinages*—the terms she uses in alluding to the rather excitable and humorist temper of the house. But in 1658 a misunderstanding about money brought about a quarrel, which in its turn had a long sequel, and results not unimportant in literature. Bussy and his cousin had jointly come in for a considerable legacy, and he asked her for a loan. If this was not positively refused, there was a difficulty made about it, and Bussy was deeply offended. A year later, at the escapade of Roissy (see RABUTIN), according to his own account, he improvised (according to probability he had long before written it) the famous portrait of Madame de Sévigné which appears in his notorious *Histoire Amoureuse*, and which is a triumph of malice. Circulated at first in manuscript and afterwards in print, this caused Madame de Sévigné the deepest pain and indignation, and the quarrel between the cousins was not fully made up for years, if indeed it was ever fully made up. This portrait, however, was more wounding to self-love than in any way really dangerous, for, read between the lines, it is in effect a testimonial of character. The Fouquet matter was more serious. The superintendent was a famous lady-killer, but Madame de Sévigné, though he was her friend, and though she had been ardently courted by him as by others (one quarrel in her presence between the Duke de Rohan and the Marquis de Tonquedec had become notorious), had hitherto escaped scandal. At Fouquet's downfall in 1661 it was announced on indubitable authority that communications from her had been found in the coffer where Fouquet kept his love letters. She protested that the notes in question were of friendship merely, and Bussy (one of the not very numerous good actions of his life) obtained from Le Tellier, who as minister had examined the letters, a corroboration of the protest. But the letters were never published, and there have always been those who held that Madame de Sévigné regarded Fouquet with at least a very warm kind of friendship. It is certain that her letters to Pomponne describing his trial are among her masterpieces of unaffected, vivid, and sympathetic narration.

During these earlier years, besides the circumstances already mentioned, Madame de Sévigné conceived, like most of the better and more thoughtful among Frenchmen and Frenchwomen, a great affection for the establishment of Port Royal, which was not without its effect on her literary work. That work, however (if writing than which certainly none was ever less carried out in a spirit of mere workmanship can be so called), dates in its bulk and really important part almost entirely from the last thirty years of her life. Her letters before the marriage of her daughter, though by themselves they would suffice to give her a very high rank among letter-writers, would not do more than fill one moderate-sized volume. Those after that marriage fill nearly ten large volumes in the latest and best edition. We do not hear very much of Mademoiselle de Sévigné's early youth. For a short time, at a rather uncertain date, she was placed at school with the nuns of St. Marie at Nantes. But for the most part her mother brought her up herself, assisted by the Abbé de la Mousse, a faithful friend, and for a time one of her most constant companions. La Mousse was a great Cartesian, and he made Mademoiselle de Sévigné also a devotee of the bold soldier of Touraine to a degree which even in that century of blue stockings excited surprise and some ridicule. But Mademoiselle de Sévigné was bent on more mundane triumphs than philosophy had to offer. Her beauty is all the more incontestable that she was by no means generally liked. Bussy, a critical and not too benevolent judge, called her "la plus jolie fille de France," and it seems to be agreed that she resembled her mother, with the advantage of more regular features. She was introduced at court early, and as she danced well she figured frequently in the ballets which were the chief amusement of the court of Louis XIV. in its early days. If, however, she was more regularly beautiful than her mother she had little or nothing of her attraction, and like many other beauties who have entered society with similar expectations she did not immediately find a husband. Various projected alliances fell through for one reason or another, and it was not till the end of 1668 that her destiny was settled. On January 29 in the next year she married François Adhémar, Comte de Grignan, a Provençal, of one of the noblest families of France, and a man of amiable and honorable character, but neither young nor handsome, nor in reality rich. He had been twice married and his great estates were heavily encumbered. Neither did the large dowry (300,000 livres [or $57,000]) which Madame de Sévigné, somewhat unfairly to her son, bestowed upon her daughter, suffice to clear encumbrances, which were constantly increased in the sequel by the extravagance of Madame de Grignan as well as of her husband.

Charles de Sévigné was by this time twenty years old, but he had no doubt already learnt that he was not the person of chief importance in the family. He never, throughout his life, appears to have resented his mother's preference of his sister; but, though thoroughly amiable, he was not (at any rate in his youth) a model character. Nothing is known of his education, but just before his sister's marriage he volunteered for a rather harebrained expedition to Crete against the Turks, and served with credit. Then his mother bought him the commission of *guidon* (a kind of sub-cornet) in the Gendarmes Dauphin, in which regiment he served for some years, and after long complaining of the slowness of promotion rather rapidly rose to the rank of captain, when he sold out. But though he always fought well he was not an enthusiastic soldier, and was constantly and not often fortunately in love. He followed his father into the nets of Ninon de l'Enclos, and was Racine's rival with Mademoiselle Champmeslé. The way in which his mother was made confidante of these discreditable and not very successful loves is characteristic both of the time and of the country. In 1669 M. de Grignan, who had previously been lieutenant-governor of Languedoc, was transferred to Provence. The governor-in-chief was the young duke of Vendôme. But at this time he was a boy, and he never really took up the government, so that Grignan for more than forty years was in effect viceroy of this important province. His wife rejoiced greatly in the part of vice-queen;

but their peculiar situation threw on them the expenses, without the emoluments of the office, and those expenses were increased by the extravagance of both, so that the Grignan money affairs hold a larger place in Madame de Sévigné's letters than might perhaps be wished.

In 1671 Madame de Sévigné with her son paid a visit to Les Rochers, which is memorable in her history and in literature. The states of Brittany were convoked that year at Vitré. This town being in the immediate neighborhood of Les Rochers, Madame de Sévigné's usually quiet life at her country house was diversified by the necessity of entertaining the governor, the Duc de Chaulnes, of appearing at his receptions, and so forth. All these matters are duly consigned to record in her letters, together with much good-natured raillery (it must be admitted that it is sometimes almost on the verge of being ill-natured, though never quite over it) on the country ladies of the neighborhood and their ways. She remained at Les Rochers during the whole summer and autumn of 1671, and did not return to Paris till late in November. The country news is then succeeded by news of the court. At the end of the next year, 1672, one great wish of her heart was gratified by paying a visit to her daughter in her vice-royalty of Provence. Madame de Grignan does not seem to have been very anxious for this visit,—perhaps because, as the letters show in many cases, the exacting affection of her mother was somewhat too strong for her own colder nature, perhaps because she feared such a witness of the ruinous extravagance which characterized the Grignan household, But her mother remained with her for nearly a year, and did not return to Paris till the end of 1673. During this time we have (as is usually the case during these Provençal visits and the visits of Madame de Grignan to Paris) some letters addressed to Madame de Sévigné, but comparatively few from her. A visit of the second class was the chief event of 1674, and the references to this, such as they are, is the chief evidence that mother and daughter were on the whole better apart. 1675 brought with it the death of Turenne (of which Madame de Sévigné has given a very noteworthy account, characteristic of her more ambitious but not perhaps her more successful manner), and also serious disturbances in Brittany. Notwithstanding these it was necessary for Madame de Sévigné to make her periodical visit to Les Rochers. She reached the house in safety, and the friendship of Chaulnes protected her both from violence and from the exactions which the miserable province underwent as a punishment for its resistance to excessive and unconstitutional taxation. No small part of her letters is occupied by these affairs.

The year 1676 saw several things important in Madame de Sévigné's life. For the first time she was seriously ill,—it would appear with rheumatic fever,—and she did not thoroughly recover till she had visited Vichy. Her letters from this place are among her very best, and picture life at a 17th-century watering-place with unsurpassed vividness. In this year, too, took place the trial and execution of Madame de Brinvilliers. This event figures in the letters, and the references to it are among those which have given occasion to unfavorable comments on Madame de Sévigné's character—comments which, with others of the kind, will be more conveniently treated together. In the next year, 1677, she moved into the Hôtel Carnavalet, a house which still remains and is inseparably connected with her memory, and she had the pleasure of welcoming the whole Grignan family to it. They remained there a long time; indeed nearly two years seem to have been spent by Madame de Grignan partly in Paris and partly at Livry. The return to Provence took place in October, 1678, and next year Madame de Sévigné had the grief of losing La Rochefoucauld, the most eminent and one of the most intimate of her close personal friends and constant associates. In 1680 she again visited Brittany, but the close of that year saw her back in Paris to receive another and even longer visit from her daughter, who remained in Paris for four years. Before the end of the last year of this stay (in February, 1684), Charles de Sévigné, after all his wandering loves, and after more than one talked-of alliance, was married to a young Breton lady, Jeanne Marguerite de Mauron, who had a considerable fortune. In the arrangements for this marriage Madame de Sévigné practically divided all her fortune between her children (Madame de Grignan of course receiving an unduly large share), and reserved only part of the life interest. The greed of Madame de Grignan nearly broke her brother's marriage, but it was finally concluded and proved a very happy one in a somewhat singular fashion. Both Sévigné and his wife became deeply religious, and at first Madame de Sévigné found their household (for she gave up Les Rochers to them) not at all lively. But by degrees she grew fond of her daughter-in-law. During this year she spent a considerable time in Brittany, first on business, afterwards on a visit to her son, and partly it would appear for motives of economy. But Madame de Grignan still continued with only short absences to inhabit Paris, and the mother and daughter were practically in each other's company until 1688. The proportion of letters therefore that we have for the decade 1677–1687 is much smaller than that which represents the decade preceding it; indeed the earlier period contains the great bulk of the whole correspondence. In 1687 the Abbé de Coulanges, Madame de Sévigné's uncle and good angel, died, and in the following year the whole family were greatly excited by the first campaign of the young Marquis de Grignan, Madame de Grignan's only son, who was sent splendidly equipped to the siege of Philippsbourg. In the same year Madame de Sévigné was present at the St. Cyr performance of *Esther*, and some of her most amusing descriptions of court ceremonies and experiences date from this time. 1689 and 1690 were almost entirely spent by her at Les Rochers with her son; and on leaving him she went across France to Provence. There was some excitement during her Breton stay, owing to the rumor of an English descent, on which occasion the Breton militia was called out, and Charles de Sévigné appeared for the last time as a soldier; but it came to nothing. 1691 was passed at Grignan and other places in the south, but at the end of it Madame de Sévigné returned to Paris, bringing the Grignans with her; and her daughter stayed with her till 1694. The year 1693 saw the loss of two of her oldest friends,—Bussy Rabutin, her faithless and troublesome but in his own way affectionate cousin, and Madame de la Fayette, her lifelong companion, and on the whole perhaps her best and wisest friend. Another friend almost as intimate, Madame de Lavardin, followed in 1694. Madame de Sévigné spent but a few months of this latter year alone, and followed her daughter to Provence. She never revisited Brittany after 1691. Two important marriages with their preparations occupied most of her thoughts during 1694–1695. The young Marquis de Grignan married the daughter of Saint-Amant, an immensely rich financier; but his mother's pride, ill-nature, and bad taste (she is said to have remarked in full court that it was necessary now and then to "manure the best lands," referring to Saint-Amant's wealth, low birth, and the Grignan's nobility) made the marriage not a very happy one. His sister Pauline, who, in the impossibility of dowering her richly, had a narrow escape of the cloister, made a marriage of affection with M. de Simiane, and eventually became the sole representative and continuator of the families of Grignan and Sévigné.

Madame de Sévigné survived these alliances but a very short time. During an illness of her daughter she herself was attacked by smallpox in April, 1696,

and she died on the 17th of that month at Grignan, and was buried there. Her idolized daughter was not present during any time of her illness; it has been charitably hoped that she was too ill herself. Her known attention to her own good looks, and the terror of the smallpox which then prevailed, supply perhaps a less charitable but sufficient explanation. But in her will Madame de Sévigné still showed her preference for this not too grateful child, and Charles de Sévigné accepted his mother's wishes in a letter showing the good-nature which he had never lacked, and the good sense which, after his early follies, and even in a way during them, he had also shown. But the two families were, except as has been said for Madame de Simiane and her posterity, to be rapidly broken up. Charles de Sévigné and his wife had no children, and he himself, after occupying some public posts (he was king's lieutenant in Brittany in 1697), went with his wife into religious retirement at Paris in 1703, and after a time sequestered himself still more in the seminary of Sainte-Magloire, where he died on March 26, 1713. His widow survived him twenty years. Madame de Grignan had died on August 16, 1705, at a country house near Marseilles, of the very disease which she had tried to escape by not visiting her dying mother. Her son, who had fought at Blenheim, had died of the same malady at Thionville the year before. Marie Blanche, her eldest daughter, was in a convent, and, as all the Comte de Grignan's brothers had either entered the church or died unmarried, the family, already bankrupt in fortune, was extinguished in the male line by Grignan's own death in 1714, at a very great age. Madame de Simiane, whose connection with the history of the letters is important, died in 1737.

The chief subjects of public interest and the principal family events of importance which are noticed in the letters of Madame de Sévigné have been indicated already. But, as will readily be understood, neither the whole nor even the chief interest of her correspondence is confined to such things. In the latest edition the letters extend to sixteen or seventeen hundred, of which, however, a considerable number (perhaps a third) are replies of other persons or letters addressed to her, or letters of her family and friends having more or less connection with the subjects of her correspondence. As a rule her own letters, especially those to her daughter, are of great length. Writing as she did in a time when newspapers were not, or at least were scanty and jejune, gossip of all sorts appears among her subjects, and some of her most famous letters are pure *reportage* (to use a modern French slang term), while others deal with strictly private subjects. Thus one of her best known pieces has for subject the famous suicide of the great cook Vatel owing to the misunderstanding as to the provision of fish for an entertainment given to the king by Condé at Chantilly. Another (one of the most characteristic of all) deals with the projected marriage of Lauzun and Mademoiselle de Montpensier; another with the refusal of one of her own footmen to turn haymaker when it was important to get the crop in at Les Rochers; another with the fire which burnt out her neighbor's house in Paris. At one moment she tells how a forward lady of honor was disconcerted in offering certain services at Mademoiselle's levée; at another how ill a courtier's clothes became him. She enters, as has been said, at great length into the pecuniary difficulties of her daughter; she tells the most extraordinary stories of the fashion in which Charles de Sévigné sowed his wild oats; she takes an almost ferocious interest and side in her daughter's quarrels with rival beauties or great officials in Provence who throw difficulties in the way of government.

Almost all writers of literary letters since Madame de Sévigné's days, or rather since the publication of her correspondence, have imitated her more or less directly, more or less consciously, and it is therefore only by applying that historic estimate upon which all true criticism rests that her full value can be discerned. The charm of her work is, however, so irresistible that, read even without any historical knowledge and in the comparatively adulterated editions in which it is generally met with, that charm can hardly be missed. Madame de Sévigné was a member of the strong and original group of writers—Retz, La Rochefoucauld, Corneille, Pascal, St. Evremond, Descartes, and the rest—who escaped the finical and weakening reforms of the later 17th century, while for the most part they had profited by those earlier reforms which succeeded the classicizing of the Pléiade and the imitation of Spanish and Italian which marred some early work of Louis XIII.'s time. According to the strictest standard of the Academy her phraseology is sometimes incorrect, and it occasionally shows traces of the quaint and affected style of the *Précieuses;* but these things only add to its savor and piquancy. In lively narration few writers have excelled her, and in the natural expression of domestic affection and maternal affection none. She had an all-observant eye for trifles and the keenest possible appreciation of the ludicrous, together with a hearty relish for all sorts of amusements, pageants, and diversions, and a deep though not voluble or over-sensitive sense of the beauties of nature. But with all this she had an understanding as solid as her temper was gay. Unlike her daughter she was not a professed blue-stocking or philosophess. But she had a strong affection for theology, in which she inclined (like the great majority of the religious and intelligent laity of her time in France) to the Jansenist side. Her favorite author in this class was Nicole. She has been reproached with her fondness for the romances of Mlle. de Scudéry and the rest of her school. But probably many persons who make that reproach have themselves never read the works they despise, and are ignorant how much merit there is in books whose chief faults are that they are written in a strongly marked and now obsolete fashion, and that their length (which, however, scarcely if at all exceeds that of *Clarissa*) is preposterous. In purely literary criticism Madame de Sévigné, few as were the airs she gave herself, was no mean expert. Her preference for Corneille over Racine has much more in it than the fact that the elder poet had been her favorite before the younger began to write; and her remarks on La Fontaine and some other authors are both judicious and independent. Nor is she wanting in original reflections of no ordinary merit. All these things, added to her abundance of amusing matter and the charm of her bright and ceaseless flowing style, fully account for the unchanged and undiminished delight which half a dozen generations have taken in her work. But it cannot be repeated too often that to enjoy that work in its most enjoyable point—the combination of fluent and easy style with quaint archaisms and tricks of phrase—it must be read as she wrote it, and not in the trimmed and corrected version of Perrin and Madame de Simiane.

There can, moreover, be no one, however wedded he may be to the plan of criticising literature as literature, who will not admit that great part of the interest and value of these remarkable works lies in the picture of character which they present. Indeed, great part of their purely literary merit lies in the extraordinary vividness of this very presentation. Madame de Sévigné's character, however, has not united quite such a unanimity of suffrage as her ability in writing. In her own time there were not wanting enemies (indeed her unsparing partisanship on her daughter's side could not fail to provoke such) who maintained that her letters were written for effect, and that her affection for her daughter was ostentatious and unreal. But few modern critics have followed these detractors, and it may be said confidently that no competent judge of character, after patiently reading the letters, can for a moment admit their view. But this kind of enemy has been followed by another, who, not overshooting his mark so conspicuously, has been somewhat more successful in persuading spectators that he has hit it. Her excessive affection for Madame de Grignan (the almost importunate character of which seems to be proved by her own confessions of unhappiness if not of quarrel when they were together); her unhesitating blindness to anything but her daughter's interest (manifested especially in the part she took in most unjustifiable attempts of Madame de Grignan to secure her stepdaughters' dowries and to force themselves into a convent); her culpable tolerance of her son's youthful follies on the one hand and the uneven balance which she held in money matters between him and his sister on the other; the apparent levity with which she speaks of the sufferings of Madame de Brinvilliers, of galley slaves, of the peasantry, etc.; and the freedom of language which she uses herself and tolerates from others,—have all been cast up against her. Here the before-mentioned historic estimate sufficiently disposes of some of the objections, a little common sense of others, and a very little charity of the rest. If too much love felt by a mother towards a daughter be a fault, then certainly Madame de Sévigné was one of the most offending souls that ever lived; but it will hardly, even with the injustice which like all excessive affection it brought in its train, be held damning. Indeed, the guilty lady was evidently quite aware of her weakness in this respect, and it is one of

the most noteworthy things of her literary capacity that, excessive as the weakness is, it does not disgust or weary the reader. The singular confidences which Madame de Sévigné received from her son and transmitted to her daughter would even at the present day be less surprising in France than in England. They are only an instance, adjusted to the manners of the time, of the system of sacrificing everything to the maintenance of confidence between mother and son, to which the almost invariable, and to foreigners sometimes rather ludierous, but certainly not unamiable, adoration of Frenchmen for their mothers is due. Here too, as well as in reference to the immediately kindred charge of crudity of language, and to that of want of sympathy with suffering, especially with the sufferings of the people, it is especially necessary to remember of what generation Madame de Sévigné was and what were her circumstanees. That generation was the generation which Madame de Rambonillet endeavored with some success to polish and humanize, but which had barely recovered the hardening influences of the religious and civil wars when it was plunged into the Fronde. It was the generation to which belong the almost incredible yet trustworthy *Historiettes* of Tallemant, and in which, when she herself had already reached middle life, Bussy Rabutin's *Histoire Amoureuse* exposed him indeed to powerful resentments but did not make him lose all caste as a gentleman and man of honor. It is absurd to expect at such a time and in private letters the delicacy proper to quite different times and circumstances. Moreover, as to the charge of inhumanity, not only do these considerations apply, but there is more to be pleaded than mere extenuating circumstances. It is not true that Madame de Sévigné shows no sympathy with the oppression of the Bretons; it is very far from true, though her incurable habit of humorous expression—of *Rabutinage*, as she says—makes her occasionally use light phrases about the matter. But it is in fact as unreasonable to expect modern political views from her (and it is from certain modern political standpoints that the charge is usually made) as it is to expect her to observe the canons of a 19th-century propriety. On the whole she may be as fairly and confidently acquitted of any moral fault, save the one peccadillo of loving her daughter too exclusively and blindly, as she may be acquitted of all literary faults whatsoever. Her letters are wholly, what her son-in-law said of her after her death, *compagnons délicieux;* and, far from faultless as Madame de Grignan was, none of her faults is more felt by the reader than her long visits to her mother, during which the letters ceased.

The bibliographic history of Madame de Sévigné's letters is of considerable interest in itself, and is moreover typical of much other contemporary literary history. The 17th century was *par excellence* the century of privately circulated literature, and from Madame de Sévigné herself we know that her own letters were copied and handed about, sometimes under specified titles, as early as 1673. None of them, however, were published until her correspondence with Bussy Rabutin appeared, in his *Memoirs and Correspondence*, partly in the year of her death, partly next year. The remainder were not printed in any form for thirty years. Then between 1725 and 1728 appeared no less than seven unauthorized editions, containing more or fewer additions from the copies which had been circulated privately. The bibliography of these is complicated and curious, and must be sought in special works (see especially the *Grands Écrivains* edition, vol. xi.). They have, however, abiding interest chiefly because they stirred up Madame de Simiane, the writer's only living representative, to give an authorized version. This appeared under the care of the Chevalier de Perrin in 6 vols. (Paris, 1734–37). It contained only the letters to Madame de Grignan, and these were subjected to editing rather careful than conscientious, the results of which were never thoroughly removed until quite recently. In the first place, Madame de Simiane, who possessed her mother's replies, is said to have burnt the whole of these from religious motives; this phrase is explained by Madame de Grignan's Cartesianism, which is supposed to have led her to expressions alarming to orthodoxy. In the second, scruples partly having to do with the susceptibilities of living persons, partly concerning Jansenist and other prejudices, made her insist on numerous omissions. Thirdly, and most unfortunately, the change of taste seems to have required still more numerous alterations of style and language, such as the substitution of "Ma Fille" for Madame de Sévigné's usual and charming "Ma Bonne," and many others. Perrin followed this edition up in 1751 with a volume of supplementary letters not addressed to Madame de Grignan, and in 1754 published his last edition of the whole, which was long the standard (8 vols., Paris). During the last half of the 18th century numerous editions of the whole or parts appeared with important additions, such as that of 1756, giving for the first time the letters to Pomponne on the Fouquet trial; that of 1773, giving letters to Moulceau; that of 1775, giving for the first time the Bussy letters separate from his memoirs, etc. An important collected edition of all these fragments, by the Abbé de Vauxcelles, appeared in 1801 (Paris, An IX.) in 10 vols.; five years later Gouvelle (Paris, 1806, 8 vols.) introduced the improvement of chronological order; this was reprinted in 12 vols. (Paris, 1819) with some more unpublished letters which had separately appeared meanwhile. In the same year appeared the first edition of M. de Monmerqué. From that date continual additions of unpublished letters were made, in great part by the same editor, and at last the whole was remodelled on manuscript copies (the originals unfortunately are available for but few) in the edition called Des Grands Écrivains, which M. de Monmerqué began, but which, owing to his death, had to be finished by MM. Regnier, Paul Mesnard, and Sommer (Paris, 1862–1868). This, which entirely supersedes all others (even a handsome edition published during its appearance by M. Silvestre de Sacy), consists of twelve volumes of text, notes, etc., two volumes of lexicon, and an album of plates. It contains all the published letters to and from Madame de Sévigné, with the replies where they exist, with all those letters to and from Madame de Simiane (many of which had been added to the main body) that contain any interest. The sole fault to be found with this excellent edition is the omission to add to each volume a table of contents giving each letter as it comes with a brief abstract of its contents. To it, however, must be added two volumes (printed uniformly) of *Lettres Inédites*, published by M. Ch. Capmas in 1876 and containing numerous variants and additions from a MS. copy discovered in an old curiosity shop at Dijon. Of less elaborate and costly editions that in the collection Didot (6 vols., Paris, v.d.) is by far the best, though, in common with all others except the *Grands Écrivains* edition, it contains an adulterated text.

Works on Madame de Sévigné are innumerable. The biography by Paul Mesnard is nearly exhaustive, but the most elaborate biographical book is that of Walckenaer (3d ed., Paris, 1856, 5 vols.), to which should be added the remarkable *Histoire de Mme. de Sévigné* of Aubenas (Paris and St. Petersburg, 1842). In English an excellent little book by Miss Thackeray (Mrs. Ritchie), Edinburgh and London, 1881, may be recommended. Most of the editions have portraits more or fewer. (G. SA.)

SEVILLE, a Spanish province—one of the eight into which Andalusia is divided—and formerly one of the four Moorish kingdoms, is bounded on the S. by Malaga and Cadiz, on the W. by Huelva, on the N. by Badajoz, and on the E. by Cordova. The superficial area is 5429 square miles, and in 1877 the population numbered 505,291. Northwards the province is broken up by low spurs of the Sierra Morena, the summits of which in the extreme north rise to a considerable height; but in the southern and larger half the ground is flat and fertile, and the only mountainous part is the frontier line formed by the Sierra de Ronda. The Guadalquivir traverses the province from northeast to southwest and receives in its course the waters of several streams, the chief being the Genil and the Guadaira on the left, and the Guadalimar to the right. The province is one of the most productive and flourishing in Spain, and grows all kinds of grain and vegetables. Oil and wine, oranges and olives, are among its chief exports, while tobacco, leather, paper, spirits, chocolate, textile fabrics of silk and wool, soap, glass, and earthenware are amongst its manufactures. Sheep and oxen, horses and asses, are reared on its pastures; and in the mountainous districts there are copper, silver, lead, iron, coal, and salt mines, and quarries of chalk and marble. Commerce has made great strides of late years owing to the opening up of the country by railways, and foreign capital has developed the natural resources of the district. The province is divided for administrative purposes into fourteen partidos judiciales and ninety-eight ayuntamientos, and is represented in the cortes by four senators and twelve deputies. The following towns have a population of more than 10,000 within the municipal boundaries: Seville (see below), Carmona (17,426), Constantina (10,988), Écija (24,955), Lebrija (12,864), Marchena (13,768), Moron de la Frontera (14,879), Osuna (17,211), and Utrera (15,093).

SEVILLE (Span. *Sevilla*, Latin *Hispalis*, Arabic

Ishbíliya) capital of the above province and the seat of an archbishopric, with a population of 133,938 in 1877, is situated in 37° 22′ N. lat. and 5° 58′ W. long., 62 miles (95 by rail) north-northeast of Cadiz and 255 miles south-southwest of Madrid, on the left bank of the Guadalquivir, which here flows through a level country as productive as a garden. The river is navigable up to the city, which is highly picturesque in its combination of ancient buildings with busy commerce. From the earliest times the port has been a chief outlet for the wealth of Spain. Under the Romans the city was made the capital of Bætica, and became a favorite resort for wealthy Romans. The emperors Hadrian, Trajan, and Theodosius were born in the neighborhood at Italica (now Santiponce) where are the remains of a considerable amphitheatre. The chief existing monument of the Romans in Seville itself is the aqueduct, on four hundred and ten arches, by which the water from Alcalá de Guadaira continued until recently to be supplied to the town. At the beginning of the 5th century the Silingi Vandals made Seville the seat of their empire, until it passed in 531 under the Goths.

Plan of Seville.

who chose Toledo for their capital. After the defeat of Don Roderick at Guadalete in 712 the Arabs took possession of the city after a siege of some months. Under the Arabs Seville continued to flourish. Edrisi speaks in particular of its great export trade in the oil of Aljarafe. The district was in great part occupied by Syrian Arabs from Emesa, part of the troops that entered Spain with Balj in 741 at the time of the revolt of the Berbers. It was a scion of one of these Emesan families, Abú 'l-Kásim Mohammed, cadi of Seville, who on the fall of the Spanish caliphate headed the revolt of his townsmen against their Berber masters (1023) and became the founder of the Abbádid dynasty, of which Seville was capital, and which lasted under his son Mo'tadid (1042–1069) and grandson Mo'tamid (1069–1091) till the city was taken by the Almoravids. The later years of the Almoravid rule were very oppressive to the Moslems of Spain; in 1133 the people of Seville were prepared to welcome the victorious arms of Alphonso VII., and eleven years later Andalusia broke out in general rebellion. Almohade troops now passed over into Spain and took Seville in 1147. Under the Almohades Seville was the seat of government and enjoyed great prosperity; the great mosque was commenced by Yúsuf I. and completed by his son the famous Almanzor. In the decline of the dynasty between 1228 and 1248 Seville underwent various revolutions, and ultimately acknowledged the Hafsite prince, who, however, was unable to save the city from Ferdinand III., who restored it to Christendom in 1248. The aspect of the town even now is essentially Moorish, with its narrow tortuous streets and fine inner court-yards to the houses. Many of these date from before the Christian conquest, and the walls and towers which until recently encircled the city for a length of 5 miles have a similar origin. The victory of Ferdinand brought temporary ruin on the city, for it is said that 400,000 of the inhabitants went into voluntary exile, and some time elapsed before Seville recovered from the loss. But its position was too favorable for trade for it to fall into permanent decay, and by the 15th century it was again in a position to derive full benefit from the discovery of America. After the reign of Philip II. its prosperity gradually waned with that of the rest of the Peninsula; yet even in 1700 its silk factories gave employment to thousands of workpeople; their numbers, however, by the end of the 18th century had fallen to four hundred. In 1800 an outbreak of yellow fever carried off 30,000 of the inhabitants, and in 1810 the city suffered severely from the French under Soult, who plundered to the extent of six millions sterling. Since that time it has gradually recovered prosperity, and is now one of the most busy and active centres of trade in the Peninsula. Politically Seville has always had the reputation of peculiar loyalty to the throne from the time when, on the death of Ferdinand III., it was the only city which remained faithful to his son Alphonso the Wise. It was consequently much favored by the monarchs, and frequently a seat of the court. In 1729 the treaty between England, France, and Spain was signed in the city; in 1808 the central junta was formed here and removed in 1810 to Cadiz; in 1823 the cortes brought the king with them from Madrid; and in 1848 Seville combined with Malaga and Granada against Espartero, who bombarded the city but fled on the return of Queen Maria Christina to Madrid.

Seville contains treasures of art and architecture which make it one of the most interesting cities in Europe. The cathedral, dedicated to Santa Maria de la Sede, ranks in size only after St. Peter's at Rome, being 415 feet long, 298 feet wide, and 150 feet high to the roof of the nave. The west front is approached by a high flight of steps, and the platform on which the cathedral stands is surrounded by a hundred shafts of columns from the mosque which formerly occupied the site. The work of building began in 1403 and was finished in 1519, so that the one style of Spanish Pointed Gothic is fairly preserved throughout the interior, however much the exterior is spoiled by later additions. Unfortunately the west front remained unfinished until 1827, when the central doorway was completed in a very inferior manner; but this has now been renewed in a purer style. At the east end are two fine Gothic doorways with good sculpture in the tympana; and on the north side the Puerta del Perdon, as it is called, has some very exquisite detail over the horseshoe arch, and a pair of fine bronze doors. The exterior of the cathedral may be disappointing, but the interior leaves little to be desired. It forms a parallelogram containing a nave and four aisles with surrounding chapels, a central dome 171 feet high inside, and at the east end a royal sepulchral chapel, which was an addition of the 16th century. The thirty-two immense clustered columns, the ninety-three windows, mostly filled with the finest glass by Flemish artists of the 16th century, and the profusion of art work of various kinds displayed on all sides produce an unsurpassed effect of magnificence and grandeur. The reredos is an enormous Gothic work containing forty-four panels of gilt and colored wood carvings by Dancart, dating from 1482, and a silver statue of the Virgin by Francisco Alfaro of 1596. The archbishop's throne and the choir-stalls (1475–1548) are fine pieces of carving, and amongst the notable metal-work are the railings (1519) by Sancho Nuñoz, and the lectern by Bartolomé Morel of the same period. The bronze candelabrum for tenebræ, 25 feet in height, is a splendid work by Morel. In the Sacristia Alta is a silver repoussé reliquary presented by Alphonso the Wise in the 13th century; and in the Sacristia Mayor, which is a good plateresque addition by Diego de Riaño in 1530, is a magnificent collection of church plate and vestments. At the west end of the nave is the grave of Ferdinand, the son of Columbus, and at the east end, in the royal chapel, lies the body of St. Ferdinand, which is exposed three times in the year. This chapel also contains a curious life-size image of the Virgin, which was presented to the royal saint by St. Louis of France in the 13th century. It is in carved wood with movable arms, seated on a silver throne and with hair of spun gold. The chief pictures in the cathedral are the Guardian Angel and the St. Anthony of Murillo, the Holy Family of Tobar, the Nativity and La Generacion of Luis de Vargas, Valdés Leal's Marriage of the Virgin, and Guadalupe's Descent from the Cross. In the Sacristia Alta are three fine paintings by Alexo Fernandez, and in the Sala Capitular are a Conception by Murillo and a St. Ferdinand by Pacheco. The organ is one of the largest in the world; it contains over 5300 pipes. A curious and unique ritual is observed by the choir boys on the festivals of Corpus Christi and the Immaculate Conception,—a solemn dance with castanets being performed by them before the altar; the custom is an old one but its origin is obscure. The Sagrario on the north of the cathedral is a Renaissance addition by Miguel de Zumarraga, which serves as the parish church. At the northeast corner of the cathedral stands the Giralda, a bell tower of Moorish origin, 275 feet in height. The lower part of the tower, or about 185 feet was built in the latter half of the 12th century by Abu Yusuf Yakub; the upper part and the belfry, which is surmounted by a vane formed of a bronze figure 14 feet high representing The Faith, were added by Fernando Ruiz in 1568. The ascent is made by a series of inclined planes. The exterior is encrusted with delicate Moorish detail, and the tower is altogether the finest specimen of its kind in Europe. At the base lies the Court of Oranges, of which only two sides now remain; the original Moorish fountain, however, is still preserved. But the chief relic of the Arab dominion in Seville is the Alcazar, a palace excelled in interest and beauty only by the Alhambra of Granada. It was begun in 1181 by Jalubi during the best period of the Almohades, and was surrounded by walls and towers of which the Torre del Oro, a decagonal tower on the river side, is now the principal survival. Pedro the Cruel made considerable alterations and additions in the 14th century, and worse havoc was afterwards wrought by Charles V. Restorations have been effected as far as possible, and the palace is now an extremely beautiful example of Moorish work. The façade, the hall of ambassadors, and the Patio de las Muñecas are the most striking portions, after which may be ranked the Patio de las Doncellas and the chapel of Isabella. Among other Moorish remains in Seville may be mentioned the Casa O'Shea, which is somewhat spoiled by whitewash and the Casa de las Dueñas, with eleven courtyards and nine fountains. The Casa de Pilatos is in a pseudo-Moorish style of the 15th century, and, in addition to its elegant court-yard surrounded by a marble colonnade, contains some fine decorative work. The Casa de los Abades is in the Sevillian plateresque style, which is strongly tinged with Moorish feeling. The following are the most notable churches in Seville: Santa Maria la Blanca, an old

Jewish synagogue; San Marcos, badly restored, but with a remarkable mudejar portal; Omnium Sanctorum, erected upon the ruins of a Roman temple; San Juan de la Palma; San Julian; Santa Catalina; San Miguel; San Clemente el Real; the church of La Sangre Hospital; the Gothic Parroquia of Santa Ana, in the Triana suburb; and La Caridad. The last-named belongs to a well-conducted almshouse founded by the Sevillian Don Juan, Miguel de Manãra. It possesses six masterpieces by Murillo, and two by Valdés Leal. The other churches, though generally deficient in architectural interest, are enriched by the products of the brush or chisel of Pacheco, Montañes, Alonso Cano, Valdés Leal, Roelas, Campaña, Morales, Vargas, and Zurbaran. The museum was formerly the church and convent of La Merced. It now coutains priceless examples of the Seville school of painting, which flourished during the 16th and 17th ceuturics. Among the masters represented are Velazquez and Murillo (both natives of Seville), Zurbaran, Roelas, Herrera the Elder, Pacheco, Juan de Castillo, Alonso Cano, Cespedes, Bocanegra, Valdés Leal, Goya, and Martin de Vos. The university was founded in 1502, and its present buildiugs were originally a convent built in 1567 from designs by Herrera, but devoted to its present use in 1767 on the expulsion of the Jesuits. The Casa del Ayuntamiento, iu the cinquecento style, was begun in 1545, and has a fine staircase aud hall and handsome carved doors. The Lonja, or exchange, was built by Herrera in 1585 in his severe Doric and Ionic style; the brown and red marble staircase which leads to the Archivo de Indias is the best part of the design. The archives contain 30,000 volumes relating to the voyages of Spanish discoverers, many of which are still unexamined. The archbishop's palace dates from 1697; the most notable features are the Churrigueresque doorway and staircase. The royal cigar factory is au immense building 662 feet long by 524 feet wide, and contaius twenty-eight court-yards. Employment is given in it to 4500 hands, who work up 2,000,000 pounds of tobacco yearly. The palace of San Telmo, now occupied by the duke of Montpensier, was formerly the seat of a naval college originally founded by the son of Columbus. The immense doorway is the principal architectural feature. The picture gallery is interesting and important. The chief squares in Seville are the Plaza Nueva, the Plaza de la Constitucion, the Plaza del Duque, and the Plaza del Triunfo. The bull-ring accommodates 18,000 spectators, and is the next in size to that at Madrid. There are several beautiful promenades, the principal being Las Delicias, along the river bank below the town. The city also contains several theatres. Across the river, and connected with the city by a bridge, is the Gypsy quarter of the Triana. The navigation of the river has been improved of late years so that vessels of large draught cau now asceud the stream. The results are shown in a larger trade, and in 1883 the aggregate burden of vessels cleared amounted to 358,541 tons (65,324 British). The imports were valued at £1,879,522, and the exports at £1,190,625. In the latter were included 3110 tuns of olive oil shipped to the United Kingdom, and 1610 tons of quicksilver from the Almaden mines, which had formerly sent their produce *via* Lisbon. In addition to strictly local industries the chief factories of the city are the tobacco factory, the cannon foundry, and the small-arms factory. There are also a petroleum refinery, some soap works, iron foundries, artificial ice and marmalade factories, and several potteries. The ancient sources of water supply having proved insufficient, a new system of water works was desigued, and was brought to a successful completion in 1883 by a firm of English eugineers. (H. B. B.)

SÈVRES, a town of France, in the department of Seine-et-Oise, on the left bank of the Seine, midway between Paris and Versailles, with a population of 6768 in 1881, owes its celebrity to the Government porcelain manufactory, which dates from 1756. In 1876 a new building was erected at the end of the park of St. Cloud to replace the older structures, which were in a dangerous state, but have since been transformed into a normal school for girls. In the museum connected with the works are preserved specimens of the different kinds of ware manufactured in all ages and countries, and the whole series of models employed at Sèvres from the commencement of the manufacture, for an account of which see vol. xix. pp. 657–58. A technical school of mosaic was established at Sèvres in 1875.

SÈVRES, Deux, a department of western France, formed in 1790 mainly of the districts of Thouars, Gâtinais, and Niortais, which constituted about one-fourth of Poitou, and to a small extent of a portion of Basse-Saintonge and Angoumois, and a very small fragment of Aunis. It derives its name from the Sèvre of Niort, which flows across the south of the department from east to west, and the Sèvre of Nantes, which drains the northwest. Lying between 45° 58′ and 47° 7′ N. lat. and between 0° 56′ W. and 0° 13′ E. long., it is bounded (for the most part conventionally) N. by Maine-et-Loire, E. by Vienne, S.E. by Charente, S. by Lower Charente, and W. by La Vendée. Part belongs to the basin of the Loire, part to that of the Sèvre of Niort, and part to that of the Charente. There are three regions,—the Gâtine, the "Plain," and the "Marsh,"—distinguished by their geological character and their general physical appearance. The Gâtine formed of primitive rocks (granite and schists), is the continuation of the "Bocage" of La Vendée and Maine-et-Loire. It is a poor district with an irregular surface, covered with hedges and clumps of woods or forests. The Plain, resting on Oolitic limestone or the "white rock" (*pierre blanche*), is a fertile grain country. The Marsh, occupying only a small part of the department to the southwest, consists of alluvial clays which also are extremely productive when properly drained. The highest point in the department (892 feet above the sea) is to the east of Parthenay; the lowest lies only 10 feet above sea-level. The climate is mild. the annual temperature at Niort being 54° Fahr., and the rainfall a little more than 24 inches. The winters are colder in the Gâtine, the summers warmer in the Plain; and the Marsh is the moistest and mildest of the three districts.

With a total area of 1,482,655 acres, the department contains 1,043,752 acres of arable ground, 125,534 acres of meadows, 49,129 of vineyards, 106,222 of forests, 20,429 of heath. The live stock in 1880 comprised 36,150 horses, 12,800 mules, 2012 asses, 217,935 cattle, 18,405 sheep (wool clip 102 tons) 78,930 pigs, 50,321 goats, 18,845 beehives (55 tons of honey). The horses are a strong breed, and the department raises mules for Spain, the Alps, Auvergne, and Provence. In 1883 there were produced—wheat, 3,909,260 bushels; meslin, 466,909; rye, 673,920; and in 1880 barley produced 1,293,600 bushels; buckwheat, 132,650; maize and millet, 508,062; oats, 2,744,500; potatoes, 4,312,000; pulse, 192,500 bushels; beetroot, 123,429 tons; hemp, 945 tons; flax, 245 tons; colza seed, 75,900 bushels (640 tuns of oil). The wine aud cider amounted in 1882 to 2,859,912 and 210,914 gallons respectively. Vegetables (artichokes, asparagus, cabbage, pease, onions) are largely cultivated. Oaks, chestnuts, and beeches are the most important trees. The apple-trees of the Gâtine aud the walnut-trees of the Plain are also of considerable value. Coal (200 miners, and 21,487 tons in 1882) and peat are worked; iron-ore, argeutiferous lead, aud antimony exist but are not worked; and free-stone, both hard and soft, is very extensively quarricd. There are several sulphurous miueral waters in the department. The most important industry is the manufacture of cloth—serges, druggets, linen, handkcrchiefs, flauuels, swan-skins, and knitted goods. Wool and cotton-spinning, tanuing and currying, glove, brush, and hat making, distilling, brewing, flour-milling, and oil-refiuing are also carried on. In 740 establishments water-power is used to the extent of 3000 horse-power; and 301 stationary and 165 movable steam-engines represent respectively 1895 and 677 horse-power. The commerce of the department, which supplies mules, cattle, and provisions for Paris and the neighboring great towns, is facilitated by 21 miles of waterway (the Sèvre aud its left-hand tributary the Mignon), 289 miles of national roads, 3535 of other roads, and 232 miles of railway. In density of population (350,103 in 1881) the department is below the average of France. It contains 38,000 Protestants, especially iu the southeast, there being only three French departments—Gard, Ardèche, and Drôme—which surpass it in this respect. The four arrondisements are Niort, Bressuire (3549 inhabitants in the town), Melle (2433), and Parthenay (4842); the cantons number 31, and the communes 356. It is part of the diocese of Poitiers, where also is the court of appeal; its military headquarters are at Tours. St. Maixent (4790) has an infantry school.

SEWAGE. See Sewerage.

SEWARD,[1] William Henry (1801–1872), Ameri-

[1] [Mr. Seward was one of the most philosophical minds which the anti-slavery struggle in the United States carried into responsible administrative place. His career was in stormy times, and

can statesman, was born May 16, 1801, in the town of Florida, Orange county, N. Y. He was graduated at Union College in 1820, and began the practice of law three years after in the town of Auburn, which became

yet marked by a suavity of manner rarely broken. It was also clouded by a peculiar repetition of misfortunes, for in the three instances where the party with which he acted obtained supreme control of the government, the presidents, who were Harrison, Taylor, and Lincoln, died in office, and their policies were repudiated by their successors or miscarried in their hands. In the era of personal politics, which began upon the disappearance of the old Federalist organization under Mr. Monroe, Mr. Seward became the advocate of John Quincy Adams's aspirations for a second term at the White House, presiding in 1828 over a New York State convention of young men devoted to the accomplishment of that object. Thus he attached himself to the Whigs from their origin and remained in their ranks until the modern Republican party was organized.

A temporary and local episode however threw him at the outset of his career into public prominence in company with Millard Fillmore, Thurlow Weed, and John C. Spencer, men who, in other alliances, long maintained a foremost place in political history. In 1826 William Morgan, a tailor of Batavia in New York, was suspected of an attempt to divulge in print the secrets of Freemasonry. Suddenly he disappeared, and, though traced to Fort Niagara, his person was never produced in court, notwithstanding the interest of the Masons at a time of bitter exasperation to purge themselves of a crime of which as a body, they were probably innocent. The general belief was that Morgan had been drowned in Lake Ontario. The tribunals of the State failed to secure any conviction settling his fate, and the opinion spread that Masonic oaths were incompatible with the duties of jurors and magistrates. In 1828 the Anti-Masonic party polled nearly one-tenth of the votes of New York, and two years later its quadrupled strength carried Mr. Seward into the State Senate, at which time Thurlow Weed, whose life-long friendship with him had already begun, removed to Albany and established the *Evening Journal* to oppose both Jackson and Calhoun. The next year Mr. Seward presided in Philadelphia at the National Convention of the Anti-Masons which nominated William Wirt for the presidency, and drafted its platform. This was the first of the political national conventions which have since become the accepted method of selecting party candidates for the chief executive offices of the nation.

As the Anti-Masonic movement expanded beyond the limits of Western New York, it became more and more an agency of opposition to Democratic measures, and it was submerged after two or three years in the new Whig party, at the head of which Mr. Seward was beaten by William L. Marcy in 1834 as candidate for the governorship of his native State. Four years later with the same candidates in the field the choice of the electors was reversed and Mr. Seward became the first Whig governor of New York. During his administration he saw his and Mr. Weed's endeavors successful in securing the nomination and triumph of General Harrison as the first Whig president of the country. Mr. Tyler's recalcitrancy to his party and his revival of the Texas annexation question remanded the Whigs to a minority for eight years, but Mr Seward's gubernatorial terms were distinguished by the policy of internal improvements, among which was the enlargement of the Erie canal, of extending the system of State education, of completing the geological survey of the State, and of reformation in the law-courts. They also witnessed the abolition of imprisonment for debt, the obliteration from the statute book of the last traces of slavery in New York, and Mr. Seward's refusal to surrender on the requisition of the governor of Virginia two seamen charged with abducting slaves, the former claiming that one State could not force a requisition on another for acts which were not offences at law in the State upon which the claim was made, and which were generally esteemed as humane. On the other hand he endeavored to obtain from the British government the release of some Americans who had been captured in arms during the Canadian "Patriots'" war and transported to Van Dieman's Land.

The same Whig reaction which sent General Taylor to the White House at Washington secured the election of his friend, Mr. Seward, to the Senate of the United States, where he became at once the recognized advocate of the president's opposition to the demand of new guarantees for slavery growing out of the acquisition of territory by the Mexican war. The Senator declared the national domain to be sacred to liberty under the constitution as well as under "a higher law than the constitution,"—a phrase which was long assailed as an admission that the anti-slavery party would evade its political obligations at the convenience of its conscientious scruples. The admission of California and Kansas as free States he supported with firmness and ability, while with equal resolution he contested the repeal of the Missouri compromise and the passage of the Fugitive Slave Law. Mr. Fillmore's accession to the presidency and his adoption of the policy urged by the Southern wing of his party divided the Whigs, and snatched from Mr. Seward his influence with the administration, compelling him to build again the political structure on which his influence was to rest. In the national convention of 1852 which nominated General Scott for the presidency Mr. Seward appeared as the leader of the Northern, Messrs. Webster and Fillmore as leaders of the Southern wing, and the former conceded to its opponents the production of a platform if it might select the candidate. After some contest this arrangement was secured, but with fatal results to the Whigs, for the election showed that they could command the confidence neither of the South nor of the anti-slavery party of the North. Mr. Seward's reëlection to the Senate in 1855 was a remarkable triumph of personal influence, since the incipient Republicanism as yet was scarcely organized, his old party was dissolved and he was bitterly obnoxious to the pro-slavery men and to the Native Americans just achieving startling local successes. His triumph however was an indication that the time had come for a new organization of the anti-slavery sentiment, and he actively forwarded the formation of the Republican party, which in the next year swept eleven northern States to the side of its candidate, John C. Fremont. From this time Mr. Seward's leadership of a great united national movement was unquestioned, and with it came the inevitable consequence of being the target for all opposing shafts.

At the convention in Chicago (1860) Mr. Seward's nomination was defeated by the alleged agency of Horace Greeley, who had uttered resentment against him because some crumbs of political patronage had not fallen from his hands upon the editor's table, but it was in accordance with many precedents that Mr. Lincoln should give to his most formidable competitor in the nominating convention the chief place in his cabinet, thus respecting the predilections of the minority of his party.

Peculiar difficulties beset the new Secretary. All the foreign legations and consulates were in the control of officers appointed by Mr. Buchanan's pro-slavery administration and were for the most part well-affected towards the Southern Confederacy which had already established a government at Montgomery in Alabama. Accredited emissaries of that government were in the chief capitals of Europe appealing to their commercial cupidity. Great Britain was in the control of her Whig party, then at the flood-water mark of its domination by free-trade and in the first rhapsody of Cobden's commercial treaty with France. Whatever "reliance on the cordial friendship of the plain people of Great Britain" Mr. Seward may have had, it was out of his province to appeal to them, and he had abundant reason until the civil war ended to dread the unfriendly intervention of both the governments of Lord Palmerston and Napoleon III. Nor do his diplomatic despatches show that Mr. Lincoln's proclamations of emancipation conciliated the good will of either of them, but that both persisted that the federal armies were, in the words of Earl Russell, "fighting for empire." The facts which confronted Mr. Seward's accession to the cabinet were that he had to entirely reorganize the diplomatic and consular services of the United States, that before Mr. Lincoln had been two months in office France and Great Britain had entered into an agreement to take the same course in regard to the civil war in America, and that a few days later Earl Russell announced to parliament the determination of his government to confer the rights of a belligerent upon the Southern Confederacy,—a step which was taken by Queen's proclamation on the 15th of May, the day before Mr. Adams was officially received as the minister of the new administration at the English court. Before the first year was over English, French and Spanish forces were on Mexican soil allied by "motives and sentiments," to use Mr. Seward's own phrase, which "resolve themselves into a jealousy of the advancement of the United States." With the great maritime nations of Europe leagued to subvert the authority of the American Union and eager to find or create pretexts for an intervention disastrous to it, the highest qualities were necessary to avert the danger and maintain the national honor. Mr. Seward ceased not to insist that the Confederates were insurgents and that foreign recognition of them in any form until they had shown their ability to achieve independence was an injurious violation of international comity, and he promptly declined repeated suggestions from the European league for arbitration or mediation between the contending sections, insisting that the halls of Congress were the constitutional and sufficient resort in which the representatives of the North and the South should settle their differences.

In the Trent affair of 8th November, 1861, when four Confederate emissaries were taken from the deck of an English steamer by Captain Wilkes and brought to Fort Warren in Boston harbor, Mr. Seward at once disclaimed that the act was authorized by the government, pronounced that in the existing state of international law Captain Wilkes had erred in not bringing the Trent as a prize before an admiralty court, but concluded that he would deliver the prisoners upon the demand of the British government in order to assimilate its interpretation of neutral maritime rights to the more liberal one maintained by the United States ever since they began to resist the right of search which led to the war of 1812-15. He had several months previously proposed to the English government that the United States would adhere to the Declaration of Paris and abandon the right of privateering, with an additional provision exempting all goods of "non-combatants from confiscation in maritime war," but broke off the negotiation upon Earl Russell's refusal to enter into such engagement if it were to "have any bearing, direct or indirect, on the internal differences now prevailing in the United States," or, in other words, if it were to curtail any of the belligerent rights which he had conceded or might accord to the Confederacy.

In the history of the Alabama claims Mr. Seward laid the foundations of the final action upon them. The British government took the position that its own municipal law was the measure of its international duties. Mr. Seward replied that every sovereign state ought to make its domestic statutes conform to its obligations of neutrality. The Foreign Enlistment Act of Great Britain was shown to Earl Russell to provide sufficient remedies against the fitting out of armed cruisers in her ports to prey upon the commerce of belligerents. He then assumed that it was not the duty of the executive to enforce municipal law, but that cases arising under it should be taken before the regular tribunals and there determined, thus compelling the agents of the United States to act as the detectives of Great Britain in the enforcement of her own statutes. Mr. Seward claimed that this position was not consistent with the "due diligence" which nations were bound to exercise for the maintenance of their own neutrality, and that the mode of obtaining international rights was not forensic but diplomatic. These positions of the United States were virtually affirmed by the Geneva Court of Arbitration in 1872, although it excluded all claims for indirect or consequential damages, and on account of vessels whose hostile careers had no origin, but which had only enjoyed refuge, in British ports. Mr. Seward ceased not to record as it arose and to urge each pretension of his government to indemnity for the acts of cruisers escaping the dull vigilance of the Palmerston ministry, although Earl Russell had early requested that no more such claims might be presented to him, and after the war was over had declined either to make reparation for their captures or "to refer the question to any foreign state." That ministry was overthrown in

his home for the rest of his life. Several of his cases brought him reputation as a lawyer, but he soon drifted into the more congenial field of politics. After he had served for four years in the State Senate, the Whig party of New York nominated him for governor of the State in 1834. Though then defeated, he was nominated again in 1838 and elected, serving until 1842. He then returned to his law practice, retaining, however, the recognized leadership of the Whig party in the most important State of the Union. During the next seven years slavery became the burning question of American politics. The purely ethical and the philanthropic sides of the anti-slavery struggle are represented by GARRISON and GREELEY (*q.v.*). Seward was the first to develop that purely political side, with an economic basis, which probably best met the desires and prejudices of the great mass of those who took part, willing or unwilling, in the struggle. The keynote of his theory was struck in 1848 in a speech at Cleveland: "The party of slavery upholds an aristocracy, *founded on the humiliation of labor*, as necessary to the existence of a chivalrous republic." The absurdity of the conception of a civilized nation which, in flat opposition to historical development, should tolerate forever a systematic humiliation of labor was only his starting point. His theory culminated naturally in his famous Rochester speech of 1858, in which he enumerated the inevitable direct and indirect consequences of a free-labor and a slave-labor system respectively, showed the two to be absolutely irreconcilable and yet steadily increasing their interferences with one another, and drew this pregnant inference: there is here "an irrepressible conflict between opposing and enduring forces, and it means that the United States must and will, sooner or later, become either entirely a slave-holding nation or entirely a free-labor nation." But the germ of the "irrepressible conflict" of 1858 lay clearly in the utterances of 1848, and Seward was even then most widely known as its exponent. When, therefore, the New York Whigs, who in 1849 controlled the State legislature, which elects United States senators, sent Seward to the Senate with hardly a show of opposition, their defiance of the southern wing of their party was a premonition of the general break-up of parties three years afterwards. In the Senate Seward had at first but two pronounced anti-slavery associates. As anti-slavery feeling increased, and the Republican party was organized in 1855–56, he went into it naturally, for it was to him only an anti-slavery Whig party, and his preëminent ability made him at once its recognized leader. In the Republican convention of 1860 he was the leading candidate for the nomination for president; and it was only by a sudden union of all the elements of opposition to him that the nomination was finally given to Abraham Lincoln, whose name was then hardly known outside of Illinois. It has been an almost invariable rule that American presidents have found their most irritating difficulties in dealing with the New York leaders of their respective parties; Lincoln when elected removed any such possibility by offering Seward the chief position in his cabinet, that of Secretary of State. Here, for at least four years, Seward did the great work of his life. His errors, whether of constitutional law, international law, or policy, are more clearly seen now than they were then. In spite of them all the estimate of the value of his work must be very high, if we consider the chances in favor of foreign intervention at some time during a four years' war, and his unbroken success in inculcating on other Governments the propriety and wisdom of neutrality. Much of this success was due to circumstances which he did not create, to his ability to rely solidly on the cordial friendship of the "plain people" (to use Lincoln's common phrase) of Great Britain and France, and particularly to the change of policy induced by the emancipation proclamations of 1862–63; but much is still left to the credit of the secretary, whose zeal, acuteness, and efficiency brought the ship safely through the intricacies of international relations while the crew were putting out the fire in her hold. In the process of reconstruction which immediately followed the war Seward sided heartily with President Johnson and shared his defeat. The Whig element had been burned out of the Republican party by the war; a new party had grown up, not limited by *ante bellum* notions, and it rapidly came to look upon Seward, its once trusted leader, not only as a traitor but as the main intellectual force which supported Johnson's clumsy attempts at treason. At the end of his second term as secretary of state in 1869 he retired to his home at Auburn, broken by loss of health, by loss of political standing, and by the death of his wife and daughter. He spent the next two years in foreign travel, and died at Auburn, October 10, 1872.

Of Seward's *Life and Works*, in 5 vols., edited by George E. Baker, the last volume deals with his career during his first term as Secretary of State.

SEWERAGE is the process of systematically collecting and removing refuse from dwellings. The matter to be dealt with may conveniently be classified as made up of four parts: (1) dust, ashes, kitchen waste, and solid matters generally, other than solid excreta; (2) excreta, consisting of urine and fæces; (3) slop-water, or the discharge from sinks, basins, baths, etc., and the waste water of industrial processes; (4) surface water due to rainfall. Before the use of underground conduits became general, the third and fourth constituents were commonly allowed to sink into the neighboring ground, or to find their way by surface channels to a watercourse or to the sea. The first and second constituents were conserved in middens or pits, either together or separately, and were carried away from time to time to be applied as

1866 and was succeeded by the fairer-minded Tory government of the Earl of Derby, with which Mr. Seward renewed the discussion and carried it to the point of a convention in 1869 between the two nations to submit all the claims of individuals on each side against either contracting power arising since 8th February, 1853 to arbitration. This treaty failed to obtain the approval of the Senate chiefly because the claims of the United States government were not recognized in it, but it was the initiation of those negotiations which two years later issued in the treaty of Washington. Though others reaped the fame of the settlement, yet Mr. Seward more than they was the means of placing the maritime law of nations upon a basis of clearer and higher principle, and of leading the way to a peaceful adjudication of gravest international differences.

Of the numerous treaties negotiated by this Secretary of State the more characteristic or important are that with Great Britain in 1862 for the suppression of the slave-trade, that of 1867 with Russia for the cession of Alaska on the payment of $7,200,000, those with North Germany, Bavaria, and Wurtemberg in 1868 overthrowing the European doctrine of the indefeasible allegiance of natives and conferring upon them the rights of expatriation and naturalization, a convention of 1866 with France for the evacuation of Mexico as the sequel to repeated intimations that the United States would sustain the Monroe doctrine even at the expense of war, and a treaty which was not ratified with the United States of Colombia in 1869 for a canal across the isthmus of Panama to be under the control of his own government. He endeavored to extend the national jurisdiction over the Danish West Indies and the Bay of Samana in Santo Domingo, to secure the acceptance of his views of naturalization by Great Britain, to effect the execution of slave-traders, arresting and returning to Cuba as a matter of natural comity one Arguelles who had landed and sold a cargo of negroes on that island, to restore the government of Juarez in Mexico and to prevent the execution there of the Archduke Maximilian. He was fertile of projects and persuasive in their advocacy. His support of President Johnson was disastrous to his popularity, though the attitude of conciliation towards the South in which it involved him corresponded with views he had long entertained and with his unquenchable hopefulness in the moral triumph of the constitutional theories to which he was wedded.

The conspirators in the assassination of Mr. Lincoln included his chief of cabinet in their murderous plans, and one of them named Atzerodt penetrated to the chamber where Mr. Seward was lying ill from injuries received in a fall from his carriage, and severely wounded him with a knife, felling his son and assistant by blows upon the head in effecting his flight. For six months Mr. Seward was incapacitated for official duty. Much of the time remaining to him in the retirement of private life was passed in visiting Alaska and Mexico, and in a journey round the world, during which he was received with marked distinction by sovereigns, their ministers and their subjects. An account of his *Travels Around the World*, which occupied his last days, appeared posthumously edited by his adopted daughter. A bronze effigy of him by Randolph Rogers stands at the junction of Broadway and Fifth Avenue in the city of New York. D. O. K.]

manure to the land. In more modern times the pits in which excrement was collected took the form of covered tanks called cesspools, and with this modification the primitive system of conservancy, with occasional removal by carts, is still to be found in many towns. Even where the plan of removing excrement by sewers has been adopted, the first kind of refuse named above is still treated by collecting it in pails or bins, whose contents are removed by carts either daily or at longer intervals. It therefore forms no part of the nearly liquid sewage which the other constituents unite to form.

Character of excremental sewage.

The second constituent is from an agricultural point of view the most valuable, and from a hygienic point of view the most dangerous, element of sewage. Even healthy excreta decompose, if kept for a short time after they are produced, and give rise to noxious gases; but a more serious danger proceeds from the fact that in certain cases of sickness these products are charged with specific germs of disease. Speedy removal or destruction of excremental sewage is therefore imperative. It may be removed in an unmixed state, either in pails or tanks or (with the aid of pneumatic pressure) by pipes; or it may be defæcated by mixture with dry earth or ashes; or, finally, it may be conveyed away in sewers by gravitation, after the addition of a relatively large volume of water. This last mode of disposal is termed the water-carriage system of sewerage. It is the plan now usually adopted in towns which have a sufficient water supply, and it is probably the mode which best meets the needs of any large community. The sewers which carry the diluted excreta serve also to take slop-water, and may or may not be used to remove the surface water due to rainfall. The water-carriage system has the disadvantage that much of the agricultural value of sewage is lost by its dilution, while the volume of foul matter to be disposed of is greatly increased. But it has been found that, even when the excrement of a community is kept out of the sewers, and subjected to distinct treatment, the contents of the sewers are still so foul that their discharge into streams is scarcely less objectionable than when the water-carriage system is adopted; and, further, it appears difficult if not impossible to realize the agricultural value of excrement by any process of separate treatment that is not offensive or dangerous or inapplicable to towns.

Water-carriage system.

Combined and separate systems of water-carriage.

When, in the water-carriage system, the same sewers carry foul sewage and surface-water due to rainfall, the sewerage is said to be "combined"; the "separate" system, on the other hand, is that in which a distinct set of sewers is provided to carry off rainfall. Each plan has its advantages. In the separate system the foul-water sewers need be large enough to take only the normal flow; they may thus be made self-cleansing much more readily than if their size were sufficient to carry the immensely greater volume to which (on the combined plan) sewage may be swollen during heavy rain. The amount of dangerously foul matter is also much reduced. On the other hand, the contents of the rain-water sewers are still too much tainted by the filth of the streets to render their discharge into rivers or lakes desirable; and the complication of two sets of mains and branches is a serious drawback. Where old sewers are giving place to new ones it is not unusual to retain the old sewers for the carriage of surface-water; but in new works a single system of sewers, provided with storm-overflows to relieve them of part of the rainfall during exceptionally heavy showers, would probably be preferred in nearly every case.[1] Since sewers should, in all cases, be water-tight, they do not form suitable collectors of subsoil water.

The water-carriage system of sewerage will be noticed here under its three aspects: (1) the ultimate disposal of sewage; (2) the system of common sewers by which sewage is conveyed to its destination; (3) the domestic arrangements for the collection of sewage.

Heads of treatment.

1. The Ultimate Disposal of Water-carried Sewage.—In the water-carriage system of sewerage the fertilizing elements are so largely diluted that it becomes a matter of the utmost difficulty to turn them to profitable account. It has been estimated that every ton of London sewage contains ingredients whose value as manure is rather more than 2d.,[2] a value which, could it be realized, would make the sewage of the metropolis worth a million and three quarters sterling per annum. Sewage farming, however, does not pay. After much costly experiment the conviction is gaining ground that, neither by applying sewage directly to land, nor by any process of chemical treatment that has yet been proposed, can sewage be made to yield a return as manure which will cover the cost of its transport, treatment, and distribution, except perhaps in a few cases where the circumstances are peculiarly favorable. At the same time, sewage farming does afford one satisfactory solution of the problem of how to dispose of sewage without creating a nuisance—a problem in which any question of profit or loss is of secondary importance. A very early instance of irrigation by sewage is that of the Craigentinny Meadows, a sandy tract of 400 acres, on which part of the sewage of Edinburgh has been discharged during certain seasons for nearly a century. There, owing to favorable conditions, and to the fact that complete purification of the sewage is not attempted, the process yields a profit; but no such result could be looked for if the sea were not at hand to receive the imperfectly cleansed sewage and the wholly uncleansed surplus. Germany furnishes a still older example of irrigation in the sewage farm of the town of Bunzlau, which has been in existence for more than three hundred years.

Disposal of water-carried sewage.

Sewage farms.

Five methods of treating sewage may be named, of which two or more are often found in combination.

Discharge into the sea.

Discharge into the Sea or into a large watercourse is in general the least costly means by which a community can rid itself of its sewage. Much care in the choice of outlets is necessary to make this plan effective in avoiding nuisance. Some towns make use of tanks or outlet-sewers of large capacity, from which the discharge is allowed to occur only when the tide is ebbing. When the volume of sewage is very large, even this precaution does not wholly protect the neighboring coast from foul deposits. A striking instance is furnished by the case of London, which discharges its sewage into the tidal estuary of the Thames at Barking and Crossness during only some three or four hours from the time of each high tide. It is found that the discharged matter is washed up and down the river with every tide, occasionally reaching as far up as Teddington, and that the portion which is not deposited in the form of mud banks only very slowly works its way to the sea.

Broad irrigation.

Broad Irrigation.—By this is meant the use of sewage to irrigate a comparatively large tract of cultivated land, in the proportion of about 1 acre (or more) of land to every 120 persons in the sewage-contributing population. This system is now largely and successfully used, especially where the soil is a porous sandy loam. Fears that the farms would prove dangerous to the health of the neighboring district, and that the crops and vegetables grown on them would be unwholesome, have proved groundless. When the farm is properly laid out and carefully managed the effluent water is pure enough to be admitted to a clear stream from which water-supply is drawn. Broad irrigation is practiced at

[1] An exception to this remark may be made in the case of London, where the enormous area to be drained, as well as the difficulty of disposing of the foul sewage on account of its large volume, has led the Commissioners on Metropolitan Sewage Discharge to advise (in their Report of 1884) that "in new drainage works the sewage should be, as far as possible, separated from the rainfall."

[2] Hoffmann and Witt, *Report to the Government Referees on Metropolitan Drainage*, 1857.

Croydon, Cheltenham, Blackburn, and many other English towns; and it has recently been applied, on a very large scale, to dispose of the sewage of Berlin.

Intermittent Downward Filtration.—This is another mode of purifying sewage by applying it to land, which differs from broad irrigation in requiring a much smaller area in proportion to the sewage dealt with. In 1870 Dr. Frankland[1] drew attention to the fact that if sewage were passed through porous soil, not continuously but at intervals long enough to let the soil become aerated, rapid purification took place through the oxidizing action of the air which the soil held in its pores. He estimated that an acre of suitable ground, well furnished with subsoil drains to remove the water after percolation, could in this way take the sewage of 2000 persons. This estimate is now considered excessive, and 1000 persons to the acre is a more recent limit. Mr. J. Bailey-Denton at once took up Dr. Frankland's suggestion, and in his hands the system of intermittent filtration through land has been successfully applied to the sewage of many towns.[2] The land which constitutes the filter is used to grow vegetables and other crops. Clay soils are, as far as possible, avoided, and the land is thoroughly underdrained at a depth of about 6 feet. The sewage is distributed over the surface in open channels, the proper laying out of which is an important item in the cost of the system, but is essential to its success. When the number of persons exceeds 500 per acre it is advisable to precipitate the solid matter that is held in suspension before the liquid is applied to the land, in order to prevent the surface of the ground from becoming clogged with sewage sludge. Mr. Bailey-Denton has pointed out the advantage which the system of intermittent filtration offers as a supplement to broad irrigation, where that is carried out. A serious objection to the disposal of sewage by irrigation is the fact that the farmer must take the sewage always,—at times when it hurts the land as well as at times when the land wants it. But by laying out a portion of the land as a filter bed the sewage may be thrown on that whenever its presence on the remainder would do harm rather than good. Mr. Denton has applied this combined system in several instances, and insists, apparently with much reason, that such a combination offers a better prospect of profit than any other efficient mode of purifying sewage. The system of intermittent filtration through land has been recommended by the Royal Commission of 1882–84 as a mode of treating London sewage.

Intermittent filtration through land.

Combination of intermittent filtration with broad irrigation.

Filtration through Artificial Filters of sand, gravel, ashes, charcoal, coke, peat, etc., though often experimented on, can scarcely be described as an actual system. It is attended by the difficulty that the filter becomes speedily choked by the deposit of sludge. The intermittent use of a suitable artificial filter will, however, serve efficiently to oxidize and therefore purify the liquid portion of sewage from which the sludge has been previously precipitated, and filtration through coke is used in some instances as a supplement to the process which is next to be described.

Artificial filters.

Chemical Treatment, or Precipitation.—When sewage is allowed to stand, or to flow very slowly through a large tank, a gradual subsidence of the solid particles takes place. The subsidence is, however, much too slow to be complete before decomposition sets in. But it may be very greatly accelerated by the addition of certain reagents, with the object of producing a precipitate which, in falling, will carry down with it the minute particles of solid matter that are suspended throughout the mass. Lime is the substance most usually employed. It is introduced in the form of milk of lime, and in the proportion of about one ton of lime to one million gallons of sewage. When thoroughly mixed, the liquid is left at rest, and a rapid separation of the sewage follows, into a comparatively clear supernatant liquid and a glutinous precipitate or "sludge." The sludge has little value as manure, for the best agricultural constituents of sewage are contained in solution, and very little of the soluble matter is carried down in the deposit. The sludge is dried by being strained over beds of slag, pressed into blocks for transport, and got rid of by being burnt or dug into the ground or thrown into the sea. It has been used in the manufacture of bricks and of cement (Scott's process), but in general it can be disposed of only at a loss. The clarified effluent still contains dissolved organic matter, and may be admitted into running streams only when a high standard of purity is not compulsory. When, however, the volume of the running water which it enters is relatively very large a quick purification takes place by means of the oxygen which the water carries in solution.

Chemical treatment.

Lime process.

The lime process is practiced, without further purification of the effluent water, at Leeds and at Burnley. At Bradford, after precipitation by lime, the effluent is filtered through beds of coke-breeze. At Birmingham the sewage of 600,000 people, after clarification by lime (which also serves to neutralize the acid contributed by manufactories), is used to irrigate a farm of 1200 acres.

Very many patents have been obtained for the precipitation of sewage by other chemicals in place of or in addition to lime. In Hillé's process lime is the chief ingredient, with tar and chloride of magnesium or calcium added. At Coventry the precipitants are sulphate of alumina, protosulphate of iron, and lime, and the effluent is afterwards filtered through land, in the proportion of 1 acre to 5000 of the population.

Sillar's "ABC" process, worked by the Native Guano Company at Aylesbury, differs from others in producing a sludge which has considerable value as manure. An emulsion of clay and carbon with a little blood is first mixed with the sewage; a precipitating solution of alum is then added, and the mixture is allowed to settle. The process gives a remarkably clear effluent; practically the whole of the insoluble constituents of the sewage and a portion of the dissolved impurities are carried down in the precipitate, which when dried and ground along with some sulphate of magnesia, is sold under the name of native guano. The ABC process has been in successful use for nine years at Aylesbury, where the "guano" finds a sale at 70s. [$17] per ton. In 1870 the Rivers Pollution Commissioners reported unfavorably on the process, a fact which may have prevented its adoption by other towns, but it has since then received the approval of many specialists. A recent protracted investigation by Dr. C. M. Tidy and Professor Dewar showed that the percentage of oxidizable organic matter removed by the process ranges from 75 to 86—a result, in their judgment, satisfactory. At Leeds, where the process was tried for a time, it was given up because the effluent was purer than the river into which it ran, and the simple lime-process, which costs less, but gives a less clear effluent, was adopted in its place.

The ABC process.

Much difference of opinion still exists as to the relative merits of broad irrigation, filtration through land, and chemical treatment, as means of disposing of sewage. That either of the two first plans or a combination of them both can be made to yield a satisfactory solution of the sewage problem, from a hygienic point of view, seems unquestionable. That chemical treatment, especially if supplemented by filtration through land, will also purify well, is generally admitted. No process of effective purification is now expected to yield a profit; but the question of cost, on which the choice of a system principally turns, is too extensive to be touched in this article.

Relative merits of the systems.

II. The Conveyance of Sewage.—For small sewers, circular pipes of glazed earthenware or fire-clay or of moulded cement are used, from 6 inches to 18 inches and even 20 inches in diameter. The pipes are made in short lengths, and are usually jointed by passing the end or spigot of one into the socket or faucet of the next. Into the space between the spigot and faucet a ring of gasket or tarred hemp should be forced, and the rest of the space filled up with cement, not clay. The gasket prevents the cement from entering the pipe, and so obstructing the flow; at the same time it forms an elastic packing which serves to keep the successive lengths of pipe concentric, even if the cement should fail. The pipes are laid with the spigot ends pointing in the direction of the flow, with a uniform gradient, and, where practicable, in straight lines. In special positions, such as under the bed of a stream, cast-iron pipes are used for the conveyance of sewage. Where the capacity of an 18-inch circular pipe would be insufficient, built sewers are used in place of earthenware pipes. These are sometimes circular or oval, but more commonly of an egg-shaped section, the invert or lower side of the sewer being a curve of shorter radius than the arch or upper side. The advantage of this form lies in the fact that great varia-

Conveyance of sewage.

Pipe sewers.

Built sewers.

[1] *Report of the Rivers Pollution Commissioners*, 1870.

[2] J. Bailey-Denton, *Intermittent Downward Filtration, with notes on the Practice and Results of Sewage Farming*, 1st ed. 1880, 2d ed. 1885.

tions in the volume of flow must be expected, and the egg-section presents for the small or dry-weather flow a narrower channel than would be presented by a circular sewer of the same total capacity. Figs. 1 and 2 show two common forms of egg-sections, with dimensions expressed in terms of the diameter of the arch.

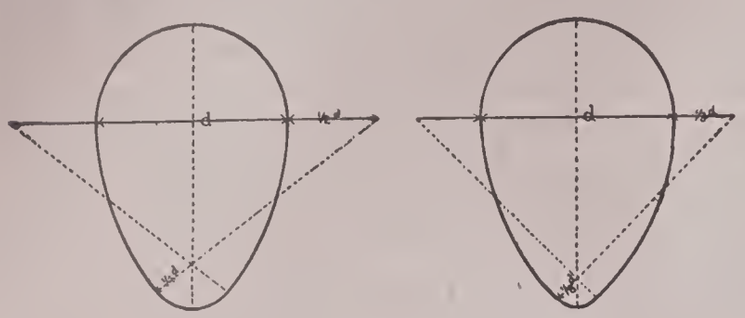


Fig. 1. Fig. 2.

Figs. 1, 2.—Forms of Sewers.

Fig. 2 is the more modern form, and has the advantage of a sharper invert. The ratio of width to height is 2 to 3.

Built sewers are most commonly made of bricks, moulded to suit the curved structure of which they are to form part. Separate invert blocks of glazed earthenware, terra-cotta, or fire-clay are often used in combination with brickwork. The bricks are laid over a templet made to the section of the sewer, and are grouted with cement. An egg-shaped sewer, made with two thicknesses of brick, an invert block, and a concrete setting, is illustrated in Fig 3. Concrete is

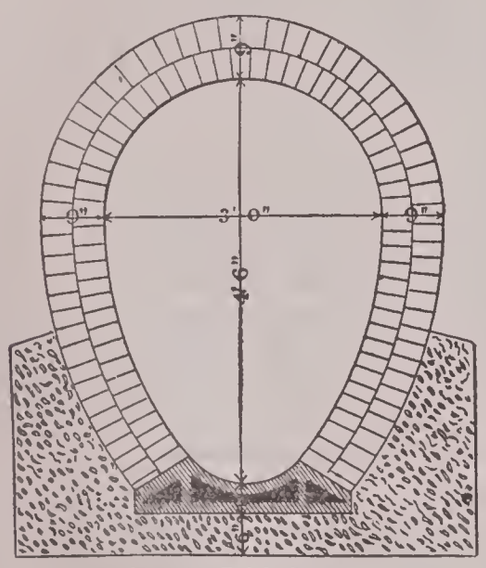


Fig. 3.—Brick Sewer.

now very largely used in the construction of sewers, either in combination with brick-work or alone. For this purpose the concrete consists of from 5 to 7 parts of sand and gravel or broken stone to 1 of Portland cement. It may be used as a cradle for or as a backing to a brick ring, or as the sole material of construction by running it into position round a mould which is removed when the concrete is sufficiently set, the inner surface of the sewer being in this case coated with a thin layer of cement.

Dimensions of sewers.

In determining the dimensions of sewers, the amount of sewage proper may be taken as equal to the water supply (generally about 30 gallons per head per diem), and to this must be added an allowance for the surface water due to rainfall. The latter, which is generally by far the larger constituent, is to be estimated from the maximum rate of rainfall for the district and from the area and character of the surface. In the sewerage of Berlin, for example (one of the most recent instances of the combined water-carriage system applied on a large scale), the maximum rainfall allowed for is $\frac{3}{4}$ of an inch per hour, of which one-third is supposed to enter the sewers. In any estimate of the size of sewers based on rainfall account must of course be taken of the relief provided by storm-overflows, and also of the capacity of the sewers to become simply charged with water during the short time to which very heavy showers are invariably limited. Rainfall at the rate of 5 or 6 inches per hour has been known to occur for a few minutes, but it is altogether unnecessary to provide (even above storm-overflows) sewers capable of discharging any such amount as this; the time taken by sewers of more moderate size to fill would of itself prevent the discharge from them from reaching a condition of steady flow; and, apart from this, the risk of damage by such an exceptional fall would not warrant so great an initial expenditure. Engineers differ widely in their estimates of the allowance to be made for the discharge of surface water, and no rule can be laid down which would be of general application.

Velocity of discharge.

In order that sewers should be self-cleansing, the mean velocity of flow should not be less than $2\frac{1}{2}$ feet per second. The gradient necessary to secure this is calculated on principles which have been stated in the article Hydromechanics (*q.v.*). The velocity of flow, V, is

$$V = c\sqrt{im},$$

where i is the inclination, or ratio of vertical to horizontal distance; m is the "hydraulic mean depth," or the ratio of area of section of the stream to the wetted perimeter; and c is a coefficient depending on the dimensions and the roughness of the channel and the depth of the stream. A table of values of c will be found in § 90 of the article referred to. This velocity multiplied by the area of the stream gives the rate of discharge. Tables to facilitate the determination of velocity and discharge in sewers of various dimensions, forms, and gradients will be found in Mr. Latham's and other practical treatises.

Interception sewers.

Where the contour of the ground does not admit of a sufficient gradient from the gathering ground to the place of destination, the sewage must be pumped to a higher level at one or more points in its course. To minimize this necessity, and also for other reasons, it is frequently desirable not to gather sewage from the whole area into a single main, but to collect the sewage of higher portions of the town by a separate high-level or interception sewer.

Sewer gas.

Sewer gas is a term applied to the air, fouled by mixture with gases which are formed by the decomposition of sewage, and by the organic germs which it carries in suspension, that fills the sewer in the variable space above the liquid stream. It is universally recognized that sewer gas is a medium for the conveyance of disease, and in all well-designed systems of sewerage stringent precautions (which will be presently described) are taken to keep it out of houses. It is equally certain that the dangerous character of sewer gas is reduced, if not entirely removed, by free admixture with the oxygen of fresh air. Sewers should be liberally ventilated, not only for this reason, but to prevent the air within them from ever having its pressure raised (by sudden influx of water) so considerably as to force the "traps" which separate it from the atmosphere of dwellings.

Ventilation of sewers.

The plan of ventilation now most approved is the very simple one of making openings from the sewer to the surface of the street at short distances,—generally shafts built of brick and cement,—and covering these with metallic gratings. Under each grating it is usual to hang a box or tray to catch any stones or dirt that may fall through from the street, but the passage of air to and from the sewer is left as free as possible. The openings to the street are frequently made large enough to allow a man to go down to examine or clean the sewers, and are then called "manholes." Smaller openings, large enough to allow a lamp to be lowered for purposes of inspection, are called "lampholes," and are often built up of vertical lengths of drain-pipe.

Manholes.

To facilitate inspection and cleaning, sewers are, as far as possible, laid in straight lines of uniform gradient, with a manhole or lamphole at each change of direction or of slope and at each junction of mains with one another or with branches. The sewers may advantageously be stepped here and there at manholes. Sir R. Rawlinson has pointed out that a difference of level between the entrance and exit pipes tends to prevent continuous flow of sewer gas towards the higher parts of the system, and makes the ventilation of each section more independent and thorough. When the gradient is slight, and the dry-weather flow very small, occasional flushing must be resorted to. Flap valves or sliding penstocks are introduced at manholes; by closing these for a short time sewage (or clean water introduced for the purpose) is dammed up behind the valve either in higher parts of the sewer

Flushing of sewers.

or in a special flushing chamber, and is then allowed to advance with a rush. Many self-acting arrangements for flushing have been devised which act by allowing a continuous stream of comparatively small volume to accumulate in a tank that discharges itself suddenly when full. A very valuable contrivance of this kind is Mr. Rogers Field's siphon flush tank, shown in Fig. 4. When the liquid in

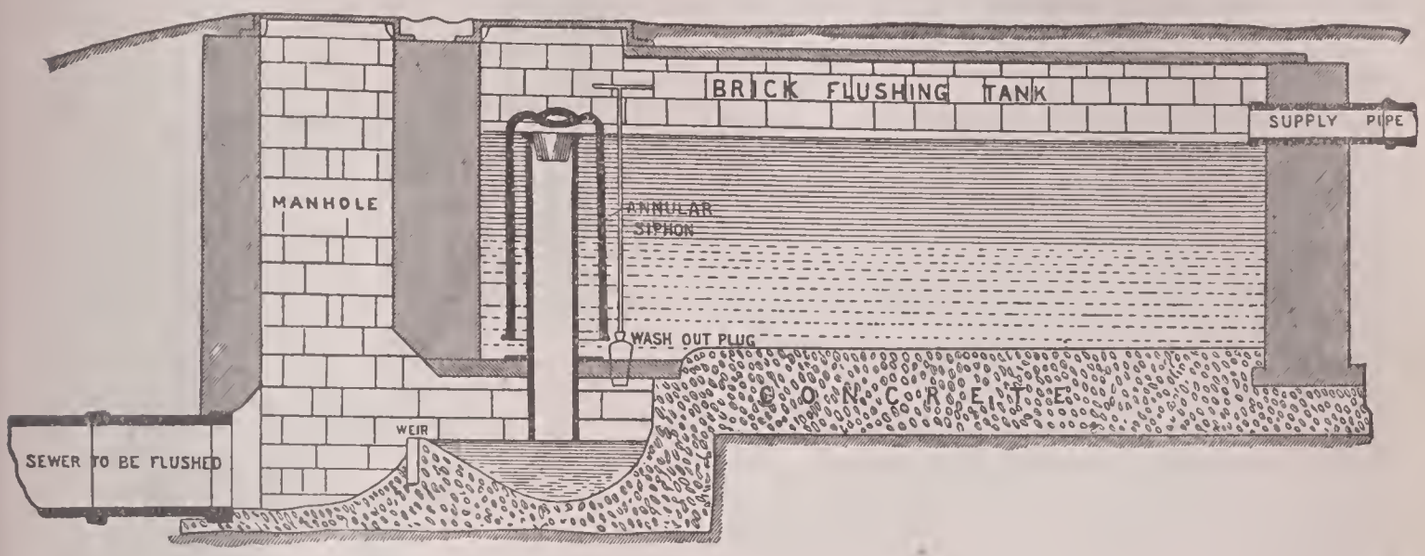


Fig. 4.—Field's Siphon Flush Tank.

the tank accumulates so that it reaches the top of the annular siphon, and begins to flow over the lip, it carries with it enough air to produce a partial vacuum in the tube. The siphon then bursts into action, and a rapid discharge takes place, which continues till the water level sinks to the foot of the bell-shaped cover.

III. Domestic Sewerage.—In the water-carriage system each house has its own network of drain-pipes, soil-pipes, and waste-pipes, which lead from the basins, sinks, closets, and gullies within and about the house to the common sewer. These must be planned to remove sewage from the house and its precincts quickly and without leakage or deposit by the way; the air within them must be kept out of the dwelling, by placing a water-trap at every opening through which sewage is to enter the pipes, and by making all internal pipes gas-tight; the pipes must be freely ventilated by a current of fresh air, in order to oxidize any deposited filth and to dilute any noxious gas they may contain; finally—and this is of prime importance—the air of the common sewer must be rigorously shut out from all drains and pipes within the house. To disconnect the pipes of each individual house from the atmosphere of the common sewer is the first principle of sound domestic sanitation. When this is done the house is safe from contagion from without, so far as contagion can come through sewer gas; and, however faulty in other respects the internal fittings may be, the house can suffer no other risk than that which arises from its own sewage.

Domestic sewerage.

Primary requisites.

Protection against the passage of gas through openings which admit of the entry of water is secured by the familiar device known as the water-trap.

Traps.

The simplest and in many respects the best form of trap is a bent pipe or inverted siphon (Fig. 5) which is sealed by water lying in the bend. The amount of the seal (measured by the vertical distance between the lines *a* and *b*) varies in practice from about ½ an inch to 3 inches. If the pressure of air within the pipe, below the trap, is greater than that of the air above the trap by an amount exceeding the pressure due to a column of water equal in height to the seal, the trap will be forced and air will bubble through. This is one way in which a trap may fail, but this may be prevented by sufficient ventilation of the pipe below the trap. Other possibilities of failure are, however, only too numerous. If the pipe is disused for some time, the water may evaporate so considerably as to break the seal. The pipe, if of lead, may bend out of shape, or it may even be so badly set in the first instance as to make the trap inoperative. The seal may be broken by the capillary action of a thread or strip of cloth, hanging over the lip of the trap and causing the water to drain away. A rush of water down the pipe, suddenly arrested, may pass the trap with such momentum as to leave it wholly or partly empty. Another and a common cause of failure can be explained by reference to Fig. 5. Let a column of water rush down the soil-pipe *c* from a closet or sink which discharges into it at some higher point. As the water passes the junction with the branch *d* it will produce a partial vacuum in the branch, and so tend to suck over the contents of the trap. This process, which is sometimes called the siphonage of traps, can be guarded against by ventilating the branch, either by a separate ventilating pipe leading to the open air or by a pipe *e* (shown by dotted lines) connecting the top of the branch *d* with a point sufficiently far up on the soil-pipe to be above the column of water which is passing the junction. One more imperfection in traps may be named. The experiments of Dr. Fergus have shown that the water in traps will allow gases to pass through by absorbing the gas on one surface and giving it off at the other. It is improbable that this action occurs to such an extent as to be dangerous by permitting the transfer of disease germs from one to the other side. Apart from any risk of this kind, however, it is clear that a trap is open to so many possibilities of failure as to form a very insufficient barrier between the air of a room and the foul air of a sewer. Nevertheless the practice was until very lately almost universal, and is still far from uncommon, of connecting closets, sinks, and even bedroom basins with common sewers by a continuous system of piping, in which the only safeguard against the entry of sewer gas is a single trap close to each sink or basin. This means that sewer gas, charged with the infection of a whole community, is brought within a few inches of the atmosphere of the dwelling, ready to contaminate it whenever the trap fails from any of the causes which have been named, or whenever, by a flow of water

Common trap.

Possible causes of failure.

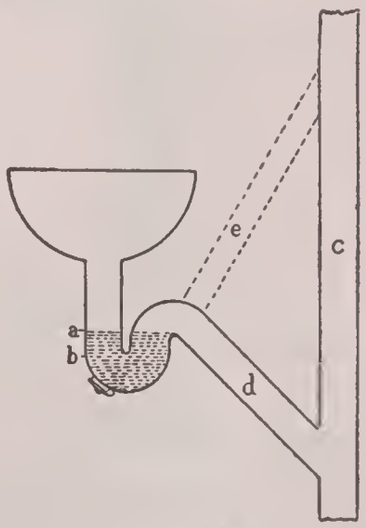


Fig. 5.—Common Water-Trap.

through it, the seal is sufficiently disturbed to allow bubbles of gas to escape into the room.

Disconnecting trap on house-drain.

The remedy for this lies in having, at any convenient point on each house-drain, a disconnecting trap which separates the house system from the sewer, and so establishes what may be called an outer line of defence. Any accidental leakage of sewer gas through it then does no more than cause a comparatively slight pollution of the air within the house-drains, and if these are well ventilated the effects of this are insensible. At each individual basin or other fitting a trap is still required, but its function is now merely to shut out the air of the house-drains from the rooms, and, as the air of the house-drains is no longer polluted by connection with the sewers, the occasional failure of this function is a matter of comparatively small moment. Further, the disconnecting trap on the house-drain furnishes a convenient place of access for fresh air; and the ventilation is completed by carrying the highest point of each soil-pipe or waste-pipe up to the level of the roof and leaving it open there. This arrangement will be understood by reference to Fig. 6, which shows a soil-pipe, open at its upper end, discharging into a house-drain in which there is a disconnecting trap provided with an open grating for the entry of air. The soil-pipe is ventilated by a current of air which (usually if not always) flows upwards. This not only dilutes any gases that are produced in the pipe, but quickly oxidizes any foul matter that may adhere to the sides. Care must be taken to avoid having

Ventilation of soil-pipes.

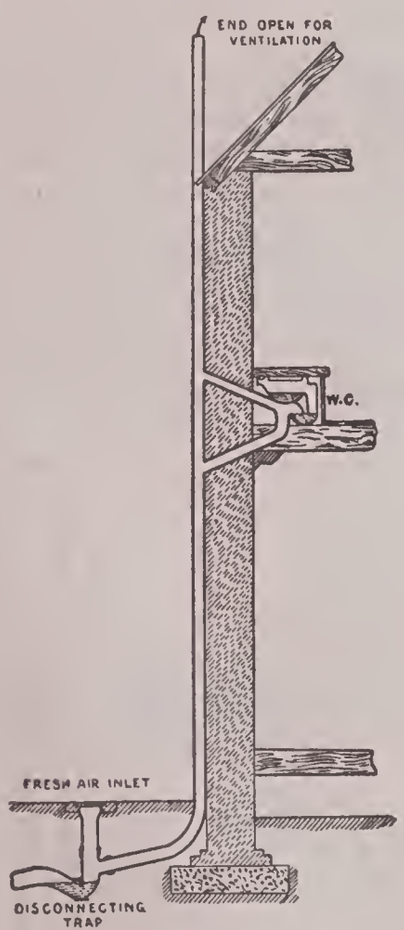


Fig. 6.—House-Drain properly disconnected from sewer, and ventilated.

the upper end of the pipe open near windows or under eaves. In the figure the branch leading to a water-closet is ventilated by a pipe carried into an upper part of the soil-pipe; this is scarcely necessary if the branch be short. Another construction is to carry a distinct ventilating pipe up from the top of the branch to a point above the roof; and where several fittings discharge into one soil-pipe, the same ventilating pipe may be made to serve for all. An example of the latter arrangement is shown in Fig. 10. The form of disconnecting trap shown in Fig. 6 is that of Mr. W. P. Buchan of Glasgow, who has done excellent service to the cause of sanitary reform by practicing and advocating the disconnection and ventilation of house-drains and soil-pipes. The same trap is shown to a larger scale in Fig. 7, where it appears imbedded in concrete and covered by a built manhole, which gives access to the trap in case of its becoming choked. The

Buchan trap.

manhole may have an open grating at the top; or the top may be closed by a solid plate (if a grating there be for any reason inadmissible), in which case a ventilating shaft is carried from the manhole to some other opening. Fig. 7

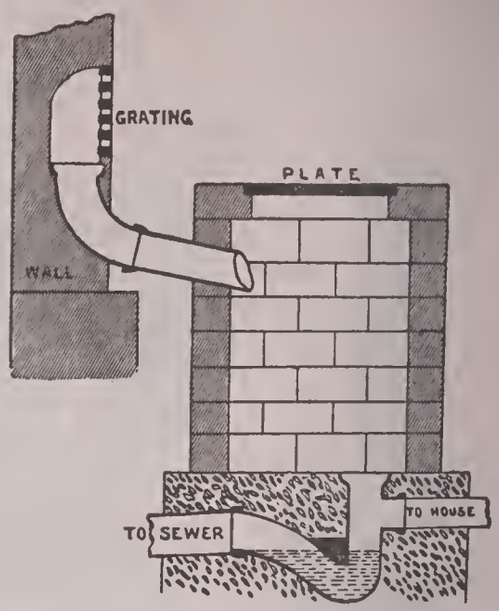


Fig. 7.—Buchan Trap and Manhole, with ventilating grating in wall.

shows such a shaft leading to a grating which is placed vertically in a neighboring wall. Among other good forms of disconnecting trap, more or less like Buchan's, mention may be made of Weaver's, Potts's, and Hellyer's.

Double disconnecting trap.

An arrangement of double disconnecting trap is illustrated in Fig. 8. Any sewer gas forcing the trap next the sewer is still kept back by the upper trap and will escape by a grating or open ventilating shaft which enters at A, while air to ventilate the house-drain enters the upper trap from the manhole. This arrangement no doubt gives more absolute protection than a single trap of the kind already described, but it is probable that (except in cases where the sewers are very foul and liable to frequent excess of pressure) the advantage is so slight as to be more than counterbalanced by the greater liability to accidental stop-

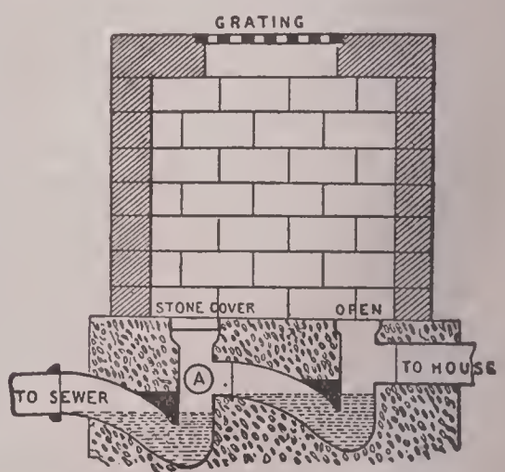


Fig. 8.—Double Disconnecting Trap.

page and greater complexity which this arrangement entails.

Discharge from basins, sinks, etc.

The extent to which it is permissible or advisable in practice to allow several fittings to discharge into a single waste-pipe or soil-pipe will vary in different cases. We can recognize a broad distinction between sewage from closets and urinals, liable to the most dangerous taint should disease occur within the house, and the comparatively innocuous sewage that comes from basins, baths, and sinks. Some sanitarians go so far as to advise that these two classes of sewage should be kept absolutely apart within the house, by the use of a complete double system of house drain-pipes. This, however, is an extreme measure; no reasonable objection can be urged against the discharge into a water-closet soil-pipe of water from a bath or washhand basin in the same room, except perhaps that if

the soil-pipe is of lead its corrosion is hastened by hot water; and the additional flushing which the soil-pipe so receives is a distinct advantage. But to connect a water-closet soil-pipe with sinks and basins in other apartments is to multiply possibilities for the spread of disease within the house, and it is strongly advisable to convey the waste from them by a separate pipe, protected from the sewer by a disconnecting trap of its own with a grating open to the air. This applies with special force to the washhand basins that are often fixed in bedrooms and dressing-rooms. Nothing could be more dangerous than the usage—of which many good houses still furnish instances—of multiplying these conveniences without regard to the risk they involve, and making this risk as great as possible by placing each in direct communication through an ordinary trap with the soil-pipe, itself perhaps unventilated and provided with no disconnection from the sewer. Even when the drain or soil-pipe is ventilated and disconnected from the sewer, no bedroom basin should, under any circumstances, be allowed to discharge into it without first passing a separate open trap. On the other hand, a bedroom basin may be made perfectly safe by leading its waste-pipe (trapped under the basin in the usual way) into an open-air channel which communicates with the sewer by a surface-trap or gully outside the house (Fig. 9). Similar treatment should be adopted in the case of

Bedroom basins.

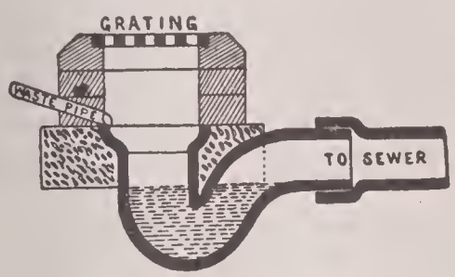


FIG. 9.—Open Trap.

pantry and scullery sinks. Under most plumbing fixtures it is usual to place a safe-tray to receive any water accidentally spilt. The discharge-pipes from these trays are sometimes, but very objectionably, led into the waste-pipe or soil-pipe below the fixture. The proper method of providing for the discharge of water spilt into the safe-tray is to lead a pipe from it through the wall and allow it to end in the open air (Fig.

Safe-trays.

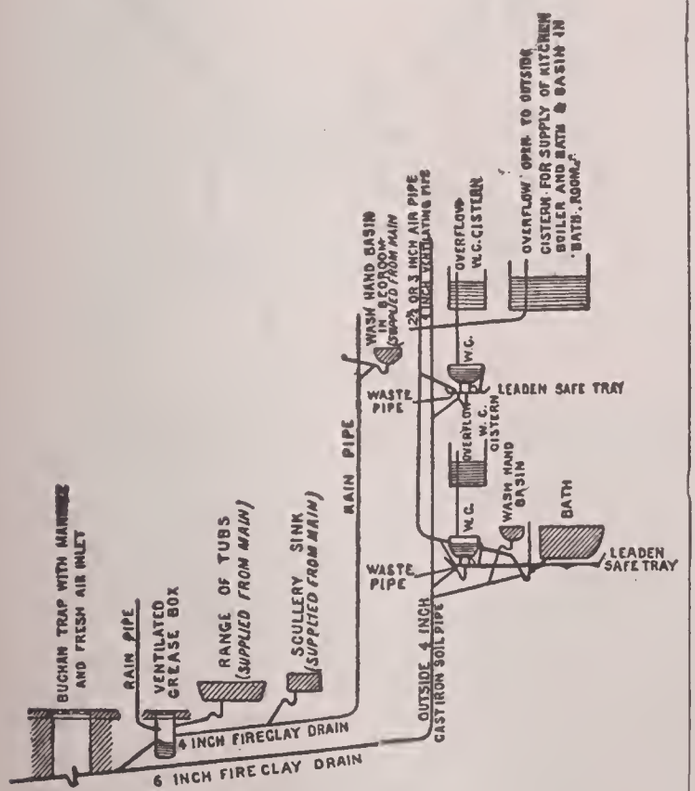


FIG. 10.—Diagram Section of the Drains and Fittings of a Small House.

10, where each of the safe-tray drains is marked "waste-pipe"); a flap valve fixed on the end will serve, if need be, to keep out draught.

Overflow pipes from cisterns used for dietetic purposes should be led, in the same way, into the open air and not into soil-pipes or waste-pipes (Fig. 10). Traps on them cannot be depended on to remain sealed, and any connection of an overflow-pipe with a soil-pipe would result in allowing foul air from the pipe to diffuse itself over the surface of water in the cistern—a state of things peculiarly likely to cause pollution of the water. When a cistern is used only for water-closet service, its overflow-pipe may properly be led into the basin of the closet.

Cistern overflows.

Rain-pipes, extending as they do to the roof, are sometimes used to serve as ventilating continuations of soil-pipes and waste-pipes. The practice is open to serious objection, for it discharges the drain air just under the eaves, at a place where air is generally being drawn into the house. The ventilating end of a soil-pipe should be carried to a higher level, as in Fig. 6, clear of the lower edge of the roof. It is better to restrict rain-pipes to their legitimate function of taking surface water from the roof, or at most to allow them to receive slop-water from sinks and basins, and to make them terminate in or over open traps from which a connection is taken to the house-drain or sewer (Fig. 9).

Rain-pipes.

In Figs. 10 and 11 the sanitary fittings of a small house are shown by diagrams, which should be carefully studied as exemplifying a well-arranged system. Two closets, and a bath and basin in the closet apartment, discharge into a soil-pipe on the right, and the branches (except that of the basin) are ventilated by pipes leading to a separate air-pipe, which, like the soil-pipe, is carried above the roof. The overflow of a cistern which supplies bath, basin, and boiler is carried out to the open air, and so are the waste-pipes of the leaden safe-trays. A separate cistern supplies each water-closet, and its overflow opens into the closet basin. A rain-pipe (in the middle of the figure) receives a bedroom basin waste, and leads by a 4-inch drain to a ventilated grease-box, into which the scullery sink and wash-tubs and another rain-pipe also discharge. Finally, the whole system is protected

Complete system for a small house.

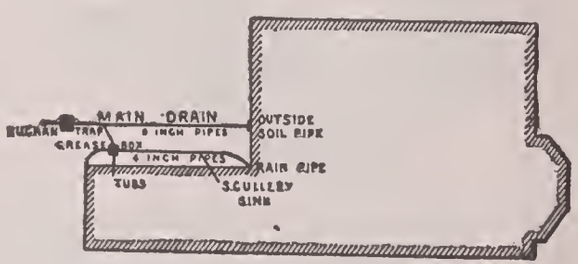


FIG. 11.—Plan of the Drains in Fig. 10.

by a Buchan trap in a built manhole, which is covered with a grating.

House-drains, that is to say, those parts of the domestic system of drainage which extend from the soil-pipes and waste-pipes to the sewer, are made of glazed fireclay pipes, generally 6 inches but sometimes only four inches in diameter. A larger size than 6 inches is rarely if ever desirable. The pipes are spigot-and-faucet jointed, and the joints should be made with cement in the manner already described for sewers. When, as is often unavoidable, the house-drain has to pass under a part of the house, or to come from back to front, iron pipes jointed with lead and coated with an anti-corrosive compound are preferred to fireclay pipes, as giving a better security against the production of leaks by the settling of the soil and other causes. Soil-pipes, when carried down inside the house, are of either lead or iron; when outside the house they are usually of iron. An outside soil-pipe is obviously preferable to an inside one; if the arrangement of the building makes an inside soil-pipe necessary, care must be taken that it shall be easily accessible for inspection at all parts of its length. The usual diameter is 4 inches. For the sake of good ventilation it is desirable to continue the soil-pipe to a point above the roof without reduction of diameter rather than apply a smaller ventilating pipe. Amongst reasons for ventilation one remains to be mentioned,—that owing to the corrosive action of sewer gas, the life of the soil-pipe is greatly shortened if provision for the free circulation of air be wanting or insufficient. A closed soil-pipe becomes in time pitted with holes, especially in the upper parts of its length.

House-drains.

Soil-pipes.

Defective joints in soil-pipes and waste-pipes, particularly where they connect with drains, closet-basins, sinks, etc., are another frequent cause of leakage. Any want of air-tightness in drains or soil-pipes within a dwelling leads to the pollution of the air,

Danger of leaks.

not merely by diffusion, but by an actual in-draught, for generally the air of the house has its pressure reduced by chimney draughts to a value slightly lower than that of the air outside. The house, in fact, ventilates itself by drawing in air from the pipe at any hole, a fact which may easily be demonstrated by holding the flame of a taper near the hole.

Smoke-test.

Various experimental methods are used of detecting such leaks as would admit foul air to the dwelling. Of these the best is the "smoke test." It consists of filling the house-drain, soil-pipes, and waste-pipes with a dense and pungent smoke, any escape of which into the house is readily observed by eye and nose. A quantity of cotton-waste soaked in oil is lighted, and its fumes are blown into the house-drain by a revolving fan, at the ventilating cover of the disconnecting trap, or at any other convenient opening. Smoke soon fills the pipes, and begins to escape at the roof. The upper ends of the pipes are then closed, and the house is searched for smoke.[1]

Hydraulic test.

Another test, especially applicable to those parts of drains that are laid under houses, is the hydraulic test, which consists in stopping up the lower end of the pipe, filling it with water so as to produce a moderate pressure, and then observing whether the level of the water falls. This test, however, is too severe for any but new and very well constructed drains.

Traps on individual fittings.

Every basin, sink, or other fitting should be separately trapped by a bend on the waste-pipe or some other form of trap. A brass cap, screwed on a ferrule which is let into the pipe on the bend, facilitates cleaning (Fig. 5). The warm waste-water from pantry and scullery sinks contains much grease, and should be discharged into a grease box (Fig. 12) where

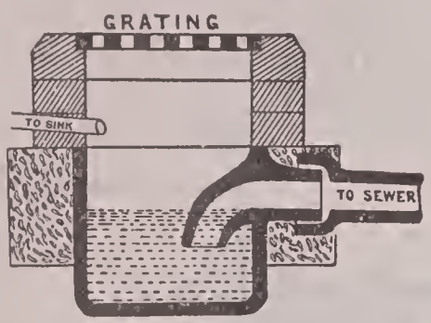


Fig. 12.—Grease Trap.

the water becomes cool and deposits its grease before overflowing into the drain.

Open traps and gullies.

To collect surface water from laundry floors, areas, court-yards, etc., an open trap or gully is used. Fig. 9 shows a simple and good form of open trap; but if the water is liable to carry down sand or earth a gully (Fig. 13) is more suitable.

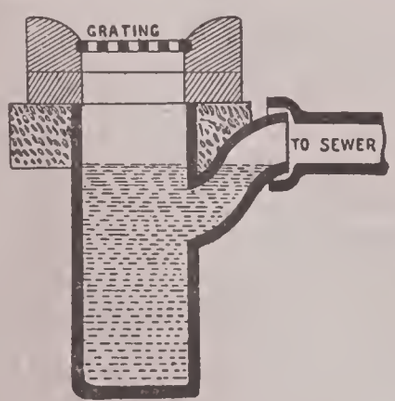


Fig. 13.—Gully-Trap.

Even in this simple fitting a remarkable ingenuity of error has been displayed. Many of the forms favored by builders are bad either because of an insecure seal, a narrow outlet, or a tendency to gather filth. One in particular, the well-known "Bell" trap, is an example of nearly everything a trap should not be.

Water-closets.

Water-closets used to be almost invariably of the "pan" type, but wherever sanitary reform has been preached to any purpose the pan-closet is giving place to cleaner and wholesomer patterns. The evils of the pan closet will be evident from an inspection of Fig. 14. At each use of the closet the hinged pan *a* is tilted down so that it discharges its contents into the container *b*. The sides of the container are inaccessible for cleaning, and their upper portions are out of reach of the flushing action of the pan. They gradually become coated with a foul deposit. A gust of tainted air escapes at every use of the closet; and it rarely happens

Pan-closet.

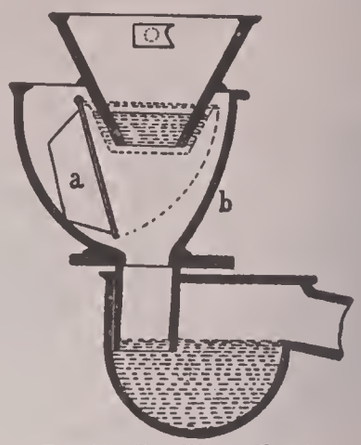


Fig. 14.—Pan Water-Closet.

that the container is air-tight, and that the filth it has gathered does not cause a smell even in intervals of disuse. To make matters worse, many of the older pan-closets are provided with the kind of trap shown in the sketch, called the D trap, which is also liable to become a gathering place for filth. Even with an ordinary trap, however, the pan-closet remains so bad that its use is to be strongly condemned.

Valve closets.

A much better closet is the valve or Brahma closet, an excellent example of which by Frew of Perth is shown in Fig. 15. The basin is kept partly full of water by a ground gun-metal valve tightly pressed up against a conical seat at the basin's foot. The chamber below is only large enough to allow the valve to turn down; it cannot collect much foul matter and may be

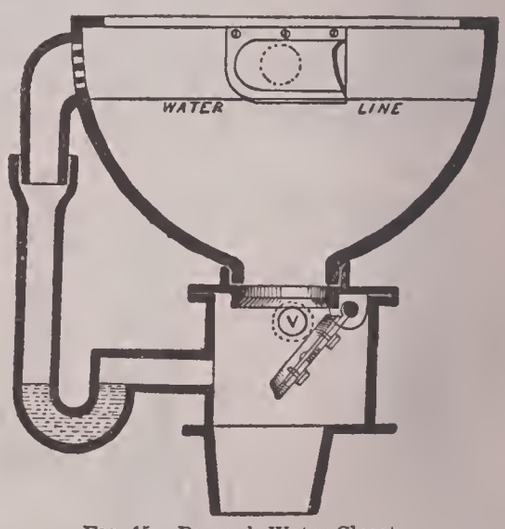


Fig. 15.—Bramah Water-Closet.

ventilated by a separate pipe. A trapped overflow prevents the basin from being overfilled. The whole closet is trapped by an ordinary bend on the soil-pipe, which is not shown in the figure. The volume of water in the basin is much greater than in pan-closets, where the height is limited by the overflow which occurs round the lip of the pan. In some closets of this kind the valve is placed at the side, and, when closed, lies nearly vertical. In another type of valve closet (Jenning's) the valve is a conical plug, pressed vertically down on a seat at the side.

Washout closet.

Valve closets can be made fairly effective and satisfactory from a sanitary point of view; but a much cheaper and certainly not less excellent type of closet is the "washout," an example of which (the "National") is shown in Fig. 16. (Another washout closet, by Doulton, appears in Fig. 6.) These are now made in a great variety of good forms, sometimes of a single piece of white stoneware. They combine cheapness and simplicity with a degree of sanitary perfection that is probably not reached by the most expensive closets of the kinds already named. They have no working parts; the closet is cleansed after use simply by the flush of water, which sweeps every-

[1] A novel plan of making the smoke test has lately been introduced, in which smoke is given off by a "smoke rocket" or cake of slowly combustible compound which is lighted and placed in the drain.

thing before it. The flush must of course be good: a 1½-inch service pipe from a cistern not less than 5 feet above the closet will do well. In some recent designs the cistern is a box at the back of the seat with a wide oval mouth

FIG. 16.—Washout Water-Closet.

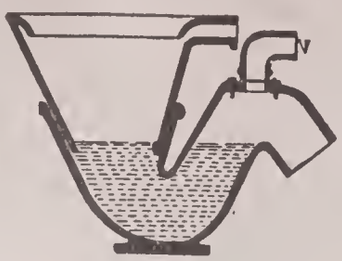


FIG. 17.—Hopper Closet.

leading from it to the flushing rim of the pan: this gives a good flush although the cistern is low. A feature of construction which may be strongly recommended is to leave the closet entirely open for inspection and cleaning, instead of concealing it in a wooden case. The seat then generally rests on iron brackets projecting from the wall, and can be raised on hinges at the back, so that the pan may be used as a urinal or slop-sink without the risk of fouling. Another good type of closet, sharing with the washout the advantage of having no mechanical parts, is the "hopper," illustrated in Fig. 17 (Dodd's Hopper). In all these closets the horn marked V is for attaching a ventilating pipe.

Hopper closet.

For the supply of water to a closet a separate cistern is desirable, especially when water for dietetic purposes is liable to be drawn from the main cistern (instead of being taken direct from the water service-pipe, which is better). It would seem needless to add, were it not that such faults are common, that no cistern—unless it be exclusively used for

Service cisterns for closets.

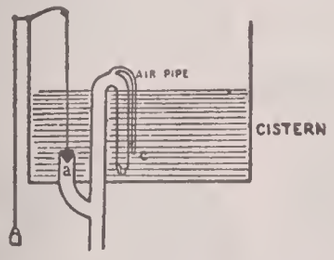


FIG. 18.—Water-Closet Cistern with Siphon Flush.

water-closet supply—should be placed in the same room with or just under a water-closet, and that the room itself should be well lighted, well ventilated, and well shut off from bedrooms. To prevent flushing of closets from being imperfect through carelessness, many plans have been devised for ensuring that once the flow of water is started it will continue until a given volume has been discharged. One of the best of these is the arrangement of siphon flush sketched in Fig. 18: when the valve *a* is opened the downrush of water starts the siphon *b* into action, and even should *a* be then closed the flow continues until the water-level falls to *c*, when air is admitted and the siphon ceases to act. The air-pipe *c* is cut to give the desired volume.

Automatic flush.

As regards house-drainage generally, the points of chief importance may be briefly summed up as follows: (1) the use of one or more disconnecting traps to shut off sewer gas from the whole system of house-drains and pipes; (2) the thorough ventilation of house-drains, soil-pipes, and branches, by providing openings through which air can enter at the foot and escape at the top; (3) the discharge of all sinks, basins, etc., other than water-closet fittings, and especially of fixed bedroom basins, into open traps in the open air; (4) the direct discharge of cistern overflows and safe-trays into the open air; (5) the use of cleanly and well-designed closets, basins, etc., each sealed by an ordinary bent trap; (6) the use of separate service cisterns for water-closets.

Summary.

It may seem superfluous to add that the system of pipes must provide a rapid and effective carriage of all sewage to the sewer, and must be water-tight and air-tight. During the last five years, however, it has been proved, by examination of the best houses in London, that it is no uncommon case for a house to be so completely without effective connection with the sewer that all its own sewage sinks into the soil under the basement; and about 75 per cent. of the houses inspected have failed to pass the "smoke test."

Actual state of London houses.

In this connection mention should be made of the system of coöperative house-inspection originated by the late Prof. Fleeming Jenkin. The Edinburgh Sanitary Protection Association was founded by him in 1878 to carry out the idea that the sanitary fittings of a house should be periodically submitted to examination by an expert, and that householders should combine to secure for this purpose the continuous service of an engineer able to detect flaws, to advise improvements, and to superintend alterations. The Edinburgh association soon justified its existence by discovering, in the houses of its members, a state of things even worse than students of sanitary science had imagined possible. Similar associations are now doing excellent work in London, Glasgow, and many other large towns.

Coöperative system of periodic inspection.

Space admits of only a very brief mention of these systems of sewerage in which excreta are not removed by the aid of water. The dry-earth system, introduced by the Rev. H. Moule, takes advantage of the oxidizing effect which a porous substance such as dry earth exerts by bringing any sewage with which it is mixed into intimate contact with the air contained in its pores. A discharge of urine and fæces is quickly and completely deodorized and absorbed when covered with a small quantity of dry earth; and the same soil, if exposed to the air and allowed to dry, may be used over and over again for the same purpose. Even after soil has been several times used, however, its value as manure is not so great as to pay for its transport to any considerable distance; and for this reason, as well as from the fact that it leaves other constituents of sewage to be dealt with by other means, the system is of rather limited application. So far as it goes it is excellent, and where there is no general system of water-carriage sewerage, or where the water-supply is small or uncertain, an earth-closet will, in careful hands, give perfect satisfaction. Numerous forms of earth-closet are sold in which a suitable quantity of earth is automatically thrown into the pan at each time of use. Arrangements of this kind are, however, not necessary to the success of the system; a box filled with dry earth and a hand scoop will answer the purpose not less effectively. Ashes are sometimes substituted for or mixed with the dry earth, and powdered charcoal is also used.

Dry-earth system.

Earth-closets.

The most primitive method of dealing systematically with excreta is to collect the discharges directly in a vessel which is either itself carried to the country, and its contents applied to the land, or is emptied into a more portable vessel for that purpose. In Japan, for example, in spite of the difficulty of transport over bad roads and by human labor, the latter plan is universally followed: the land and the people have in fact performed for centuries what may be called a complete cycle of operations. The agricultural return is so good that farmers pay for leave to remove excrement, and householders look to their discharges as a source of income. The plan, although carried out in the roughest manner, appears to involve fewer sanitary drawbacks than might be expected; but the smells from privies and carts, and above all, from the process of emptying by ladle, are a nuisance which no Western community would tolerate. A simple pail system, in which the sewage is collected and removed in the same vessel, has been used at Rochdale; another, with an absorbent lining in the pails, at Halifax. A plan much used in Continental cities is to collect excrement in tight vaults, which are emptied at intervals into a tank cart by a suction pump or injector. A more recent pneumatic system is that of Liernur, applied at Amsterdam, where sewage reservoirs at individual houses are permanently connected with a central reservoir by pipes, through which the contents of the former are sucked by exhausting air from the reservoir at the central station. A similar plan has been tried at Lyons and Paris by M. Berlier.

Pail systems.

Pneumatic systems.

References.—The blue-book literature of sewage disposal is very voluminous. Special reference should be made to the *Reports of the Rivers Pollution Commissioners*, from 1866; *Reports of the Referees on Metropolitan Main Drainage*, 1857; *Reports of the Commission on the Sewage of Towns*, 1858–1865; *Reports of Select Committees of the House of Commons*, 1862 and 1864; *Reports of the British Association Committee on the Treatment and Utilization of Sewage*, 1869–1876; *Re-*

port of the Birmingham Sewage Inquiry Committee, 1871; *Reports of the Local Government Board; Reports of the Royal Commission on Metropolitan Sewage Discharge*, 1884 (the second and final report contains a valuable historical résumé of the subject). See also the following books: Corfield, *Treatment and Utilization of Sewage*, 1871; Burke, *Handbook of Sewage Utilization*, 1873; Robinson and Melliss, *Purification of Water-carried Sewage*, 1877; Robinson, *Sewage Disposal*, 1882; J. Bailey-Denton, *Intermittent Downward Filtration*, 2d ed., 1885. Engineering details of sewerage are given in Baldwin Latham's *Sanitary Engineering*, 2d ed., 1878; and particulars of the drainage of individual towns will be found in numerous papers in the *Minutes of Proceedings* of the Institution of Civil Engineers. The domestic aspect of sewerage has been treated by J. Bailey-Denton, *Handbook of House Sanitation*, 1882; W. P. Buchan, *Plumbing and House Drainage*, 4th ed., 1883; W. Eassie, *Healthy Houses*, 1876; Gerhard, *House Drainage*, New York, 1882; Waring, *Sanitary Drainage of Houses and Towns*, Boston, 4th ed., 1883; F. Jenkin, *Healthy Houses*, 1878; and many other writers.

(J. A. E.)

SEWIN, or Sewen. See Salmonidæ, vol. xxi. p. 233.

SEWING-MACHINES. The sewing-machine, as is the case with most mechanical inventions, is the result of the efforts of many ingenious persons, although it would appear that the most meritorious of these worked in entire ignorance of the labors and successes of others in the same field. Many of the early attempts to sew by machinery went on the lines of imitating ordinary hand-sewing, and all such inventions proved conspicuous failures. The method of hand-sewing is of necessity slow and intermittent, seeing that only a definite length of thread is used, which passes its full extent through the cloth at every stitch, thus causing the working arm, human or otherwise, to travel a great length for every stitch made, and demanding frequent renewals of thread. The foundation of machine-sewing was laid by the invention of a double-pointed needle, with the eye in the centre, patented by Charles F. Weisenthal in 1755. This device was intended to obviate the necessity for inverting the needle in sewing or embroidering, and it was subsequently utilized in Heilman's well-known embroidery machine.

Many of the features of the sewing machine are distinctly specified in a patent secured in England by Thomas Saint in 1790, in which he, *inter alia*, describes a machine for stitching, quilting, or sewing. Saint's machine, which appears to have been intended principally for leather work, was fitted with an awl which, working vertically, pierced a hole for the thread. A spindle and projection laid the thread over this hole, and a descending forked needle pressed a loop of thread through it. The loop was caught on the under side by a reciprocating hook; a feed moved the work forward the extent of one stitch; and a second loop was formed by the same motions as the first. It, however, descended within the first, which was thrown off by the hook as it caught the second, and being thus secured and tightened up an ordinary tambour or chain stitch was formed. Had Saint hit on the idea of the eye-pointed needle his machine would have been a complete anticipation of the modern chain-stitch machine.

The inventor who first devised a real working machine was a poor tailor, Barthélemy Thimonier, of St. Étienne, who obtained letters patent in France in 1830. In Thimonier's apparatus the needle was crocheted, and descending through the cloth it brought up with it a loop of thread which it carried through the previously made loop, and thus it formed a chain on the upper surface of the fabric. The machine was a rather clumsy affair, made principally of wood, notwithstanding which as many as eighty were being worked in Paris in 1841, making army clothing, when an ignorant and furious crowd wrecked the establishment and nearly murdered the unfortunate inventor. Thimonier, however, was not discouraged, for in 1845 he twice patented improvements on it, and in 1848 he obtained both in France and the United Kingdom patents for further improvements. The machine was then made entirely of metal, and vastly improved on the first model. But the troubles of 1848 blasted the prospects of the resolute inventor. His patent rights for Great Britain were sold; a machine shown in the Great Exhibition of 1851 attracted no attention, and Thimonier died in 1857 unfriended and unrewarded.

The most important ideas of an eye-pointed needle and a double thread or lock-stitch are strictly of American origin, and that combination was first conceived by Walter Hunt of New York about 1832–34. Hunt reaped nothing of the enormous pecuniary reward which has been shared among the introducers of the sewing-machine, and it is therefore all the more necessary that his great merit as an inventor should be insisted on. He constructed a machine having a vibrating arm, at the extremity of which he fixed a curved needle with an eye near its point. By this needle a loop of thread was formed under the cloth to be sewn, and through that loop a thread carried in an oscillating shuttle was passed, thus making the lock-stitch of all ordinary two-thread machines. Hunt's invention was purchased by a blacksmith named Arrowsmith, and a good deal was done towards improving its mechanical details, but no patent was sought, nor was any serious attempt made to draw attention to the invention. After the success of machines based on his two devices was fully established, Hunt in 1853 applied for a patent; but his claim was disallowed on the ground of abandonment. The most important feature in Hunt's invention—the eye-pointed needle—was first patented in the United Kingdom by Newton and Archbold in 1841, in connection with glove-stitching.

Apparently quite unconscious of the invention of Walter Hunt, the attention of Elias Howe, a native of Spencer, Mass., was directed to machine-sewing about the year 1843. In 1844 he completed a rough model, and in 1846 he patented his sewing-machine (Fig. 1). Howe was thus the first to patent a lock-stitch machine, but his invention had the two essential features—the curved eye-pointed needle and the under-thread shuttle—which undoubtedly were invented by Walter Hunt twelve years previously. Howe's invention was sold in England to William Thomas of Cheapside, London, a corset manufacturer, for £250 [$1215]. Thomas secured in December, 1846, the English patent in his own name, and engaged Howe on weekly wages to adapt the machine for his manufacturing purposes. The career of the inventor in London was chequered and unsuccessful; and, having pawned his American patent rights in England, he returned in April, 1849, in deep poverty to America. There in the meantime the sewing-machine was beginning to excite public curiosity, and various persons were making machines which Howe found to trench on

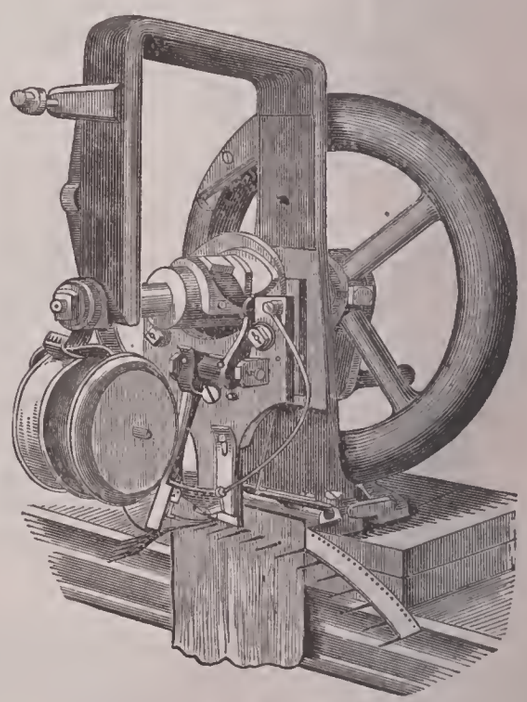


Fig. 1.—Howe's original Machine.

his patent rights. The most prominent of the manufacturers, if not of inventors, ultimately appeared in the person of Isaac Merritt Singer, who in 1851 secured a patent for his machine (Fig. 2), and immediately

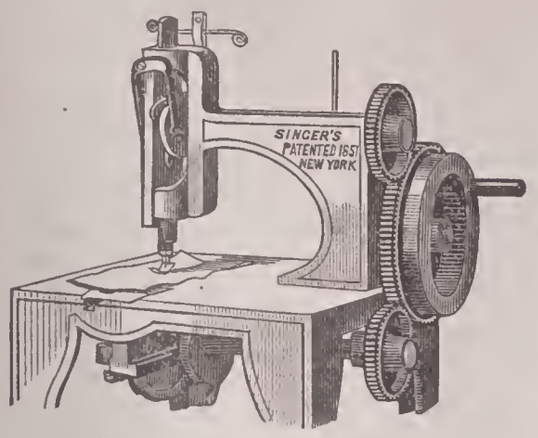


Fig. 2.—Singer's original Machine.

devoted himself with immense energy to push the fortunes of the infant industry. Howe now became alert to vindicate his rights, and after regaining possession of his pawned patent, he instituted suits against the infringers. An enormous amount of litigation ensued, in which Singer figured as a most obstinate defendant, but ultimately all makers became tributary to Elias Howe. It is calculated that Howe received in the form of royalties on machines made up to the period of the expiry of his extended patent—September, 1867—which was also the month of his death, a sum of not less than two millions of dollars.

The practicability of machine-sewing being demonstrated, inventions of considerable originality and merit followed in quick succession. One of the most ingenious of all the inventors—who worked also without knowledge of previous efforts—was Mr. Allan B. Wilson. In 1849 he devised the rotary hook and bobbin combination, which now forms the special feature of the Wheeler & Wilson machine. Mr. Wilson obtained a patent for his machine, which included the important and effective four-motion feed, in November, 1850. In February, 1851, Mr. William O. Grover, tailor, of Boston, patented his double chain-stitch action, which formed the basis of the Grover & Baker machine. At a later date, in 1856, Mr. James A. E. Gibbs, a Virginia farmer, devised the improved chain-stitch machine now popularly known as the Wilcox & Gibbs. These together—all American inventions—form the types of the various machines now in common use. Several thousands of patents have been issued in the United States and Europe, covering improvements in the sewing-machine; but, although the efficiency of the machine has been greatly increased by numerous accessories and attachments, the main principles of the various machines have not been affected thereby.

In machine-sewing there are three varieties of stitch made,—(1) the simple chain or tambour stitch, (2) the double chain-stitch, and (3) the lock-stitch. In the first variety the machine works with a single thread; the other forms use two, an upper and an under thread.

The structure of the chain-stitch is shown in Fig. 3. The needle first descends through the cloth, then as it begins to

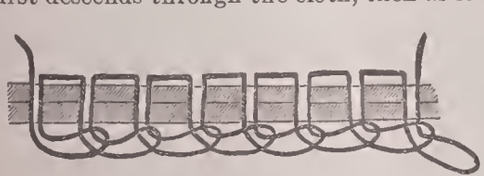


Fig. 3.—Chain-Stitch.

ascend the friction of the thread against the fabric is sufficient to form a small loop into which the point of a hook operating under the cloth plate enters, expanding and holding the loop while the needle rises to its full height. The feed then moves the fabric forward one stitch length, the hook with its loop is also projected so that when next the needle descends its loop is formed within the previous loop. The hook then releases loop No. 1, seizes and expands loop No. 2, and in so doing draws up the previous loop into a stitch, chain-like on the under side but plain on the upper surface of the fabric. The seam so made is firm and elastic, but easily undone, for if at any point a thread is broken the whole of the sewing can be readily run out backwards by pulling the thread, just as in crochet work. To a certain extent this imperfection in the chain-stitch machine is overcome in the Wilcox & Gibbs machine, in which each loop is, by means of a rotating hook, twisted half a revolution after it has passed through its predecessor.

The double chain-stitch is made by machines associated with the name of Grover & Baker. The somewhat compli-

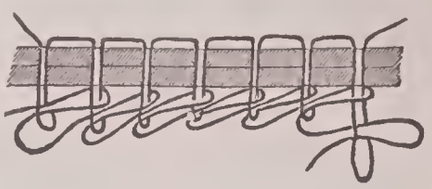


Fig. 4.—Double Chain-Stitch.

cated course of the threads in this stitch is shown in Fig. 4. The under thread in this machine is supplied from an ordinary bobbin and is threaded through a circular needle of peculiar form. The machine is wasteful of thread, and the sewing forms a knotted ridge on the under side of the fabric. Except for special manufacturing and ornamental purposes the machine is now in little use.

The lock-stitch is that made by all ordinary two-thread sewing-machines, and is a stitch peculiar to machine-sewing. Its structure is, as shown in Fig. 5, very simple, and

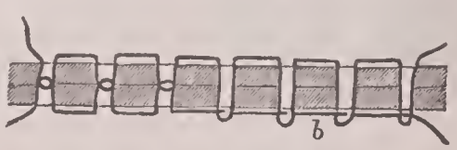


Fig. 5.—Lock-Stitch.

when by proper tension the threads interlock within the work the stitch shows the same on both sides and is very secure. When, however, the tension on the upper thread is weak, the under thread runs along the surface as at *b*, held more or less tightly by the upper loops. It will be seen that to make the lock-stitch the under thread has to be passed quite through the loop of the upper thread. That is done in two principal ways. By the first plan a

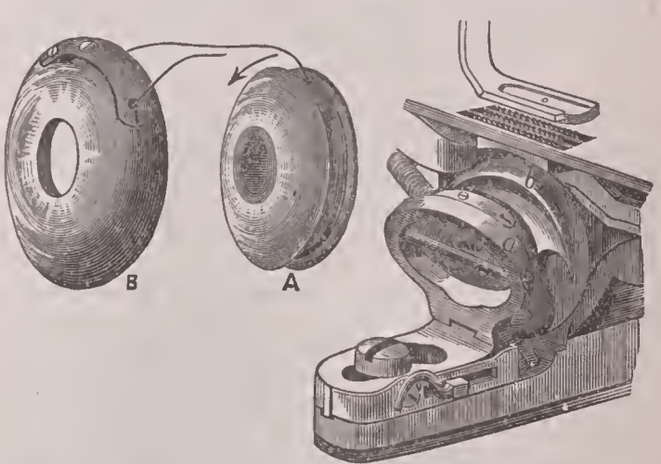


Fig. 6.—Rotary Hook, Bobbin, and Bobbin Case (Wheeler & Wilson Machine).

small metal shuttle, holding within it a bobbin of thread, is carried backward and forward under the cloth plate, and at each forward movement it passes through the upper thread loop formed by each succeeding stroke of the needle. Such is the principle devised by Hunt, introduced by Howe, and improved by Singer and many others. The second principal method of forming the lock-stitch consists in seizing the loop of the upper thread by a rotating hook, expanding the loop and passing it around a stationary bobbin within which is wound the under thread. The method is the invention of Mr. A. B. Wilson, and is known generally as the Wheeler & Wilson principle. The rotary hook seen at *b*, Fig. 6, is so bevelled and notched that it

opens and expands the upper thread loop, causing it quite to enclose the bobbin of under thread, after which it throws it off and the so-formed lock-stitch is pulled up and tightened either by an independent take-up motion as in recent machines, or by the expansion of the next loop as in the older forms. The bobbin A, lenticular in form, and its case B, Fig. 6, fit easily into a circular depression within the hook, against which they are held by the bobbin-holder *a*, Fig. 6.

Intermediate between the shuttle and the rotary-hook machines is the new oscillating-shuttle machine introduced by the Singer Co. The shuttle is hook-formed, not unlike the Wilson hook, and it carries within it a capacious circular bobbin of thread *h*, Fig. 7. This shuttle is driven by an oscillating driver *db* within an annular raceway *a a*, and, instead of revolving completely like the Wilson hook, it only oscillates in an arc of 150°, so far as serves to catch and clear the upper thread. The oscillating-shuttle and rotary hook machines work with great smoothness and rapidity.

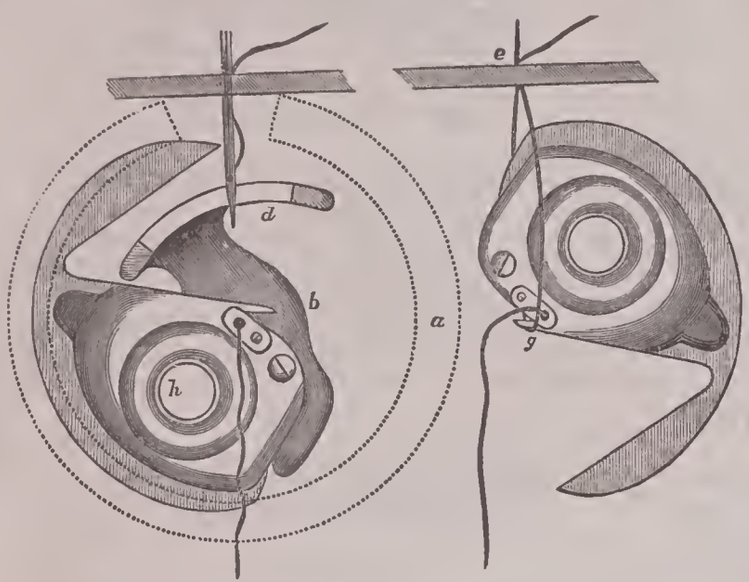


FIG. 7.—Singer's Oscillating-Shuttle Machine.

There are numerous special sewing-machines adapted for leather work, glove-sewing, etc., some of which will be alluded to under SHOES. (J. PA.)

SEX. Since the article REPRODUCTION (*q.v.*) includes not only some account of the reproductive processes but an outline of the comparative anatomy of the reproductive organs, and even a somewhat detailed description of the essential sexual elements, it only remains here to make a brief survey of the more important groups with respect to the absence, union, or distinction of the sexes and to the associated "secondary sexual characters" which distinctly male and female organisms so frequently and strikingly present, and to follow up that outline of the morphological facts with a brief discussion of the nature and origin of the sexes and of the theory of reproduction.

Characters of the Sexes.—Starting with the *Protozoa*, we find indeed that union or conjugation of two or more individuals is of frequent if not universal occurrence; yet, since, at any rate with rare and slight exceptions, no permanent morphological difference can be made out which would entitle us to speak of males or females, the group is generally defined as characterized by the absence of sexual reproduction. Without at present accepting or rejecting this view, it is convenient to postpone its discussion until the origin of sex comes to be considered.

Passing to the *Cœlentera*, we find among the *Hydromedusæ* the sexes usually distinct, and this distinction of the sexes has lately been traced back to the apparently asexual colonies from which the gonophores arise. Exceptions, however, occur,— *e.g.*, *Tubularia*, which is monœcious. The higher *Medusæ* are also usually unisexual, and occasionally even show secondary sexual differences, as in the form and length of the prehensile filaments (*Aurelia*). *Chrysaora*, however, is hermaphrodite. The *Siphonophora* usually present both sexes within a single colony,—the gonophores themselves being, however, unisexual. In a few cases (*Apolemia uvaria*, *Diphyes acuminata*) the colony itself is entirely male or female. The *Ctenophora* are invariably hermaphrodite; and among the *Hexactinia* this is frequently though not generally the case, completely diœcious-colonies even occurring (*Gerardia*). Among the *Octactinia* the sexes are usually distinct, even so far as the colonies are concerned, yet there are many exceptions, *e.g.*, *Corallium*, which has male, female, and hermaphrodite polyps on the same stock. See HYDROZOA, CORALS, etc.

The *Echinodermata* are very rarely hermaphrodite (*Synapta*, *Amphiura squamata*), but secondary sexual characters are almost unknown. *Thyone*, however, has the male orifice on a small protuberance. See ECHINODERMATA.

Probably no invertebrate group presents so varied and interesting a series of sexual phenomena as the *Vermes*. Thus the *Polyzoa* exhibit that remarkable association of hermaphroditism with asexual reproduction which so frequently recurs in organisms of vegetative habit. The Brachiopods also are hermaphrodite, as also are the Oligochætes; *Polychæta* only exceptionally so; some (*Nereidæ*) exhibit secondary sexual characters so well marked as to have been mistaken for specific or even generic ones. The *Platyhelminthes* with few exceptions are hermaphrodite; the Nemerteans (except *Borlasia*) are unisexual and occasionally exhibit secondary sexual differences. The Nematodes are very rarely hermaphrodite (*Ascaris*, *Pelodytes*), but present very marked sexual differences, the male being usually recognizable by smaller size and caudal curvature. Spicules or claspers for copulation are also present. In *Strongylus* the female is carried by the male in a ventral furrow. The aberrant nematoid *Echinorhynchus* is also diœcious. *Sagitta* is hermaphrodite; *Balanoglossus* unisexual, but without secondary sexual difference. Some of the most striking cases of sexual dimorphism are presented by the *Rotifera*, where the male is often a fallen representative of the specific type presented by the female, having not only greatly diminished in size but having undergone thorough degeneration in structure, the alimentary canal especially becoming represented by a mere imperforate thread of cells. Nor are such cases of male degeneration by any means confined to this group: a yet more striking instance is presented by the Gephyrean *Bonellia*, in which the oviduct of the large and well-grown female contains a number of almost microscopic ciliated Turbellarian-looking parasites, which have been shown to be the degenerate males. The other *Gephyrea* present no such extraordinary dimorphism, while the *Discophora* are hermaphrodite. See POLYZOA, BRACHIOPODA, ANNELIDA, NEMERTEANS, PLANARIANS, TAPEWORM, SAGITTA, LEECH, etc.

Among Crustaceans the males are frequently smaller or relatively dwarfish, sometimes attached parasitically to the female, and the sexes are generally distinguishable at least by differences in the structure of some of the appendages, —generally, however, in evident relation to their respective functions. Among the Copepods the sexes are separate, and a marked tendency to dimorphism is manifested, even among the free-living forms. This is sometimes manifested in a way which suggests the sexual magnificence of the highest animals; thus, for instance, the male *Sapphirina* has the brilliance of a gem. With the appearance of parasitism in the group the reproductive relations become profoundly modified; thus it is the always less active female which first becomes sessile and parasitic; the male occasionally permanently retains freedom, as in the common *Nicothoe* of the lobster's gill; more usually, however, he settles down beside or even upon the female and becomes more or less completely epi-parasitic, undergoing a more thorough degeneration than the female herself. The analogous series from free to parasitic forms furnished by the *Ostracoda* and *Cirripedia* are yet more remarkable in their sexual degeneration, since not only does hermaphroditism become the rule, but "complementary males" (most frequently two to one female) appear. These are utterly degenerate in size and structure, in fact often quite unrecognizable as Cirripedes at all, much less as members of the same species, save for their developmental history and the existence of a few intermediate degrees of degeneration between the normal and the lost Cirripede organization,—*e.g.*, *Ibla* or *Scalpellum*, where the males of some species still retain cirri and buccal pieces. In some cases at least their male reproductive function seems to be discharged early in larval life, before the exchange of free for sessile habits, their subsequent life apparently even sinking below the level of reproductive activity. A reversal of sex has actually been alleged in some cases, the males having been said to become female. In the Phyllopods the sexes are separate, but parthenogenesis very frequently occurs, as in *Daphnia*,

Apus, etc., and even in *Apus* tends to replace sexual reproduction very completely. Von Siebold examined thousands of specimens during twelve years without finding a single male; in other years, however, from 10 to 45 per cent. of males have since been found. Besides the usual copulatory modifications of appendages the males of some Phyllopods have more olfactory filaments on the antennæ. In Amphipods similar differences have been noted; in Isopods these often become much more marked,—sometimes, as in the classical case of *Praniza* and *Anceus*, reaching a degree of dimorphism without degeneration which is hardly exceeded in the animal kingdom, and which quite naturally led to the separation of the sexes into distinct genera. In the parasitic forms (*Bopyridæ*) the females degenerate much more thoroughly than the small and active males. The Schizopods exhibit considerable sexual differences. Thus among the males the antennæ bear larger olfactory comb-like structures and larger abdominal members; copulatory appendages may also be specialized; while the females, as in many Isopods, etc., have a brood-pouch formed of overlapping ventral lamellæ. The different position of the sex-openings and the characteristic forms of the limbs render the sexes easily distinguishable among the Decapods; the crabs have an obviously broader abdomen in the female (see CRUSTACEA). Among the *Arachnida*, the archaic king-crabs already show slight external sex-differences; among the spiders the males have a maxillary palp specially modified for a copulatory organ, an adaptation which, associated with their often extremely small size, is of great importance in aiding their escape from their larger and ferocious mates. Some species of *Theridium* have a stridulating apparatus. The male scorpions on the other hand seem to possess a rather stronger development; in the *Acarinæ* the smaller males are more distinctly segmented, possess appendages modified for attachment, and sometimes retain a free habit of life as distinguished from the parasitic females. See ARACHNIDA.

Among Insects the sexes are distinguished by varying modifications of different parts of the body, and differences in general form and in color are frequent. The males are generally active and more beautiful, and seem better endowed with sense organs, though usually smaller than the females. The males have also a preëminence or even monopoly in producing sounds, and it is perhaps in relation to this that the psychology of sex can first be said to come within the range of observation. Thus the field-cricket is said to lower the tone of his song while caressing the female with his antennæ. In the parasitic forms dimorphism, as might be expected, becomes very marked; in *Strepsiptera* the males are free and winged, while the females are blind and wingless, in fact, permanently larval. Similar cases occur in other orders, the glow-worm being probably the most familiar instance. In parasitic or abundantly nourished forms parthenogenesis very frequently appears, the extreme case being presented by *Cecidomyia*, a fly which exhibits rapid parthenogenetic reproduction in the larval state. The dimorphism of many beetles, in which the male frequently acquires the most extraordinary specializations of external form, has received especial attention from Darwin, whose *Descent of Man* includes the fullest details. Here it is enough to mention that Reichenau has recently pointed out the coexistence of the larger size and relative inactivity of the male with the presence of these functionless outgrowths. The beautiful sexual dimorphism so common among the Lepidoptera need not be more than mentioned at present; while the very remarkable sexual differentiation of *Hymenoptera* (bees, ants, sawflies, etc.) may also be assumed to be sufficiently familiar. (See INSECTS, ANTS, BEES.) In several orders (*Diptera, Lepidoptera, Coleoptera*) cases of dimorphism occur among the females themselves, or even among the males; as many as three forms of females have been described in certain butterflies.

The Molluscan series opens with the normally diœcious Lamellibranchs, of which some genera (most species of *Ostrea, Pecten*, etc.) are, however, hermaphrodite. The Pteropods, Polmonates, and Opisthobranchs are hermaphrodite; the Prosobranchs, Heteropods, and Cephalopods unisexual. Though slight differences have been described even in Lamellibranch shells (*Unio*), and though the internal anatomy of the essential and accessory organs is of very high complexity, the extraordinary phenomena associated with "hectocotylization" among the Cephalopods are the only marked outward manifestations of that sexual dimorphism which reaches its climax in the Argonaut. (See MOLLUSCA, CUTTLE-FISH.) The Tunicates are usually hermaphrodite; *Amphioxus*, however, is unisexual (see TUNICATA).

Among Fishes hermaphroditism is extremely rare (*Serranus*). The males are sometimes characterized by the modification of the pelvic limbs as claspers, etc., and are at the reproductive period often readily distinguishable from the females by their brighter color or other cutaneous changes, such as ruffling of the skin. Male and female rays are readily also distinguishable by their teeth and dermal defences. The hooked jaw of the male salmon gives him a characteristic physiognomy during the breeding season. The carp undergoes a sort of epidermic eruption at the same period; male and female eels, too, are said often to become distinguishable both in color and shape. Stridulating apparatus may be present, notably in the Siluroids. (See ICHTHYOLOGY.) Among Amphibians the bright dorsal crest of the male newt is perhaps the most striking of sex distinctions, but many male frogs and toads have vocal air sacs, epidermal callosities, and some (*Cultripes, Pelobates*) possess a gland under the fore-limb. (See AMPHIBIA.)

Among the Ophidians the males are smaller, and have longer and more slender tails; the sexes, too, differ sometimes in color and markings. Male Chelonians, too, have sometimes longer tails and claws and may even give voice. The submaxillary musk-gland of the crocodile is especially active in the breeding season; the lizards have remarkable throat-pouches and crests, which may be epidermic or even correspond to cranial outgrowths, as in the chameleon.

But it is among Birds and Mammals that the observer of sexual characters finds abundant and remarkable differences extending to the minutest details, and showing how the higher evolution of parental care which the inevitably prolonged embryonic life involves and the wider range of sexual selection have coöperated in modifying the whole organism. As might be expected, the lower mammals show least of this; but as we ascend the adult males become differentiated from the females by the acquirement of secondary sexual characters which are mainly either offensive and defensive aids for battle with each other, or which assist in gaining the admiration of the females; and these may coexist or coincide in very various degrees. Thus scent-glands are of common occurrence from the *Insectivora* (perhaps even from *Ornithorhynchus*) upwards. Greater beauty of markings or more vivid colors are acquired,—in many *Anthropidæ* (baboons, etc.) the latter being of peculiarly crude magnificence. Abundant local growths of hair often appear, most notably in the lion and in many *Anthropidæ*. The development of tusks and horns is also too familiar to need more than passing mention.

But it is unquestionable that in this as in not a few other respects the birds, rather than the mammals, have reached the highest stages of evolution. For here sexual characters no longer seem merely superadded or supplementary to the apparatus of individual life, but habits and organization alike become thoroughly adapted to these—the sex-differences and the reproductive functions as it were saturating the whole life, and producing so many and marvellous results, in habits and character, in beauty and song, that it is not to be wondered at that the descriptive labors of the professed ornithologist have constantly risen into those of the artist and even the poet. See BIRDS, and Darwin's *Descent of Man*.

Nature and Determination of Sex.—It is not here proposed to enter upon the task of historical review and criticism of the various theories of sex—which were estimated at so many as five hundred at the beginning of the last century, or even to attempt any sketch of the present very conflicting state of opinion on the subject.[1]

Although our theories of sex may be still vague enough, the greatest step to the solution has been made in the general abandonment by scientific men of the doubtless still popular explanation—in terms of a "natural tendency" for the production of an excess of males or the like. It is now held that "quality and quantity of food, elevation of abode, conditions of temperature, relative age of parents, their mode of life, habits, rank, etc., are all factors which have to be considered." The idea that the problem of the nature of sex is capable of being approached by empirical observation of the numbers of different sexes produced under known sets of conditions, and the obvious practical corollary of this, viz., that the proportion of the

1 As for reproduction in general, so for sex, the most convenient starting-point is the work of Hensen ("Die Zeugung," in Hermann's *Hdb. d. Physiologie*), while other dissertations are to be found in the leading manuals of zoology and botany, especially, however, in special papers too numerous to mention. See also REPRODUCTION, and for fuller bibliographical details see Geddes, "On the Theory of Growth, Reproduction, Sex, and Heredity," *Proc. Roy. Soc. Edin.*, 1886.

sexes must therefore be capable of being experimentally modified and regulated, are conceptions which have steadily been acquiring prominence, especially of late. In short, if we can find how sex is determined, we shall have gone far to investigate sex itself.

One of the most crude attempts has been that of Canestrini, who ascribes the determination of sex to the number of sperms entering the ovum, but this view has been already demolished by Fol and Pflüger. The time of fertilization has also and apparently with greater weight been insisted upon; thus Thury, followed by Düsing, holds that the sex of the offspring depends on the period of fertilization: an ovum fertilized soon after liberation produces a female, while the fertilization of an older ovum produces a male. This view has been carried a step farther by Hensen, who suggests that the same should probably hold true of the spermatozoa, and thus the fertilization of a young ovum by a fresh sperm would have a double likelihood of resulting in a female. There are some observations which support this: thus Thury and other cattle-breeders have claimed to determine the sex of cattle on this principle, and Girou long ago alleged that female flowers, fertilized as soon as they are able to receive pollen, produced a distinct excess of female offspring.

Great weight has also been laid on the relative age of the parents. Thus Hofacker, so long ago as 1828, and Sadler a couple of years later, independently published a body of statistics (each of about 2000 births) in favor of the generalization (since known as Hofacker's and Sadler's law) that when the male parent is the elder the offspring are preponderatingly male: while, if the parents be of the same age, or *a fortiori* if the male parent be younger, female offspring appear in increasing majority. This view has been confirmed by Goehlert, Boulanger, Legoyt, and others; some breeders of horses, cattle, and pigeons have also accepted it. Other breeders, however, deny it altogether; moreover, the recent statistics of Stieda and of Berner (taken independently from Alsace-Lorraine and Scandinavia) seem to stand in irreconcilable contradiction. At any rate at present we do not seem justified in ascribing greater importance to the relative age of parents than as a secondary factor, which may probably take its place among those causes influencing nourishment discussed below.

That good nourishment appears to produce a distinct preponderance of females is perhaps the single result which can at present be regarded as clearly proven and generally accepted. Yet it would be too much to say that unanimity is even here complete; thus, among plants, the experiments of Girou (1823), Haberlandt (1869), and others gave no certain result; those of Heyer (1883) have led him to dispute the validity of the generalization altogether, while Haberlandt (1877) brought evidence for regarding the excess of females as largely due to the greater mortality of the males. The investigations of agricultural observers, especially Meehan (1878), which are essentially corroborated by Düsing (1883), however, leave little doubt that abundant moisture and nourishment tend to produce females. Some of Meehan's points are extremely instructive. Thus old branches of Conifers overgrown and shaded by younger ones produce only male inflorescences, a fact which may be taken in connection with Sadebeck's observation that some fern prothallia, under unfavorable conditions, can still form antheridia but not archegonia. The formation of female flowers on male heads of maize is ascribed by Knop to better nutrition consequent on abundant moisture. The only seriously contradictory observations are thus those of Heyer, and it is therefore reassuring when a detailed scrutiny of his paper shows his ill-conducted experiments (which land him in the conclusion that the organism is not modifiable by its environment at all) to be largely capable of a reversed interpretation. The agency of temperature is also of considerable importance. Thus Meehan finds that the male plants of hazel grow more actively in heat than the female, and Ascherson states that *Stratiotes aloides* bears only female flowers north of 52° lat., and from 50° southwards only male ones. Other instances might be given.

Passing to the animal kingdom we find the cases of insects peculiarly clear; thus Mrs. Treat showed that if caterpillars were starved before entering the chrysalis state the resultant butterflies or moths were males, while others of the same brood highly nourished came out females. Gentry too has shown for moths that innutritious or diseased food produced males; hence perhaps a partial explanation of the excess of male insects in autumn, although temperature is probably more important. The recent experiments of Yung on tadpoles are also very conclusive. Thus he raised the percentage of females in one brood from 56 in those unfed to 78 in those fed with beef, and in another supply from 61 to 81 per cent. by feeding with fish; while, when the especially nutritious flesh of frogs was supplied, the percentage rose from 54 to 92. Among mammals the difficulties of proof are greater, but evidence is by no means wanting. Thus an important experiment was long ago made by Girou, who divided a flock of 300 ewes into equal parts, of which the one half were extremely well fed and served by two young rams, while the other was served by two mature rams and poorly fed. The proportion of ewe lambs in the two cases was respectively 60 and 40 per cent. Düsing also states that it is usually the heavier ewes which bring forth ewe lambs.

Nor does sex in the human species appear to be independent of differences of nutrition. After a cholera epidemic or a war more boys are said to be born, and Düsing also points out that in females with small placenta and little menstruation more boys are found, and even affirms that the number of male children varies with the rise in prices. In towns and in prosperous families there are also more females, while males are more numerous in the country and among the poor. The influence of temperature is also marked: more males are born during the colder months, a fact noted also by Schlechter for horses.

The best known and probably still most influential theory is that systematized by Girou and known as that of "comparative vigor." This makes sex of offspring depend on that of the more vigorous parent. But to this view there are serious difficulties; thus consumptive mothers produce a great excess of daughters, not sons as might be expected from the superior health of the father. Still less weight can be attached to that form of the hypothesis which would make sex follow "genital superiority" or "relative ardency" alone. Any new theory has thus to reconcile the arguments in favor of each of the preceding views,—and meet the difficulties which beset all. As Starkweather puts it, it must at once account for such facts as "the preponderance of male births in Europe, of females among mulattoes and other hybrid races, as also among polygamous animals, and for the equality among other animals. More especially it must suggest some principle of self-adjustment by which not only is the balance of the sexes nearly preserved on the whole, but by which also in cases of special disturbance the balance tends to readjust itself." Starkweather proceeds to attempt this, and his argument may be briefly summarized. While few maintain any essential equality of the sexes, and still fewer any superiority of the female, the weight of authority has been from the earliest times in favor of the doctrine of male superiority. From the earliest ages philosophers have contended that woman is but an undeveloped man; Darwin's theory of sexual selection presupposes a superiority in the male line and entailed on that sex; for Spencer the development of woman is early arrested by procreative functions; in short, Darwin's man is as it were an evolved woman, and Spencer's woman an arrested man. On such grounds we have a number

of theories of sex. Hough thinks males are born when the system is at its best, more females when occupied in growth, reparation, or disease. So, too, Tiedman and others regard every embryo as originally female and remaining female if arrested, while Velpau conversely regards embryos as all naturally male, but frequently degenerating to the female state. Starkweather points out some of the difficulties to the view of female inferiority, and lays it down as the foundation of his work that "neither sex is physically the superior, but both are essentially equal in a physiological sense." But while this is true of the average, there are many grades of individual differences and deficiencies in detail, involving a greater or less degree of superiority in one or other of every pair. Starkweather's theory then is "that sex is determined by the superior parent, also that the superior parent produces the opposite sex." The arguments adduced in favor of this view, however, are scarcely worthy of it, since, save a chapter of pseudo-physiological discussion of vital forces and polarities, of superiority,—nervous, electrical, etc.,—they rest mainly on the vague and shifting grounds of physiognomy and temperament. And when superiority is analyzed into its factors,—cerebral development and activity, temperament, state of health, of nutrition, etc.,—soon we find under the appearance of simplicity a law has been obtained not by discovering any real unity under the many apparently different factors, but by simply lumping them under a common name. Nor is a rationale given of the affirmed reversal of sex, which Schlechter and other authorities moreover wholly deny. Despite these and other faults and failures the work is interesting and often suggestive, and that not only on account of its theoretic position but its sanguine proposals for the practical control of sex.

The work of Düsing (1883), while less speculative, is of great importance in respect to the causes which regulate the proportions of the sexes; since, instead of falling back with Darwin on the unexplained operation of natural selection, he seeks to note the circumstances in which a majority of one sex is profitable, and to show that organisms have really the power to produce in such circumstances a majority of one sex,—in short, that disturbances in the proportion of the sexes bring about their own compensation, and further supports these views by calculation and statistical evidence.

He separates the causes determining sex into those affecting (*a*) one parent and (*b*) both alike. Starting with a minority of one sex, he emphasizes the importance of delayed fertilization, accepting it as a fact that females late fertilized bear most males (this corresponding in man to a scarcity of males among the lower animals). He notes that the first-born child is most frequently a male, especially among older persons, and thus explains how after a war, when there is a want of males, most male children are born. He ascribes importance to the amount of sexual intercourse. Thus, suppose a minority of females: their fertilization tends to occur more frequently, and thus (if the general statement be correct) they should produce a majority of their own sex; or similarly with males. This is supported by reference to cattle-breeding, and it is interpreted physiologically to involve that young spermatozoa produce a majority of males. Suppose a great majority of males: the chances of early fertilization of the females are of course great, but eggs fertilized early tend to produce females. Or suppose conversely a great minority of males: the chances of early fertilization are small, but old eggs tend to produce males, and either excess will thus become compensated. Or again, the more decided the minority of one sex the more frequent the sexual activity of its individuals, the younger their sexual elements, and consequently the more individuals of that sex are produced. Düsing next takes up as indirect causes equivalent to a minority of individuals—(*a*) deficient nutrition; just as frequent copulation overstrains the genital organs the same result may arise from the deficient nutrition of the system; hence an ill-fed cow yields a female to a well-fed bull and *vice versa*; (*b*) relative age; the nearer either parent is to the period of greatest reproductive capacity the less, he thinks, is a birth of that sex probable.

As factors affecting both parents he first discusses variations in nutrition; although means of subsistence may decrease, there is at first no decrease in the number of progeny. But it is necessary to distinguish the reproduction of the species from its multiplication, so that in defective nutrition, though an animal may not reproduce less, it will permanently multiply much less. He agrees with Darwin that the reproductive system is most sensitive to changes of nutrition; gives cases showing the effect of abundant nutrition on reproductive activity, notes the influence of climate, function, etc., and contrasts organisms of high activity, like birds and insects, with parasites. The nutritive relations of the sexes are also contrasted; since females have to give to the embryo more than the male, they are much more dependent on food for vigor of their reproductive capacity, and hence the frequent contrast of their size, etc. Furthermore, animals suit their multiplication to their conditions of nutrition; if food be abundant there is an increase in the number of females, and therefore a further increase in number of individuals of the species; if food, however, be too scarce the more males are produced and the number of the species tends to diminish. Hence the connection above mentioned between increase of children (especially females) in prosperity and after a good harvest, and the rising proportion of boys during a rise of prices. Similarly for animals: the more food the more females, and the more rapidly the species increases; the less food the more males, and the less rapid the increase. Again, plants on good soil produce more female flowers and more seed with profit to the species; on bad soil male flowers preponderate, mostly perish, and the species tends to disappear. The extreme case of optimum nutrition tends to produce normal parthenogenesis ("thelytokie"), yielding only females, different in cause and operation from the parthenogenesis resulting from the absence of males ("arrenotokie").[1]

Theory of Reproduction and Sex.—If we now attempt to reach a rational standpoint from which to criticise and compare the innumerable empirical conceptions of sex,—much more if we seek a firm basis for the construction of a really comprehensive theory,—it is evident that such a theory must be addressed not merely to the specialist concerned with problems of reproduction and development, but, while embracing details and anomalies, must be satisfactory alike to the general morphologist and physiologist. We must, therefore, have before us that conception of the main lines of thought on each of these subjects which has been outlined under the headings PHYSIOLOGY and MORPHOLOGY.

The close coincidence between these two independent developments is especially to be noted. From the vague account of general form and appearance, of habits and temperaments, which made up the descriptive natural history of the past, the two streams of progress, though distinct, are wholly parallel. Thus Buffon furnished a brilliant and synthetic exposition of the oldest view, while one side of their general aspect received new precision at the hands of Linnæus,—to some extent the other also at the hands of his physiological contemporaries. The anatomical advance of Cuvier is parallel to the detailed study of the functions of the organs, while the great step made by Bichat lay in piercing below the conception of the organ and its function as ultimate, and in seeking to interpret both by reference to the component tissues. The cell-theory of Schwann and his successors analyzed these tissues a step farther, while the latest and deepest analysis refers all structure ultimately to the substance called protoplasm, and similarly claims to express all function in terms of the construction and destruction, synthesis and analysis, anabolism and katabolism of this. See PHYSIOLOGY, PROTOPLASM, MORPHOLOGY.

Now, since every morphological and physiological fact or theory is in one or other of these few categories, it is evident that we have here the required criterion of theories of reproduction and sex. The question, What is sex? what is meant by male or female? admits of a regular series of answers. The first and earliest is in terms of general aspect, temperament, and habit, and, though crude, empirical, and superfi-

[1] See Düsing, *Jena Zeitschr.*, 1885; Starkweather, *Law of Sex*, 1883.

cial, it lacks neither unity nor usefulness. At this plane are not only most popular conceptions but many theories like that of Starkweather, which may be mentioned as the most recent. The anatomist contents himself with the recognition of specific organs of sex, or at most with a similarly empirical account of their functions; while the embryologist and histologist will not rest contented without seeking to refer these organs to the tissues of which they are composed and the layer from which they spring, and even reaches and describes the ultimate cellular elements essential to sex,—the ovum and spermatozoon. A parallel physiological interpretation of these is next required, and at this point appear such hypotheses as these of Weismann and others.

Thus the bewildering superabundance of widely different theories at the present juncture becomes intelligible enough; and, each once classified according to its stage of progress, a detailed criticism would be easy. But this is not enough; the demand for an explanation at once rational and ultimate, to comprehend and underlie all the preceding ones, is only the more urgent. Where shall we seek for it? On the one hand the morphological aspect of such an explanation must interpret the forms of sex cells in terms of those of cells in general, and in terms of the structural properties of protoplasm itself; while its more difficult yet more satisfying physiological aspect must express the mysterious difference of male and female in terms of the life processes of that protoplasm,—in terms, that is to say, of anabolism and katabolism. Were these steps made a new synthesis would be reached, and from this point it should even next be possible to retrace the progress of the science, and interpret the forms and the functions of tissues and organs, nay, even of the facts of aspect, habit, and temperament, so furnishing the deductive rationale of each hitherto merely empirical order of observed fact and connecting theory.

While this conception does not admit of development within the present limits,[1] a brief abstract of such an interpretation of reproduction and of sex in terms of anabolism and katabolism may be of interest to the reader. The theory of reproduction, in general principle at least, is simple enough. A continued surplus of anabolism involves growth, and the setting in of reproduction when growth stops implies a relative katabolism. This in short is merely a more precise restatement of the familiar antithesis between nutrition and reproduction. At first this disintegration and reintegration entirely exhaust the organism and conclude its individual existence, but as we ascend the process becomes a more localized one. The origin of this localization of the reproductive functions may best be understood if we figure to ourselves a fragment of the genealogical tree of the evolutionist in greater detail, and bear in mind that this is made up of a continuous alternate series of sex-cell and organism, the organism too, becoming less and less distinguished from its parent cell until the two practically coincide in the *Protozoa*, which should be defined not so much as "organisms devoid of sexual reproduction" but rather as undifferentiated reproductive cells (protosperms or protova, as they might in fact be called), which have not built up round themselves a body. We should note, too, how the continuous immortal stream of Protozoan life (see PROTOZOA) is continued by that of ordinary reproductive cells among the higher animals, for the mortality of these does not affect this continuity any more than the fall of leaves does the continued life of the tree. The interpretation of sex is thus less difficult than might at first sight appear. For anabolism and katabolism cannot and do not absolutely balance, as all the facts of rest and motion, nutrition and reproduction, variation and disease, in short of life and death, clearly show. During life neither process can completely stop, but their algebraic sum keeps varying within the widest limits. Let us note the result, starting from the undifferentiated amœboid cell. A surplus of anabolism over katabolism involves not only a growth in size but a reduction in kinetic and a gain in potential energy, *i.e.*, a diminution of movement. Irregularities thus tend to disappear; surface tension too may aid; and the cell acquires a spheroidal form. The large and quiescent ovum is thus intelligible enough. Again starting from the amœboid cell, if katabolism be in increasing preponderance the increasing liberation of kinetic energy thus implied must find its outward expression in increased activity of movement and in diminished size; the more active cell becomes modified in form by passage through its fluid environment, and the flagellate form of the spermatozoon is thus natural enough. It is noteworthy, too, that these physiological normal results of the rhythm of cellular life, the resting, amœboid, and ciliate forms, are precisely those which we empirically reach on morphological grounds alone (see MORPHOLOGY, vol. xvi. p. 869).

Given, then, the conception of the cellular life rhythm as capable of thus passing into a distinctly anabolic or katabolic habit or diathesis, the explanation of the phenomena of reproduction becomes only a special field within a more general view of structure and function, nay even of variation, normal and pathological. Thus the generality, use, and nature of the process of fertilization becomes readily intelligible. The profound chemical difference surmised by so many authors becomes intelligible as the outcome of anabolism and katabolism respectively, and the union of their products as restoring the normal balance and rhythm of the renewed cellular life. Without discussing the details of this, farther than to note how it resumes the speculations of Rolph and others as to the origin of fertilization from mutual digestion, of the reproductive from the nutritive function, we may note how they illustrate on this view that origin of fertilization from conjugation which is the central problem of the ontogeny and phylogeny of sex. The formation of polar vesicles seems thus an extrusion of katabolic (or male) elements, and conversely its analogues in spermatogenesis (see REPRODUCTION). Passing over such tempting applications as that to the explanation of segmentation and even subsequent developmental changes, it must suffice to note that the constant insistance of embryologists upon the physiological importance of the embryonic layers bears essentially upon their respective predominance of anabolism and katabolism. The passage from ordinary growth to that discontinuous growth which we term asexual reproduction, and from this again to sexuality or the frequent reverse progress, is capable of rational interpretation in like manner: the "alternation of generations" is but a rhythm between a relatively anabolic and katabolic preponderance; a parthenogenetic ovum is an incompletely differentiated ovum which retains a measure of katabolic (male) products, and thus does not need fertilization; while hermaphroditism is due to the local preponderances of anabolism or katabolism in one set of reproductive cells or in one period of their life. The reversion of unisexual forms to hermaphrodite ones, or of these to asexual ones, which we have seen in such constant association with high nutrition and low expenditure,[2] is no longer inexplicable. The female sex being thus preponderatingly anabolic, the importance of good nutrition in determining it is explained: menstruation is seen to be the means of getting rid of the anabolic surplus in absence of its fœtal consumption, while the higher temperature and greater activities of the male sex express its katabolic diathesis. The phenomena of sex, then, are no isolated ones, but express the highest outcome of the whole activities of the organism—the literal blossoming of the individual life. (P. GE.)

SEXTANT, an instrument for measuring angles on the celestial sphere. The name (indicating that the instrument is furnished with a graduated arc equal to a sixth part of a circle) is now only used to designate an instrument employing reflection to measure an angle; but originally it was introduced by Tycho Brahe, who constructed several sextants with two sights, one on a fixed, the other on a movable radius, which the observer pointed to the two objects of which the angular distance was to be measured.

In the article NAVIGATION the instruments are described which were in use before the invention of the reflecting sextant. Their imperfections were so evident that the idea of employing reflection to remove them occurred independently to several minds. Hooke contrived two reflecting instruments. The first is described in his *Posthumous Works* (p. 503); it had only one mirror, which reflected the light from one object into a telescope which is pointed directly at the other. Hooke's second plan employed two single reflections, whereby an eye placed at the side

[1] See paper by Geddes already mentioned at p. 724, footnote.

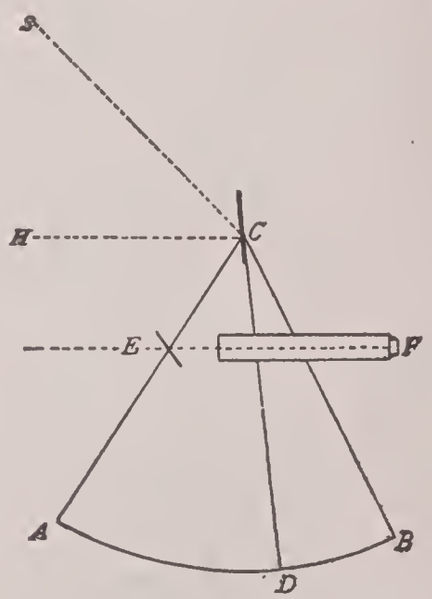
[2] Thus Marshall Ward has lately drawn attention to the association of parasitism with the disappearance of sexual reproduction in *Fungi* (*Quart. Jour. Micr. Sci.*, xxiv.).

of a quadrant could at the same time see the images formed in two telescopes, the axes of which were radii of the quadrant and which were pointed at the two objects to be measured. This plan is described in Hooke's *Animadversions to the Machina Cœlestis of Hevelius*, published in 1674, while the first one seems to have been communicated to the Royal Society in 1666. Newton had also his attention turned to this subject, but nothing was known about his ideas till 1742, when a description in his own handwriting of an instrument devised by him was found among Halley's papers and printed in the *Philosophical Transactions* (No. 465). It consists of a sector of brass, the arc of which, though only equal to one-eighth part of a circle, is divided into 90°. A telescope is fixed along a radius of the sector, the object glass being close to the centre and having outside it a plane mirror inclined 45° to the axis of the telescope, and intercepting half the light which would otherwise fall on the object glass. One object is seen through the telescope, while a movable radius, carrying a second mirror close to the first, is turned round the centre until the second object by double reflection is seen in the telescope to coincide with the first.

But long before this plan of Newton's saw the light the sextant in its present form had been invented and had come into practical use. On May 13, 1731, John Hadley gave an account of an "octant," employing double reflection, and a fortnight later he exhibited the instrument.[1] On the 20th May Halley stated to the society that Newton had invented an instrument founded on the same principle, and had communicated an account of it to the society in 1699, but on search being made in the minutes it was only found that Newton had showed a new instrument "for observing the moon and stars for the longitude at sea, being the old instrument mended of some faults," but nothing whatever was found in the minutes concerning the principle of the construction. Halley had evidently only a very dim recollection of Newton's plan, and at a meeting of the Royal Society on December 16, 1731, he declared himself satisfied that Hadley's idea was quite different from Newton's. The new instrument was already in August, 1732, tried on board the "Chatham" yacht by order of the Admiralty, and was found satisfactory, but otherwise it does not seem to have superseded the older instruments for at least twenty years. As constructed by Hadley the instrument could only measure angles up to 90°; but in 1757 Captain Campbell of the navy, one of the first to use it assiduously, proposed to enlarge it so as to measure angles up to 120°, in which form it is now generally employed.

Quite independently of Hadley and Newton the sextant was invented by Thomas Godfrey, a poor glazier in Philadelphia. In May, 1732, Mr. James Logan of that city wrote to Halley that Godfrey had about eighteen months previously showed him a common sea quadrant "to which he had fitted two pieces of looking-glass in such a manner as brought two stars at almost any distance to coincide." The letter gave a full description of the instrument; the principle was the same as that of Hadley's first octant which had the telescope along a radius. At the meeting of the Royal Society on January 31, 1734, two affidavits sworn before the mayor of Philadelphia were read, proving that Godfrey's quadrant was made about November, 1730, that on the 28th November it was brought by G. Stewart, mate, on board a sloop, the "Truman," John Cox, master, bound for Jamaica, and that in August, 1731, it was used by the same persons on a voyage to Newfoundland. There can thus be no doubt that Godfrey invented the instrument independently; but the statement of several modern writers that a brother of Godfrey, a captain in the West India trade, sold the quadrant at Jamaica to a Captain or Lieutenant Hadley of the British navy, who brought it to London to his brother, an instrument maker in the Strand, has been proved to be devoid of all foundation. Not only is this totally at variance with all the particulars given in the affidavits, but between 1719 and 1743 there was no officer in the British navy of the name of Hadley, and John Hadley cannot possibly have been in the West Indies at that time, as he was present at many meetings of the Royal Society between November, 1730, and May, 1731; besides, neither Hadley nor his brothers were professional instrument makers. A detailed discussion of this question by Prof. Rigaud is found in the *Nautical Magazine*, vol. ii. No. 21.[2]

The annexed figure gives an idea of the construction of the sextant. ABC is a light framework of brass in the shape of a sector of 60°, the limb AB having a graduated arc of silver (sometimes of gold) inlaid in the brass. It is held in the hand by a small handle at the back, either vertically to measure the altitude of an object, or in the plane passing through two objects the angular distance of which is to be found. CD is a radius movable round C, where a small plane mirror of silvered plate-glass is fixed perpendicular to the plane of the sextant and in the line CD. At D is a vernier read through a small lens, also a clamp and a tangent screw which enable the observer to give the arm CD a very slow motion within certain limits. At E is another mirror "the horizon glass," also perpendicular to the plane of the sextant and parallel to CB. F is a small telescope fixed across CB, parallel to the plane CAB and pointed to the mirror E. Dark glasses can be placed outside E and between E and C when observing the sun. As only the lower half of E is silvered, the observer can see the horizon in the telescope through the unsilvered half, while the light from the sun or a star S may be reflected from the "index glass" C to the silvered half of E and thence through F to the observer's eye. If CD has been moved so as to make the image of a star or of the limb of the sun coincide with that of the horizon, it is easy to see that the angle SCH (the altitude of the star or solar limb) is equal to twice the angle BCD. The limb AB is always graduated so as to avoid the necessity of doubling the measured angle, a space marked as a degree on the limb being in reality only 30′. The vernier should point to 0° 0′ 0″ when the two mirrors are parallel, or in other words, when the direct and reflected images of a very distant object are seen to coincide. For the methods of adjusting the mirrors and finding the index error see NAVIGATION (vol. xvii. p. 275).



Sextant.

If the sextant is employed on land, an artifical horizon has to be used. This is generally a basin of mercury pro-

[1] Hadley described two different constructions: in one the telescope was fixed along a radius as in Newton's form, in the other it was placed in the way afterwards universally adopted; an octant of the first construction was made as early as the summer of 1730, according to a statement made to the Royal Society by Hadley's brother George on February 7, 1734.

[2] John Hadley was a country gentleman of independent means, and the fact that he was the first to bring the construction of reflecting telescopes to any perfection has made many authors of astronomical books believe that he was a professional instrument maker. His brother George, who assisted him in his pursuits, was a barrister.

tected from the wind by a roof of plate-glass with perfectly parallel faces; sometimes a glass plate is used (with the lower surface blackened), which can be levelled on three screws by a circular level. The telescope is directed to the image of the celestial object reflected from the artificial horizon, and this image is made to coincide with that reflected from the index-glass. In this case the angle BCD will be double the altitude of the star. Towards the end of last and the beginning of this century the sextant was much used on land for determining latitudes, but, though in the hands of a skilful observer it can give results far superior to what one might expect from a small instrument held in the hand (or attached to a small stand), it has on shore been quite superseded by the portable altazimuth or theodolite, while at sea it continues to be indispensable.

The principle of the sextant has been applied to the construction of reflecting circles, on which the index arm is a diameter with a vernier at each end to eliminate the error of eccentricity. The circles constructed by Pistor and Martins of Berlin have a glass prism instead of the horizon glass and are extremely convenient. (J. L. E. D.)

SEXTUS EMPIRICUS. See Scepticism.

SEYCHELLES, an archipelago of the Indian Ocean, consisting of eighty islands—several of them mere islets—situated between 3° 38′ and 5° 45′ S. lat. and 52° 55′ and 53° 50′ E. long.,[1] about 1400 miles southeast of Aden and 1000 miles east of Zanzibar. They are the only small tropical oceanic islands of granitic structure, and rise steeply out of the sea, culminating in the island of Mahé, at an elevation of 2998 feet above the sea-level. The most northerly island is Bird, ½ by ¼ mile; the most southerly, Plate; the most easterly, Frégates; the most westerly, Silhouette. Mahé, the largest island of the group, 3 by 1½ miles,[1] is very nearly central, 60 miles south of Bird, and having to the north and northeast of it La Digne, Félicité, Praslin, and Curieuse. Only a few—Mahé, Praslin, La Digue, Denis, and Bird—are inhabited. The total area is about 50,120 acres, of which Mahé alone comprises 34,749.[1] The beaches of glistening calcareous sand are begirt by coral reefs which form a wall round the islands. The valleys and easier slopes are overlaid with a very fertile soil, and vegetation is most luxuriant. Though the climate is tropical, the heat is tempered and rendered uniform by the sea breezes, and probably this accounts for epidemic diseases and endemic fever being of uncommon occurrence. There are numerous brooks and torrents, making their way to the sea between blocks of granite. The islands are green and fresh at all times, particularly during the wet season from November to May. The total rainfall for 1881 was 113.50 inches. The extreme range of the thermometer in 1881 and 1882 was only 22° (minimum 71°, maximum 93°). The heat is seldom sultry and oppressive. The Seychelles lie too far to the north to receive the hurricanes which occasionally sweep over Bourbon and Mauritius, and even thunderstorms are rare. The population at the census of 1881 was 14,081 (7179 males and 6902 females)—500 white (mostly French creoles), 11,500 black, and 2000 coolies. Since 1881 the population has considerably increased in consequence of a tide of immigration from Mauritius. Men and women of exceptionally great age are frequently met with, and the death-rate for 1880 amounted to only 13.1 per 1000. The prevailing language is a French patois, but English is taught in the schools.

These islands were discovered at the beginning of the 16th century, but never occupied, by the Portuguese. In 1742 the French took possession of them, calling them at first Îsles des Labourdonnais, but afterwards the Seychelles, from Count Hérault de Seychelles, an officer of the East Indian fleet. The first settlement was made in 1768 at Mahé, now Port Victoria. In 1794 the English wrested them from the French along with Mauritius, and they are now ruled by a board of six civil commissioners, as a dependency under the governor of Mauritius. In 1834 slavery was abolished, and since then the plantations have been in a declining state. In 1884 there were in the islands 20 primary schools aided by Government grants and attended by 1620 children. There are 16 churches belonging to the Roman Catholics (the dominant faith) and 11 to the Church of England. The main product is the cocoanut, but tobacco, coffee, rice, maize, sweet potatoes, and manioc are raised for home consumption, while cotton, pepper, cinnamon, and other spices grow wild. Many of the trees display simultaneously blossoms and unripe and ripe fruit. The so-called sea or Maldive double cocoanut "coco de mer," the fruit of the palm-tree *Lodoicea Sechellarum*, is peculiar to certain of these islands. It was long known only from sea-borne specimens cast up on the Maldive and other coasts, was thought to grow on a submarine palm, and, being esteemed a sovereign antidote to poisons (*Lusiad*, x. 136), commanded exorbitant prices in the East. This palm will grow to a height of 100 feet, and shows fern-like leaves of enormous size. Sensitive plants from America spread like lawns over the soil and quake at every step taken over them. The cocoanut palm flourishes in the gardens, overtopping the houses and most other trees, lining the shore, climbing high up the mountains, and in many places forming extensive forests. There are no native mammals, and domestic animals are scarce. The birds comprise gannets, terns in great numbers, and white egrets. Tortoises are common,—among them the gigantic turtle and black turtle, whose flesh is exported. The sea abounds in fish, many of them distinguished by splendid colors, and yields the inhabitants not only a large part of their animal food, but also material for building their houses,—a species of massive coral, *Porites gaimardi*, being hewn into square building blocks which at a distance glisten like white marble.

The principal harbor is Port Victoria, situated on Mahè island. The total value of imports here in 1884, including Rs.27,097 [$13,169.14] specie, was Rs.428,605 [$208,302.03], and of the exports, including Rs.21,582 [$10,488.85] specie, Rs.392,175 [$190,597.05]. The chief imports were coffee and cotton manufactures; the chief exports, cocoanut, cocoanut oil, and sperm oil. The fiscal receipts for 1884 amounted to Rs.130,047 [$63,202.84]. The cultivation of cocoa is progressing favorably, but the same cannot be said of the vanilla and clove plantations, which suffer from want of regular labor, attributed to the widespread share system, which the negroes prefer to regular work. The leaf disease affecting coffee has done great injury, and cocoanut plantations have suffered from the ravages of an insect, but no effort seems to have yet been made by weeding the plantations to stamp out the disease. Of the 34,749 acres of land making up Mahé, 12,000 acres are laid out in cocoanut, 500 in vanilla, coffee, and cloves, and 1500 are in forest; of the uncultivated land 8000 acres are well suited for vanilla, cocoa, and coffee plantations.

SEYMOUR, Edward. See Somerset, Duke of.

SEYNE, La, a town of France, in the department of Var, 5 miles southwest of Toulon, with a population of 9788 in 1881. It owes its importance mainly to its ship-building, the Société des Forges et Chantiers de la Méditerranée having here one of the finest building yards in Europe, in which more than 2000 workmen are employed; contracts are executed for private shipowners, for the great Messageries Maritimes Company, and for various Governments. The port, which has communication by steamer and omnibus with that of Toulon, is 6 acres in extent, and admits vessels of the largest tonnage.

SFAX, a city of Tunis, second in importance only to the capital, is situated 116 miles south of Mahadia, on the coast of the Gulf of Gabes (Syrtis Minor) opposite the Kerkenah Islands. It consists of three distinct portions: the new European quarter to the south, with roads, piers, and other improvements carried out by the municipality; the Arab town in the middle with its tower-flanked walls entered by only two gates; and to the north the French camp. Round the town for five or six miles to the north and west stretch orchards and gardens and country houses, where most of the Sfax families have their summer quarters. Dates, almonds, grapes, figs, peaches, apricots, olives, and in rainy years melons and cucumbers, grow there in great abundance without irrigation. Two enormous cisterns maintained by public charitable trusts supply the town with water in dry seasons. Sfax was formerly the terminus of a caravan route to Central Africa, but its inland trade now extends only to

[1] [This longitude is that of the Amirante Islands. The Seychelles lie 160 miles further east. The area of Mahé is correct, but the dimensions should read from 1½ to 3 miles broad by 16 miles long. See Keith Johnston's *Gazetteer*.—Am. Ed.]

Gafsa. The export trade (esparto grass, oil, almonds, pistachio nuts, sponges, wool, etc.) has attained considerable dimensions. Fifty-one English vessels (34,757 tons) visited the port in 1884. The anchorage is 2 miles from the shore, and there is a rise and fall of 5 feet at spring tides (a rare phenomenon in the Mediterranean). In 1881 the population was said to be about 15,000 (including 1200 Arabs, 1500 Tunisian Jews, 1000 Maltese, etc., 500 Europeans); in 1886 it is stated at 32,000 (1200 Maltese, 1000 Europeans).

Sfax (the Arabic Asfáḳis or Safáḳus, sometimes called the City of Cucumbers) occupies the site of the ancient *Taphrura*. In the Middle Ages it was famous for its vast export of olive oil. The Sicilians took Sfax under Roger the Norman in the 12th century, and the Spaniards occupied it for a brief period in the 16th century. The bombardment of the town in 1881 was one of the principal events of the French conquest of Tunis; it was pillaged by the soldiers on July 16th and the inhabitants had afterwards to pay a war indemnity of £250,000 [$1,215,000].

SFORZA, House of. See Milan, vol. xvi. p. 305, and Italy, vol. xiii. p. 489.

SHAD is the name given to certain migratory species of Herrings (*Clupea*), which are distinguished from the herrings proper by the total absence of teeth in the jaws. Two species occur in Europe, much resembling each other,—one commonly called Allis Shad (*Clupea alosa*), and the other known as Twaite Shad (*Clupea finta*). Both are, like the majority of herrings, greenish on the back and bright silvery on the sides, but they are distinguished from the other European species of *Clupea* by the presence of a large blackish blotch behind the gill-opening, which is succeeded by a series of several other similar spots along the middle of the side of the body. So closely allied are these two fishes that their distinctness can be proved only by an examination of the gill-apparatus, the allis shad having from sixty to eighty very fine and long gill-rakers along the concave edge of the first branchial arch, whilst the twaite shad possesses from twenty-one to twenty-seven stout and stiff gill-rakers only. In their habits and geographical distribution also the two shads are very similar. They inhabit the coasts of temperate Europe, the twaite shad being more numerous in the Mediterranean. While they are in salt water they live singly or in very small companies, but during May (the twaite shad some weeks later) they congregate, and in great numbers ascend large rivers, such as the Severn (and formerly the Thames), the Seine, the Rhine, the Nile, etc., in order to deposit their spawn,—sometimes traversing hundreds of miles, until their progress is arrested by some natural obstruction. A few weeks after they may be observed dropping down the river, lean and thoroughly exhausted, numbers floating dead on the surface, so that only a small proportion seem to regain the sea. Although millions of ova must be deposited by them in the upper reaches of a river, the fry does not seem to have been actually observed in fresh water, so that it seems probable that the young fish travel to the sea long before they have attained to any size.

On rivers in which these fishes make their periodical appearance they have become the object of a regular fishery, and their value increases in proportion to the distance from the sea at which they are caught. Thus they are much esteemed on the middle Rhine, where they are generally known as "Maifisch"; those caught on their return journey are worthless and uneatable. The allis shad is caught at a size from 15 to 24 inches, and is considered to be better flavored than the twaite shad, which generally remains within smaller dimensions.

Other, but closely allied species, occur on the Atlantic coasts of North America, all surpassing the European species in importance as food fishes and economic value, viz., the American Shad (*Clupea sapidissima*), the Gaspereau or Ale-wife (*C. mattowocca*), and the Menhaden (*C. Menhaden*). See Menhaden.

SHADDOCK (*Citrus decumana*) is a tree allied to the orange and the lemon, presumably native to the Malay and Polynesian islands, but generally cultivated throughout the tropics. The leaves are like those of the orange, but downy on the under surface, as are also the young shoots. The flowers are large and white, and are succeeded by very large globose or pear-shaped fruits like oranges, but paler in color, and with less flavor. The name Shaddock is asserted to be that of a captain who introduced the tree to the West Indies. The fruit is also known under the name of pommeloes and "forbidden fruit." There are two varieties commonly met with, one with pale and the other with red pulp.

SHADWELL, Thomas (1640–1692), a playwright and miscellaneous versifier of the Restoration period, Dryden's successor in the laureateship, is remembered now, not by his works, though he was a prolific writer of comedies highly successful in their day, but as the subject of Dryden's satirical portraits "MacFlecknoe" and "Og." He was a native of Norfolk—not an Irishman, as he retorted with significant imbecility when Dryden's satire appeared,—went through the forms of study at Cambridge and the Inner Temple, travelled abroad for a little, returned to London, cultivated the literary society of coffee-houses and taverns, and in 1668, at the age of 28, gained the ear of the stage with a comedy *The Sullen Lovers*. For fourteen years afterwards, till his memorable encounter with Dryden he continued regularly to produce a comedy nearly every year, showing considerable cleverness in caricaturing the oddities of the time. Ben Jonson was his model, but he drew his materials largely from contemporary life. He also acquired standing among the wits as a talker. In the quarrel with Dryden he was the aggressor. They had been good enough friends, and Dryden in 1679 had furnished him with a prologue for his *True Widow*. But when Dryden threw in his lot with the court, and satirized the opposition in *Absalom and Achitophel* and *The Medal*, Shadwell was rash enough to constitute himself the champion of the true-blue Protestants and wrote a grossly personal and scurrilous attack on the poet, entitled *The Medal of John Bayes*. Dryden immediately retorted in *MacFlecknoe*, the most powerful and contemptuously scornful personal satire in our language, adding the next month a few more rough touches of supercilious mockery in the second part of *Absalom and Achitophel*, where Shadwell figures as "Og":

> Og from a treason-tavern rolling home,
> Round as a globe, and liquored every chink;
> Goodly and great he sails behind his link.

Dryden may not be strictly fair when he addresses his enemy as "thou last great prophet of tautology," and makes Flecknoe extol him because "he never deviates into sense," but Shadwell had fairly earned his chastisement, the sting of which lay in its substantial truth. He survived till 1692, and on Dryden's resignation of the laureateship in 1688 was promoted to the office, a sign of the poverty of the Whig side at the time in literary men, and part of the explanation of their anxiety in the next generation to secure literary talent.

A complete edition of Shadwell's works was published in 1720, in 4 vols. 12mo. His dramatic works are—*The Sullen Lovers*, 1668; *The Royal Shepherdess*, 1669; *The Humorist*, 1671; *The Miser*, 1672; *Epsom Wells*, 1673; *Psyche*, 1675; *The Libertine*, 1676; *The Virtuoso*, 1676; *Timon of Athens*, 1678; *A True Widow*, 1679; *The Woman Captain*, 1680; *The Lancashire Witches*, 1682; *The Squire of Alsatia*, 1688; *Bury Fair*, 1689; *The Amorous Bigot*, 1690; *The Scowerers*, 1691; and *The Volunteers*, 1693.

SHAF'Í, SHAF'ÍTES. See Sunnites.

SHAFTESBURY, Anthony Ashley Cooper, First Earl of (1621–1683), was the son of Sir John Cooper of Rockbourne in Hampshire, and of Anne, the only child of Sir Anthony Ashley, Bart., and was born at Wimborne St. Giles, Dorset, on July 22, 1621.

His parents died before he was ten years of age, and he inherited extensive estates in Hampshire, Wiltshire, Dorsetshire, and Somersetshire, much reduced, however, by litigation in chancery. He lived for some time with Sir Daniel Norton, one of his trustees, at Southwick, and upon his death in 1635 with Mr. Tooker, an uncle by marriage, at Salisbury. In 1637 he went as a gentleman-commoner to Exeter College, Oxford, where he remained about a year. No record of his studies is to be found, but he has left an amusing account of his part in the wilder doings of the university life of that day, in which, in spite of his small stature, he was recognized by his fellows as their leader. At the age of eighteen, on February 25, 1639, he married Margaret, daughter of Lord Coventry, with whom he and his wife lived at Durham House in the Strand, and at Canonbury House in Islington. In March, 1640, though still a minor, he was elected for Tewkesbury, and sat in the parliament which met on April 13, but appears to have taken no active part in its proceedings. In 1640 Lord Coventry died, and Cooper then lived with his brother-in-law at Dorchester House in Covent Garden. For the Long Parliament, which met on November 3, 1640, he was elected for Downton in Wiltshire, but the return was disputed, and he did not take his seat,—his election not being declared valid until the last days of the Rump. He was present as a spectator at the setting up of the king's standard at Nottingham on August 25, 1642; and in 1643 he appeared openly on Charles's side in Dorsetshire, where he raised at his own expense a regiment of foot and a troop of horse, of both of which he took the command. He was also appointed governor of Weymouth, sheriff of Dorsetshire for the king, and president of the king's council of war in the county. In the beginning of January, 1644, however, for reasons which are variously reported by himself and Clarendon, he resigned his governorship and commissions and went over to the Parliament. He appeared on March 6 before the standing committee of the two Houses to explain his conduct, when he stated he had come over because he saw danger to the Protestant religion in the king's service, and expressed his willingness to take the Covenant. In July, 1644, he went to Dorsetshire on military service, and on August 3 received a commission as field-marshal general. He assisted at the taking of Wareham, and shortly afterwards compounded for his estates by a fine of £500 [$2430] from which, however, he was afterwards relieved by Cromwell. On October 25 he was made commander-in-chief in Dorsetshire, and in November he took by storm Abbotsbury, the house of Sir John Strangways,—an affair in which he appears to have shown considerable personal gallantry. In December he relieved Taunton. His military service terminated at the time of the Self-denying Ordinance in 1645; he had associated himself with the Presbyterian faction, and naturally enough was not included in the New Model. For the next seven or eight years he lived in comparative privacy. He was high sheriff of Wiltshire during 1647, and displayed much vigor in this office. Upon the execution of Charles, Cooper took the Engagement, and was a commissioner to administer it in Dorsetshire. On April 25, 1650, he married Lady Frances Cecil, sister of the earl of Essex, his first wife having died in the previous year leaving no family. In 1651 a son was born to him, who died in childhood, and on January 16, 1652, another son, named after himself, who was his heir. On January 17 he was named on the commission for law reform, of which Hale was the chief, and on March 17, 1653, he was pardoned of all delinquency, and thus at last made capable of sitting in parliament. He sat for Wiltshire in the Barebones parliament, of which he was a leading member, and where he zealously and prudently supported Cromwell's views against the extreme section. He was at once appointed on the council of thirty. On the resignation of this parliament he became a member of the council of state named in the "Instrument." In the first parliament elected under this "Instrument" he sat for Wiltshire, having been elected also for Poole and Tewkesbury, and was one of the commissioners for the ejection of unworthy ministers. After December 28, 1654, for reasons which it is impossible to ascertain with clearness, he left the privy council, and henceforward is found with the Presbyterians and Republicans, in opposition to Cromwell. His second wife had died during this year; in 1656 he married a third, who survived him, Margaret, daughter of Lord Spencer, niece of the earl of Southampton, and sister of the earl of Sunderland, who died at Newbury. By his three marriages he was thus connected with many of the leading politicians of Charles II.'s reign.

Cooper was again elected for Wiltshire for the parliament of 1656, but Cromwell refused to allow him, with many others of his opponents, to sit. He signed a letter of complaint, with sixty-five excluded members, to the speaker, as also a "Remonstrance" addressed to the people. In the parliament which met on January 20, 1658, he took his seat, and was active in opposition to the new constitution of the two Houses. He was also a leader of the opposition in Richard Cromwell's parliament, especially on the matter of the limitation of the power of the Protector, and against the House of Lords. He was throughout these debates celebrated for the "nervous and subtle oratory" which made him so formidable in after days: he had "his tongue well hung, and words at will."

Upon the replacing of the Rump by the army, after the breaking up of Richard's parliament, Cooper endeavored unsuccessfully to take his seat on the ground of his former disputed election for Downton. He was, however, elected on the council of state, and was the only Presbyterian in it; he was at once accused by Scot, along with Whitelocke, of corresponding with Hyde. This he solemnly denied. After the rising in Cheshire Cooper was arrested in Dorsetshire on a charge of correspondence with its leader Booth, but on the matter being investigated by the council he was unanimously acquitted. In the disputes between Lambert at the head of the military party and the Rump in union with the council of state, he supported the latter, and upon the temporary supremacy of Lambert's party worked indefatigably to restore the Rump. With Monk's commissioners he, with Haselrig, had a fruitless conference, but he assured Monk of his co-operation, and joined with eight others of the overthrown council of state in naming him commander-in-chief of the forces of England and Scotland. He was instrumental in securing the Tower for the parliament, and in obtaining the adhesion of Admiral Lawson and the fleet. Upon the restoration of the parliament on December 26, Cooper was one of the commissioners to command the army, and on January 2 was made one of the new council of state. On January 7 he took his seat on his election for Downton in 1640, and was made colonel of Fleetwood's regiment of horse. He speedily secured the admission of the secluded members, having meanwhile been in continual communication with Monk, was again one of the fresh council of state, consisting entirely of friends of the Restoration, and accepted from Monk a commission to be governor of the Isle of Wight and captain of a company of foot. He now steadily pursued the design of the Restoration, but without holding any private correspondence with the king, and only on terms similar to those proposed in 1648 to Charles I. at the Isle of Wight. In the Convention Parliament he sat for Wiltshire. Monk cut short these deliberations, and forced on the Restoration without condition. Cooper was one of the twelve commissioners who went to Charles at Breda to invite him to return. On his journey he was upset from his carriage, and the accident caused an internal abscess which was never cured.

Cooper was at once placed on the privy council, receiving also a formal pardon for former delinquencies.

His first duty was to examine the Anabaptist prisoners in the Tower. In the prolonged discussions regarding the Bill of Indemnity he was instrumental in saving the life of Haselrig, and opposed the clause compelling all officers who served under Cromwell to refund their salaries, he himself never having had any. He showed, indeed, none of the grasping and avaricious temper so common among the politicians of the time. He was one of the commissioners for conducting the trials of the regicides, but was himself vehemently "fallen upon" by Prynne for having acted with Cromwell. He was named on the council of plantations and on that of trade. In the debate abolishing the court of wards he spoke, like most landed proprietors, in favor of laying the burden on the excise instead of on the land, and on the question of the restoration of the bishops carried in the interests of the court an adjournment of the debate for three months. At the coronation, in April, 1661, Cooper had been made a peer, as Baron Ashley of Wimborne St. Giles, in express recognition of his services at the Restoration; and on the meeting of the new parliament in May he was appointed chancellor of the exchequer and under-treasurer, aided, no doubt, by his connection with Southampton. He vehemently opposed the persecuting Acts now passed,—the Corporation Act, the Uniformity Bill, against which he is said to have spoken three hundred times, and the Militia Act. He is stated also to have influenced the king in issuing his dispensing declaration of December 26, 1662, and he zealously supported a bill introduced for the purpose of confirming the declaration, rising thereby in favor and influence with Charles. He was himself the author of a treatise on tolerance. He was now recognized as one of the chief opponents of Clarendon and the High Anglican policy. On the breaking out of the Dutch War in 1664 he was made treasurer of the prizes, being accountable to the king alone for all sums received or spent. He was also one of the grantees for the province of Carolina, and took a leading part in its management; it was at his request that Locke in 1669 drew up a constitution for the new colony. In September, 1665, the king unexpectedly paid him a visit at Wimborne. He opposed unsuccessfully the appropriation proviso introduced into the supply bill as hindering the due administration of finance, and this opposition seems to have brought about a reconciliation with Clarendon. In 1668, however, he supported a bill to appoint commissioners to examine into the accounts of the Dutch War, though in the previous year he had opposed it. In accordance with his former action on all questions of religious toleration, he strongly opposed the shameful Five Mile Act of 1665. In 1667 he eagerly supported the bill for prohibiting the importation of Irish cattle on the ground that it would lead to a great fall of rents in England. Ashley was himself a large landowner, and moreover was opposed to Ormonde, who would have greatly benefited by the importation. In all other questions of this kind he shows himself far in advance of the economic fallacies of the day. His action led to an altercation with Ossory, the son of Ormonde, in which Ossory used language for which he was compelled to apologize. On the death of Southampton, Ashley was placed on the commission of the treasury, Clifford and William Coventry being his principal colleagues. He appears to have taken no part in the attempt to impeach Clarendon on a general charge of treason.

The new administration was headed by Buckingham, in whose toleration and comprehension principles Ashley shared to the full. A most able paper written by him to the king in support of these principles, on the ground especially of their advantage to trade, has been preserved. He excepts, however, from toleration Roman Catholics and Fifth Monarchy men. His attention to all trade questions was close and constant; he was a member of the council of trade and plantations appointed in 1670, and was its president from 1672 to 1676. The difficulty of the succession also occupied him, and he coöperated thus early in the design of legitimizing Monmouth as a rival to James. In the intrigues which led to the infamous treaty of Dover he had no part. That treaty contained a clause by which Charles was bound to declare himself a Catholic, and with the knowledge of this Ashley, as a stanch Protestant, could not be trusted. In order to blind him and the other Protestant members of the Cabal a sham treaty was arranged in which this clause did not appear, and it was not until a considerable while afterwards that he found out that he had been duped. Under this misunderstanding he signed the Sham Dover treaty on December 31, 1670. This treaty, however, was carefully kept from public knowledge, and Ashley did not hesitate to help Charles to hoodwink parliament by signing a similar treaty on February 2, 1672, which was then laid before them as the only one in existence. This is one of the proved dishonorable actions of his life. His approval of the attempt of the Lords to alter a money bill led to the loss of the supply to Charles and to the consequent displeasure of the king. His support of the Lord Roos Act, ascribed generally to his desire to ingratiate himself with Charles, was no doubt due in part to the fact that his son had married Lord Roos's sister. It is, too, necessary to notice that, so far from advising the "Stop of the Exchequer," he actively opposed this bad measure; the reasons which he left with the king for his opposition are extant. The responsibility rests with Clifford alone. In the other great measure of the Cabal ministry, Charles's Declaration of Indulgence, he cordially concurred. He was now rewarded by being made Earl of Shaftesbury and Baron Cooper of Pawlett by a patent dated April 23, 1672. It is stated too that he was offered, but refused, the lord treasurership. On November 17, 1672, however, he became lord chancellor, Bridgman having been compelled to resign the seat. As chancellor he issued writs for the election of thirty-six new members to fill vacancies caused during the long recess; this, though grounded upon precedent, was certainly open to the gravest suspicion as an attempt to fortify Charles, and was vehemently attacked by an angry House of Commons which met on February 4, 1673. The writs were cancelled, and the principle was established that the issuing of writs rested with the House itself. It was at the opening of parliament that Shaftesbury made his celebrated "delenda est Carthago" speech against Holland, in which he urged the Second Dutch War, on the ground of the necessity of destroying so formidable a commercial rival to England, excused the Stop of the Exchequer which he had opposed, and vindicated the Declaration of Indulgence. On March 8 he announced to parliament that the declaration had been cancelled, though he did his best to induce Charles to remain firm. For affixing the great seal to this declaration he was threatened with impeachment by the Commons. The Test Act was now brought forward, and Shaftesbury, who appears to have heard how he had been duped in 1670, warmly supported it, with the object probably of thereby getting rid of Clifford. He now began to be regarded as the chief upholder of Protestantism in the ministry; he rapidly lost favor with Charles, and on Sunday, September 9, 1673, was dismissed from the chancellorship. Among the reasons for this dismissal is probably the undoubted fact that he opposed reckless grants to the king's mistresses. He has been accused of much vanity and ostentation in his office, but his reputation for ability and integrity as a judge was high even with his enemies.

Charles soon regretted the loss of Shaftesbury, and endeavored, as did also Louis, to induce him to return, but in vain. He preferred now to become the great popular leader against all the measures of the court, and may be regarded as the intellectual chief of the opposition. At the meeting of parliament on January

8, 1674, he carried a motion for a proclamation banishing Catholics to a distance of ten miles from London. During the whole session he organized and directed the opposition in their attacks on the king's ministers. On May 19 he was dismissed the privy council and ordered to leave London. He hereupon retired to Wimborne, from whence he urged upon his parliamentary followers the necessity of securing a new parliament. He was in the House of Lords, however, in 1675, when Danby brought forward his famous Non-resisting Test Bill, and headed the opposition which was carried on for seventeen days, distinguishing himself, says Burnet, more in this session than ever he had done before. The bill was finally shelved, a prorogation having taken place in consequence of a quarrel between the two Houses supposed to have been purposely got up by Shaftesbury, in which he vigorously supported the right of the Lords to hear appeal cases, even where the defendant was a member of the Lower House. Parliament was prorogued for fifteen months until February 15, 1677, and it was determined by the opposition to attack its existence on the ground that a prorogation for more than a year was illegal. In this matter the opposition were clearly in the wrong, and by attacking the parliament discredited themselves. The immediate result was that Shaftesbury, Buckingham, Wharton, and Salisbury were sent to the Tower. In June Shaftesbury applied for a writ of *habeas corpus*, but could get no release until February 26, 1678, after his letter and three petitions to the king. Being brought before the bar of the House of Lords he at length made a complete submission as to his conduct in declaring parliament dissolved by the prorogation, and in violating the Lords' privileges by bringing a *habeas corpus* in the King's Bench.

The breaking out of the Popish Terror in 1678 marks the worst part of Shaftesbury's career. That so clear-headed a man could have really credited the extravagant lies of Oates and the other perjurers is beyond belief; and the manner in which by incessant agitation he excited the most baseless alarms, and encouraged the wildest excesses of fanatic cruelty, for nothing but party advantage, is utterly without excuse. On November 2 he opened the great attack by proposing an address declaring the necessity for the king's dismissing James from his council. Under his advice the opposition now made an alliance with Louis whereby the French king promised to help them to ruin Danby on condition that they would compel Charles, by stopping the supplies, to make peace with France, doing thus a grave injury to Protestantism abroad for the sake of a temporary party advantage at home. Upon the refusal in November of the Lords to concur in the address of the Commons requesting the removal of the queen from court, he joined in a protest against the refusal, and was foremost in all the violent acts of the session. He urged on the bill by which Catholics were prohibited from sitting in either House of Parliament, and was bitter in his expressions of disappointment when the Commons passed a proviso excepting James, against whom the bill was especially aimed, from its operation. A new parliament met on March 6, 1679. Shaftesbury had meanwhile ineffectually warned the king that unless he followed his advice there would be no peace with the people. On March 25 he made a striking speech upon the state of the nation, especially upon the dangers to Protestantism and the misgovernment of Scotland and Ireland. He was, too, suspected of doing all in his power to bring about a revolt in Scotland. By the advice of Temple, Charles now tried the experiment of forming a new privy council in which the chief members of the opposition were included, and Shaftesbury was made president, with a salary of £4000 [$19,440], being also a member of the committee for foreign affairs. He did not, however, in any way change either his opinions or his action. He vigorously opposed the compelling of Protestant Nonconformists to take the oath required of Roman Catholics. That indeed, as Ranke says, which makes him memorable in English history is that he opposed the establishment of an Anglican and Royalist organization with decisive success. The question of the succession was now again prominent, and Shaftesbury, in opposition to Halifax, committed the error which really brought about his fall, of putting forward Monmouth as his nominee, thus alienating a large number of his supporters; he encouraged, too, the belief that this was agreeable to the king. He pressed on the Exclusion Bill with all his power, and, when that and the inquiry into the payments for secret service and the trial of the five peers, for which too he had been eager, were brought to an end by a sudden prorogation, he is reported to have declared aloud that he would have the heads of those who were the king's advisers to this course. Before the prorogation, however, he saw the invaluable Act of Habeas Corpus, which he had carried through parliament, receive the royal assent. In pursuance of his patronage of Monmouth, Shaftesbury now secured for him the command of the army sent to suppress the insurrection in Scotland, which he is supposed to have fomented. In October, 1679, the circumstances which led Charles to desire to conciliate the opposition having ceased, Shaftesbury was dismissed from his presidency and from the privy council; when applied to by Sunderland to return to office he made as conditions the divorce of the queen and the exclusion of James. With nine other peers he presented a petition to the king in November, praying for the meeting of parliament, of which Charles took no notice. In April, upon the king's declaration that he was resolved to send for James from Scotland, Shaftesbury strongly advised the popular leaders at once to leave the council, and they followed his advice. In March we find him unscrupulously eager in the prosecution of the alleged Irish Catholic plot. Upon the king's illness in May he held frequent meetings of Monmouth's friends at his house to consider how best to act for the security of the Protestant religion. On June 26, accompanied by fourteen others, he presented to the grand jury of Westminster an indictment of the duke of York as a Popish recusant. In the middle of September he was seriously ill. On November 15 the Exclusion Bill, having passed the Commons, was brought up to the Lords, and a historic debate took place, in which Halifax and Shaftesbury were the leaders on opposite sides. The bill was thrown out, and Shaftesbury signed the protest against its rejection. The next day he urged upon the House the divorce of the queen. On December 7, to his lasting dishonor, he voted for the condemnation of Lord Stafford. On the 23d he again spoke vehemently for exclusion, and his speech was immediately printed. All opposition was, however, checked by the dissolution on January 18. A new parliament was called to meet at Oxford, to avoid the influences of the city of London, where Shaftesbury had taken the greatest pains to make himself popular. Shaftesbury, with fifteen other peers, at once petitioned the king that it might as usual be held in the capital. He prepared, too, instructions to be handed by constituencies to their members upon election, in which exclusion, disbanding, the limitation of the prerogative in proroguing and dissolving parliament, and security against Popery and arbitrary power were insisted on. At this parliament, which lasted but a few days, he again made a personal appeal to Charles, which was curtly rejected, to permit the legitimizing of Monmouth. The king's advisers now urged him to arrest Shaftesbury; he was seized on July 2, 1681, and committed to the Tower, the judges refusing his petition to be tried or admitted to bail. This refusal was twice repeated in September and October, the court hoping to obtain evidence sufficient to ensure his ruin. In October he wrote offering to retire to Carolina if he were released. On November 24 he was in-

dicted for high treason at the Old Bailey, the chief ground being a paper of association for the defence of the Protestant religion, which, though among his papers, was not in his handwriting; but the grand jury ignored the bill. He was released on bail on December 1. In 1682, however, Charles secured the appointment of Tory sheriffs for London; and, as the juries were chosen by the sheriffs, Shaftesbury felt that he was no longer safe from the vengeance of the court. Failing health and the disappointment of his political plans led him now into violent courses. He appears to have entered into consultation of a treasonable kind with Monmouth and others; he himself had, he declared, ten thousand brisk boys in London ready to rise at his bidding. For some weeks he was concealed in the city and in Wapping; but, finding the schemes for a rising hang fire, he determined to flee. He went to Harwich, disguised as a Presbyterian minister, and after a week's delay, during which he was in imminent risk of discovery, if indeed, as is very probable, his escape was not winked at by the Government, he sailed to Holland on November 28, 1682, and reached Amsterdam in the beginning of December. Here he was welcomed with the jest, referring to his famous speech against the Dutch, "nondum deleta Carthago." He was made a citizen of Amsterdam, but died there of gout in the stomach on January 21, 1683. His body was sent in February to Poole, in Dorset, and was buried at Wimborne St. Giles.

Few politicians have been the mark of such unsparing abuse as Shaftesbury. Dryden, while compelled to honor him as an upright judge, overwhelmed his memory with scathing, if venal, satire; and Dryden's satire has been accepted as truth by later historians. Macaulay in especial has exerted all his art, though in flagrant contradiction of probability and fact, to deepen still further the shade which rests upon his reputation. Mr. Christie, on the other hand, in possession of later sources of information, and with more honest purpose, has done much to rehabilitate him. Occasionally, however, he appears to hold a brief for the defence, and, though his picture is comparatively a true one, should be read with caution. Finally, in his monograph in the series of "English Worthies," Mr. H. D. Traill professes to hold the scales equally. He makes an interesting addition to our conception of Shaftesbury's place in English politics, by insisting on his position as the first great party leader in the modern sense, and as the founder of modern parliamentary oratory. In other respects his book is derived almost entirely from Christie. Much of Shaftesbury's career, increasingly so as it came near its close, is incapable of defence; but it has escaped his critics that his life up to the Restoration, apparently full of inconsistencies, was evidently guided by one leading principle, the determination to uphold the supremacy of parliament, a principle which, however obscured by self-interest, appears also to have underlain his whole political career. He was, too, ever the friend of religious freedom and of an enlightened policy in all trade questions. And, above all, it should not be forgotten, in justice to Shaftesbury's memory, that "during his long political career, in an age of general corruption, he was ever incorrupt, and never grasped either money or land. In the days of the Commonwealth he never obtained or sought grants of forfeited estates. In the days of the restored monarchy he never profited by the king's favor for aught beyond the legal emoluments of office, and in office or out of office spurned all and many offers of bribes from the French king." (O. A.)

SHAFTESBURY, Anthony Ashley Cooper, Third Earl of (1671–1713), was born at Exeter House in London, February 26, 1670–71. He was grandson of the first and son of the second earl. His mother was Lady Dorothy Manners, daughter of John, earl of Rutland. According to a curious story, told by the third earl himself, the marriage between his father and mother was negotiated by John Locke, who was a trusted friend of the first earl. The second Lord Shaftesbury appears to have been a poor creature, both physically and mentally,—"born a shapeless lump, like anarchy," according to what is doubtless the exaggerated metaphor of Dryden. At the early age of three his son was made over to the formal guardianship of his grandfather. Locke, who in his capacity of medical attendant to the Ashley household had already assisted in bringing the boy into the world, though not his instructor, was entrusted with the superintendence of his education. This was conducted according to the principles enunciated in Locke's *Thoughts concerning Education*, and the method of teaching Latin and Greek conversationally was pursued with such success by his instructress, Mrs. Elizabeth Birch, that at the age of eleven, it is said, young Ashley could read both languages with ease. In November, 1683, some months after the death of the first earl, his father entered him at Winchester as a warden's boarder. Being a shy, retiring boy, and being moreover constantly taunted with the opinions and fate of his grandfather, he appears to have been rendered miserable by the rough manners of his schoolfellows, and to have left Winchester, in 1686, for a course of foreign travel. By this change he was brought into direct contact with those artistic and classical associations which afterwards exercised so marked an influence on his character and opinions. On his travels he did not, we are told by the fourth earl, "greatly seek the conversation of other English young gentlemen on their travels," but rather that of their tutors, with whom he could converse on congenial topics.

In 1689, the year after the Revolution, Lord Ashley returned to England, and for nearly five years from this time he appears to have led a quiet, uneventful, and studious life. There can be no doubt that the greater part of his attention was directed to the perusal of those classical authors, and to the attempt to realize the true spirit of that classical antiquity, for which he had conceived so ardent a passion. He had no intention, however, of becoming a recluse, or of permanently holding himself aloof from public life. Accordingly, he became a candidate for the borough of Poole, and was returned May 21, 1695. He soon distinguished himself by a speech, which excited great attention at the time, in support of the Bill for Regulating Trials in Cases of Treason, one provision of which was what seems to us the obviously reasonable one that a person indicted for treason or misprision of treason should be allowed the assistance of counsel. In connection with this speech a story is told of Shaftesbury which is also told, though with less verisimilitude, of Halifax, that, being overcome by shyness, and unable to continue his speech, he simply said, before sitting down: "If I, sir, who rise only to speak my opinion on the bill now depending, am so confounded that I am unable to express the least of what I proposed to say, what must the condition of that man be who is pleading for his life without any assistance and under apprehensions of being deprived of it?" "The sudden turn of thought," says his son, the fourth earl, "pleased the House extremely, and, it is generally believed, carried a greater weight than any of the arguments which were offered in favor of the bill." But, though a Whig, alike by descent, by education, and by conviction, Ashley could by no means be depended on to give a party vote; he was always ready to support any propositions, from whatever quarter they came, that appeared to him to promote the liberty of the subject and the independence of parliament. Unfortunately, his health was so treacherous that, on the dissolution of July, 1698, he was obliged to retire from parliamentary life. He suffered much from asthma, a complaint which was aggravated by the London smoke.

Lord Ashley now retired into Holland, where he became acquainted with Le Clerc, Bayle, Benjamin Furly, the English Quaker merchant, at whose house Locke had resided during his stay at Rotterdam, and probably Limborch and the rest of the literary circle of which Locke had been a cherished and honored member nine or ten years before. To Lord Ashley this society was probably far more congenial than his

surroundings in England. Unrestrained conversation on the topics which most interested him—philosophy, politics, morals, religion—was at this time to be had in Holland with less danger and in greater abundance than in any other country in the world. To the period of this sojourn in Holland must probably be referred the surreptitious impression or publication of an imperfect edition of the *Inquiry concerning Virtue*, from a rough draught, sketched when he was only twenty years of age. This liberty was taken, during his absence, by Toland.

After an absence of over a twelvemonth, Ashley returned to England, and soon succeeded his father as earl of Shaftesbury. He took an active part, on the Whig side, in the general election of 1700–1, and again, with more success, in that of the autumn of 1701. It is said that William III. showed his appreciation of Shaftesbury's services on this latter occasion by offering him a secretaryship of state, which, however, his declining health compelled him to decline. Had the king's life continued, Shaftesbury's influence at court would probably have been considerable. After the first few weeks of Anne's reign, Shaftesbury, who had been deprived of the vice-admiralty of Dorset, returned to his retired mode of life, but his letters to Furly show that he still retained a keen interest in politics. In August, 1703, he again settled in Holland, in the air of which he seems, like Locke, to have had great faith. At Rotterdam he lived, he says in a letter to his steward Wheelock, at the rate of less than £200 [$972] a year, and yet had much "to dispose of and spend beyond convenient living." He returned to England, much improved in health, in August, 1704. But, though he had received immediate benefit from his stay abroad, symptoms of consumption were constantly alarming him, and he gradually became a confirmed invalid. His occupations were now almost exclusively literary, and from this time forward he was probably engaged in writing, completing, or revising the treatises which were afterwards included in the *Characteristics*. He still continued, however, to take a warm interest in politics, both home and foreign, and especially in the war against France, of which he was an enthusiastic supporter.

Shaftesbury was nearly forty before he married, and even then he appears to have taken this step at the urgent instigation of his friends, mainly to supply a successor to the title. The object of his choice (or rather of his second choice, for an earlier project of marriage had shortly before fallen through) was a Miss Jane Ewer, the daughter of a gentleman in Hertfordshire. The marriage took place in the autumn of 1709, and on February 9, 1710, was born at his house at Reigate, in Surrey, his only child and heir, the fourth earl, to whose manuscript accounts we are in great part indebted for the details of his father's life. The match appears to have been a happy one, though Shaftesbury neither had nor pretended to have much sentiment on the subject of married life.

With the exception of a *Preface to the Sermons of Dr. Whichcote*, one of the Cambridge Platonists or latitudinarians, published in 1698, Shaftesbury appears to have printed nothing himself till the year 1708. About this time the French prophets, as they were called, attracted much attention by the extravagances and follies of which they were guilty. Various remedies of the repressive kind were proposed, but Shaftesbury maintained that their fanaticism was best encountered by "raillery" and "good-humor." In support of this view he wrote a letter to Lord Somers, dated September, 1707, which was published anonymously in the following year, and provoked several replies. In May, 1709, he returned to the subject, and printed another letter, entitled *Sensus Communis, an Essay on the Freedom of Wit and Humor*. In the same year he also published *The Moralist, a Philosophical Rhapsody*, and in the following year *Soliloquy, or Advice to an Author*. None of these pieces seem to have been printed either with his name or his initials. In 1711 appeared the *Characteristics of Men, Manners, Opinions, Times*, in three volumes, also without any name or initials on the title-page, and without even the name of a printer. These three handsome volumes contain in addition to the four treatises already mentioned, *Miscellaneous Reflections*, now first printed, and the *Inquiry concerning Virtue or Merit*, described as "formerly printed from an imperfect copy, now corrected and published intire," and as "printed first in the year 1699."

The declining state of Shaftesbury's health rendered it necessary for him to seek a warmer climate, and in July, 1711, he set out for Italy. He settled at Naples in November, and lived there considerably over a year. His principal occupation at this time must have consisted in preparing for the press a second edition of the *Characteristics*, which appeared in 1713, soon after his death. The copy, most carefully corrected in his own handwriting, is still preserved in the British Museum. He was also engaged, during his stay at Naples, in writing the little treatise (afterwards included in the *Characteristics*) entitled *A Notion of the Historical Draught or Tablature of the Judgment of Hercules*, and the letter concerning *Design*. A little before his death he had also formed a scheme of writing a Discourse on the Arts of Painting, Sculpture, Etching, etc., but when he died he had made but little progress with it. "Medals, and pictures, and antiquities," he writes to Furly, "are our chief entertainments here." His conversation was with men of art and science, "the virtuosi of this place."

The events preceding the peace of Utrecht, which he regarded as preparing the way for a base desertion of our allies, greatly troubled the last months of Shaftesbury's life. He did not, however, live to see the actual conclusion of the treaty (March 31, 1713), as he died the month before, February 4, 1712, O.S. At the time of his death he had not yet completed his forty-second year. His body was brought back by sea to England and buried at St. Giles's, the family seat in Dorsetshire. Though he died so long ago, and was one of the earliest of the English moralists, his descendant, the celebrated philanthropist, who died so recently as 1885, was only his great-grandson.

Shaftesbury's amiability of character seems to have been one of his principal characteristics. All accounts concur in representing him as full of sweetness and kindliness towards others, though he may sometimes himself have been the victim of melancholy and despondency. Like Locke he had a peculiar pleasure in bringing forward young men. Among these may be especially mentioned Michael Ainsworth, a native of Wimborne St. Giles, the young man who was the recipient of the *Letters* addressed to a student at the university, and who was maintained by him at University College, Oxford. The keen interest which Shaftesbury took in his studies, and the desire that he should be specially fitted for the profession which he had selected, that of a clergyman of the Church of England, are marked features of the letters. Other protegés were Crell, a young Pole, the two young Furlys, and Harry Wilkinson, a boy who was sent into Furly's office at Rotterdam, and to whom several of the letters still extant in the Record Office are addressed.

In the popular mind, Shaftesbury is generally regarded as a writer hostile to religion. But, however short his orthodoxy might fall if tried by the standards of any particular church, his temperament was preëminently a religious one. This fact is shown conspicuously in his letters, where he had no reason for making any secret of his opinions. The belief in a God, all-wise, all-just, and all-merciful, governing the world providentially for the best, pervades all his works, his correspondence, and his life. Nor had he any wish to undermine established beliefs, except where he conceived that they conflicted with a truer religion and a purer morality.

To the public ordinances of the church he scrupulously conformed. But unfortunately, there were many things both in the teaching and the practice of the ecclesiastics of that day which were calculated to repel men of sober judgment and high principle. These evil tendencies in the popular presentation of Christianity undoubtedly begot in Shaftesbury's mind a certain amount of repugnance and contempt to some of the doctrines of Christianity itself; and, cultivating, almost of set purpose, his sense of the ridiculous, he was too apt to assume towards such doctrines and their teachers a tone of raillery and banter, which sometimes even approaches grimace.

But, whatever might be Shaftesbury's speculative opinions or his mode of expressing them, all witnesses concur in bearing testimony to the elevation and purity of his life and aims. Molesworth, who had no special reason for flattering him, speaks of him as "possessing right reason in a more eminent degree than the rest of mankind," and of his character as "the highest that the perfection of human nature is capable of." Even Warburton, in his dedication of the *Divine Legation* to the free-thinkers, is compelled to "own that this lord had many excellent qualities, both as a man and a writer. He was temperate, chaste, honest, and a lover of his country."

As an earnest student, an ardent lover of liberty, an enthusiast in the cause of virtue, and a man of unblemished life and untiring beneficence, Shaftesbury probably had no superior in his generation. His character and pursuits are the more remarkable considering the rank of life in which he was born and the circumstances under which he was brought up. In many respects he reminds us of the imperial philosopher Marcus Aurelius, whose works we know him to have studied with avidity, and whose influence is unmistakably stamped upon his own productions.

Most of Shaftesbury's writings have been already mentioned. In addition to these there have been published fourteen letters from Shaftesbury to Molesworth, edited by Toland in 1721; some letters to Benjamin Furly, his sons, and his clerk Harry Wilkinson, included in a volume entitled *Original Letters of Locke, Sidney, and Shaftesbury*, which was published by Mr. T. Forster in 1830, and again in an enlarged form in 1847; three letters, written respectively to Stringer, Lord Oxford, and Lord Godolphin, which appeared, for the first time, in the *General Dictionary;* and lastly a letter to Le Clerc, in his recollections of Locke, first published in *Notes and Queries*, Feb. 8, 1851. The *Letters to a Young Man at the University* [Michael Ainsworth], already mentioned, were first published in 1716, it being uncertain by whom. The Letter on Design was first published in the edition of the *Characteristics* issued in 1732. Besides the published writings, there are still to be found several memoranda, letters, rough drafts, etc., in the Shaftesbury papers in the Record Office.

Shaftesbury, it is plain, took great pains in the elaboration of his style, and he succeeded so far as to make his meaning transparent. The thought is always clear. But, on the other hand, he did not equally succeed in attaining elegance, an object at which he seems equally to have aimed. There is a curious affectation about his style,—a falsetto note,—which, notwithstanding all his efforts to please, is often irritating to the reader. Its main characteristic is perhaps best hit off by Charles Lamb when he calls it "genteel." He poses too much as a fine gentleman, and is so anxious not to be taken for a pedant of the vulgar scholastic kind that he falls into the hardly more attractive pedantry of the æsthete and *virtuoso*. But, notwithstanding these defects, he possesses the great merits of being easily read and easily understood. Hence, probably, the wide popularity which his works enjoyed in the last century; and hence, undoubtedly, the agreeable feeling with which, notwithstanding all their false taste and their tiresome digressions, they still impress the modern reader.

It is mainly as a moralist that Shaftesbury has a claim to a place in the history of literature and philosophy. Like most of the ethical writers of his time his first impulse to speculation, or at least to publication, seems to have been derived from a desire to combat the still fashionable paradoxes of Hobbes, and to arrest the progress of doctrines at which society still continued to be seriously alarmed. Hence it became his main concern to assert the reality and independence of our benevolent affections, and to show that these and the acts which result from them are what mainly elicit the feeling of moral approbation. This work he appears to have conceived it his special mission to undertake, not as a "pedant" or a "Schoolman," but as a "man of taste." It was probably in accordance with this conception that he refrained from using the language about the "laws of nature" which had hitherto been current in ethical treatises, and that he preferred to represent morality as a matter of "taste," "sentiment," or "affection," rather than as dictated simply by reason.

The leading ideas in Shaftesbury's ethical theory are those of a system, or the relation of parts to a whole, benevolence, moral beauty, and a moral sense.

The individual man himself is a system consisting of various appetites, passions, and affections, all united under the supreme control of reason. Of this system the parts are so nicely adjusted to each other that any disarrangement or disproportion, however slight, may mar and disfigure the whole. "Whoever is in the least versed in this moral kind of architecture will find the inward fabric so adjusted, and the whole so nicely built, that the barely extending of a single passion a little too far, or the continuance of it too long, is able to bring irrecoverable ruin and misery."

But morality and human nature cannot be adequately studied in the system of the individual man. There are parts in that system, both mental and bodily, which have an evident respect to something outside it. Neither man nor any other animal, though ever so complete a system of parts as to all within, can be allowed in the same manner complete as to all without; he must be considered as having a further relation abroad to the system of his kind. So even this system of his kind to the animal system; this to the world (our earth); and this again to the bigger world and to the universe. No being can properly be called good or ill except in reference to the systems of which he is a part. "When, in general, all the affections or passions are suited to the public good or end of the species, then is the natural temper entirely good. If, on the contrary, any requisite passion be wanting, or if there be one supernumerary or weak, or anywise disserviceable or contrary to that main end, then is the natural temper, and consequently the creature himself, in some measure corrupt and ill." Hence it follows that benevolence, if not the sole, is at least the principal moral virtue.

The idea of a moral and social system, the parts of which are in a constant proportion to each other, and so nicely adjusted that the slightest disarrangement would mar the unity of design, almost necessarily suggests an analogy between morality and art. As the beauty of an external object consists in a certain proportion between its parts, or in a certain harmony of coloring, so the beauty of a virtuous character consists in a certain proportion between the various affections, or in a certain harmonious blending of the various springs of action as they contribute to promote the great ends of our being. And similarly, we may suppose, the beauty of a virtuous action would be explained as consisting in its relation to the virtuous character in which it has its source, or to the other acts of a virtuous life, or to the general condition of a virtuous state of society. This analogy between art and morality, or, as it may otherwise be expressed, between the beauty of external objects and the beauty of actions or characters, is never long absent from Shaftesbury's mind. Closely connected with it is the idea that morals, no less than art, is a matter of taste or relish.

This idea leads us to the last of the distinctive features in Shaftesbury's ethical philosophy. The faculty which approves of right and disapproves of wrong actions is with him a sense, and more than once he anticipates Hutcheson by calling it a "moral sense," an expression, indeed, which he may be said to have contributed to the English language. This "sense of right and wrong" is "as natural to us as natural affection itself," and "a first principle in our constitution and make." At the same time it includes a certain amount of judgment or reflection, that is to say, a rational element. Shaftesbury's doctrine on this head may, perhaps, briefly be summed up as follows: Each man has from the first a natural sense of right and wrong, a "moral sense" or "conscience" (all which expressions he employs as synonymous). This sense is, in its natural condition, wholly or mainly emotional, but, as it admits of constant education and improvement, the rational or reflective element in it gradually becomes more prominent. Its decisions are generally described as if they were immediate, and, beyond the occasional recognition of a rational as well as an emotional element, little or no attempt is made to analyze it. It was reserved for Hume properly to discriminate between these two elements, and to point out that, while the feeling of moral approbation or disapproba-

tion is instantaneous, the moral judgment which precedes it is often the result of an intellectual process of considerable length and perplexity.

It may be sufficient to supplement this brief survey of Shaftesbury's system by a still briefer summary of the answers, so far as they can be collected from his works, which he would have given to the principal questions of ethics as they are now usually propounded. His answers to these questions are, as it appears to the present writer, that our moral ideas—the distinctions of virtue and vice, right and wrong—are to be found in the very make and constitution of our nature; that morality is independent of theology, actions being denominated good or just, not by the arbitrary will of God (as had recently been maintained by Locke), but in virtue of some quality existing in themselves; that the ultimate test of a right action is its tendency to promote the general welfare; that we have a peculiar organ, the moral sense, analogous to taste in art, by which we discriminate between characters and actions as good or bad; that the higher natures among mankind are impelled to right action, and deterred from wrong action, partly by the moral sense, partly by the love and reverence of a just and good God, while the lower natures are mainly influenced by the opinions of others, or by the hope of reward and the fear of punishment; that appetite and reason both concur in the determination of action; lastly, that the question whether the will does or does not possess any freedom of choice, irrespectively of character and motives, is one (at least so we may gather from Shaftesbury's reticence) which it does not concern the moralist to solve.

The close resemblance of Hutcheson's speculations to those of Shaftesbury, amounting sometimes to identity, will be apparent on reference to the account of that philosopher (vol. xii. pp. 423–7). Next to Hobbes, the moralist with whose views Shaftesbury's stand in most direct antagonism is Locke, who not only maintained that moral distinctions depend solely on the arbitrary will of God, but that the sanctions by which they are mainly enforced are the hope of future reward and the fear of future punishment. "By the fault is the rod, and with the transgression a fire ready to punish it." Shaftesbury's was in reality, though perhaps not in appearance, a more truly religious philosophy. For with him the incentives to well-doing and the deterrents from evil doing are to be sought not solely, or even mainly, in the opinion of mankind, or in the rewards and punishments of the magistrate, or in the hopes and terrors of a future world, but in the answer of a good conscience approving virtue and disapproving vice, and in the love of a God, who, by His infinite wisdom and His all-embracing beneficence, is worthy of the love and admiration of His creatures.

The main object of the *Moralists* is to propound a system of natural theology, and to vindicate, so far as natural religion is concerned, the ways of God to man. The articles of Shaftesbury's religious creed were few and simple, but these he entertained with a conviction amounting to enthusiasm. They may briefly be summed up as a belief in one God whose most characteristic attribute is universal benevolence, in the moral government of the universe, and in a future state of man making up for the imperfections and repairing the inequalities of the present life. Shaftesbury is emphatically an optimist, but there is a passage in the *Moralists* (pt. ii. sec. 4) which would lead us to suppose that he regarded matter as an indifferent principle, co-existent and co-eternal with God, limiting His operations, and the cause of the evil and imperfection which, notwithstanding the benevolence of the Creator, is still to be found in His work. If this view of his optimism be correct, Shaftesbury, as Mill says of Leibnitz, must be regarded as maintaining, not that this is the best of all imaginable but only of all possible worlds. This brief notice of Shaftesbury's scheme of natural religion would be conspicuously imperfect unless it were added that it is popularized in Pope's *Essay on Man*, several lines of which, especially of the first epistle, are simply statements from the *Moralists* done into verse. Whether, however, these were taken immediately by Pope from Shaftesbury, or whether they came to him through the papers which Bolingbroke had prepared for his use, we have no means of determining.

Shaftesbury's philosophical activity was confined to ethics, æsthetics, and religion. For metaphysics, properly so called, and even psychology, except so far as it afforded a basis for ethics, he evidently had no taste. Logic he probably despised as merely an instrument of pedants,—a judgment for which, in his day, and especially at the universities, there was only too much ground.

The influence of Shaftesbury's writings was very considerable both at home and abroad. His ethical system was reproduced, though in a more precise and philosophical form, by Hutcheson, and from him descended, with certain variations, to Hume and Adam Smith. Nor was it without its effect even on the speculations of Butler. Of the so-called deists Shaftesbury was probably the most important, as he was certainly the most plausible and the most respectable. No sooner had the *Characteristics* appeared than they were welcomed, in terms of warm commendation, by Le Clerc and Leibnitz. In 1745 Diderot adapted or reproduced the *Inquiry concerning Virtue* in what was afterwards known as his *Essai sur le Mérite et la Vertu*. In 1769 a French translation of the whole of Shaftesbury's works, including the *Letters*, was published at Geneva. Translations of separate treatises into German began to be made in 1738, and in 1776–1779 there appeared a complete German translation of the *Characteristics*. Hermann Hettner says that not only Leibnitz, Voltaire, and Diderot, but Lessing, Mendelssohn, Wieland, and Herder, drew the most stimulating nutriment from Shaftesbury. "His charms," he adds, "are ever fresh. A new-born Hellenism, or divine cultus of beauty presented itself before his inspired soul." Herder is especially eulogistic. In the *Adrastea* he pronounces the *Moralists* to be a composition in form well-nigh worthy of Grecian antiquity, and in its contents almost superior to it. The interest felt by German literary men in Shaftesbury has been recently revived by the publication of two excellent monographs, one dealing with him mainly from the theological side by Dr. Gideon Spicker (Freiburg in Baden, 1872), the other dealing with him mainly from the philosophical side by Dr. Georg von Gizycki (Leipsic, 1876).

In the foregoing article the writer has made free use of his monograph on Shaftesbury and Hutcheson in the series of "English philosophers" (1880), published by Sampson Low & Co. In that work he was able largely to supplement the printed materials for the Life by extracts from the Shaftesbury papers now deposited in the Record Office. These include, besides many letters and memoranda, two lives of him, composed by his son, the fourth earl, one of which is evidently the original, though it is by no means always closely followed, of the Life contributed by Dr. Birch to the *General Dictionary*. For a description and criticism of Shaftesbury's philosophy reference may also be made to Mackintosh's *Progress of Ethical Philosophy*, Whewell's *History of Moral Philosophy in England*, Jouffry's *Introduction to Ethics* (Channing's translation), Leslie Stephen's *English Thought in the Eighteenth Century*, Martineau's *Types of Ethical Theory*, and the article Ethics in the present work (vol. viii. pp. 527–528). For his relation to the religious and theological controversies of his day, see, in addition to some of the above works, Leland's *View of the Principal Deistical Writers*, Lechler's *Geschichte des Englischen Deismus*, Hunt's *Religious Thought in England*, Abbey and Overton's *English Church in the Eighteenth Century*, and A. S. Farrar's Bampton Lectures. (T. F.)

SHAFTESBURY, Anthony Ashley Cooper, Seventh Earl of (1801–1885), was the son of Cropley, sixth earl, and Anne, daughter of the third duke of Marlborough, and was born 28th April, 1801. He was educated at Harrow and Christ Church, Oxford, where he obtained a first class in classics in 1822, and graduated M.A. in 1832. In 1841 he received from his university the degree of D.C.L. He entered parliament as member for the pocket borough of Woodstock in 1826; in 1830 he was returned for Dorchester; from 1831 till February, 1846, he represented the county of Dorset; and he was member for Bath from 1847 till (having previously borne the courtesy title Lord Ashley) he succeeded his father as earl in 1851. Although giving a general support to the Conservatives, his parliamentary conduct was greatly modified by his intense interest in the improvement of the social condition of the working classes, his efforts in behalf of whom have made his name a household word. He opposed the Reform Bill of 1832, but was a supporter of Catholic emancipation, and his objection to the continuance of resistance to the abolition of the Corn Laws led him to resign his seat for Dorset in 1846. In parliament his name, more than any other, is associated with the factory legislation (see Factory Acts, vol. viii. p. 740). He was a lord of the admiralty under Sir Robert Peel (1834–35), but on being invited to join Peel's administration in 1841 refused, having been unable to obtain Peel's support for the Ten Hours' Bill. Chiefly by his persistent efforts a Ten Hours' Bill was carried in 1847, but its operation was impeded by legal difficulties, which were only removed by successive Acts, instigated chiefly by him, until legislation reached a final stage in the Factory Act of 1874. The part which he took in the legislation bearing on coal mines was equally prominent. It is worthy of notice that his efforts in behalf of the practical welfare of the

working classes were guided by his own personal knowledge of their circumstances and wants. Thus in 1846 he took advantage of his leisure after the resignation of his seat for Dorset to explore the slums of the metropolis, and by the information he obtained not only gave a new impulse to the movement for the establishment of ragged schools, but was able to make it more widely beneficial. For over forty years he was president of the Ragged School Union. He was also one of the principal founders of reformatory and refuge unions, young men's Christian associations, and working men's institutes. He took an active interest in foreign missions, and was president of several of the most important philanthropic and religious societies of London. He died 1st October, 1885. By his marriage to Lady Emily, daughter of the fifth Earl Cowper, he left a large family, and was succeeded by his eldest son Anthony, who committed suicide shortly afterwards.

SHAGREEN. See LEATHER, vol. xiv. pp. 390–1, and SHARK.

SHÁHÁBÁD, a British district in the Patna division of the lieutenant-governorship of Bengal, India, between 24° 31′ and 25° 43′ N. lat. and between 83° 23′ and 84° 55′ E. long., with an area of 4365 square miles. It is bounded on the N. by the district of Ghazipur in the Northwestern Provinces and by Saran, on the E. by Patna and Gayá districts, on the S. by Lohardaga, and on the W. by Mirzapur, Benares, and Ghazipur districts of the Northwestern Provinces. About three-fourths of the whole area lying to the north is an alluvial flat, wholly under cultivation, and fairly planted with mangoes, bamboos, and other trees; while the southern portion of the district is occupied by the Kaimur Hills, a branch of the great Vindhyan range, and is a densely wooded tract. The chief rivers are the Ganges and the Son, which unite in the northeastern corner of Sháhábád. A series of canals on the Son are reported to have secured for the district immunity from future famine. In the southern portion of the district large game abounds, including the tiger, bear, leopard, and several varieties of deer; and among other animals met with are the wild boar, hyena, jackal, and fox. The nylghau is seen on the Kaimur Hills. The climate is very sultry, and the rains heavy. The East Indian Railway traverses the north of the district for 60 miles, and the aggregate length of road is about 1000 miles.

The census of 1881 disclosed a population of 1,964,909 (males 950,250, females 1,014,659); Hindus numbered 1,817,881, Mohammedans 146,732, and Christians 274. Four towns contain a population exceeding 10,000, viz., Arrah 42,998, Dumraon 17,429, Baxar 16,498, and Jagdispur 12,568. The administrative headquarters of the district are at Arrah. The chief staple of Shábábád is rice, which produces three crops during the year; wheat, barley, maize, cereals, and various other plants are also grown. The principal manufactures of the district are sugar, paper, saltpetre, blankets, coarse cotton cloth, and brass utensils. Its trade is chiefly carried on by means of permanent markets in the town and at fairs. The principal exports are rice, wheat, barley, pulses, grain, oats, linseed, caraway seed, paper, and spices; imports consist of cleaned rice, betel-nut, tobacco, sugar, molasses, salt, pepper, cotton, iron, brass, zinc, copper, lead, tin, and betel-leaf. The revenue of Sháhábád district in 1883–84 amounted to £253,542, of which the land yielded £171,263. The southern part of the district was ceded to the British by Shah Alum, emperor of Delhi in 1765, and the northern part by Azuf-ud-Dowlah, vizier of Oudh, ten years later.

SHÁH JAHÁN, Mogul emperor from 1627 to 1658. See INDIA, vol. xii. p. 834.

SHÁHJAHÁNPUR, the easternmost district of the Rohilkhand division in the lieutenant-governorship of the Northwestern Provinces of British India, lying between 27° 36′ and 28° 29′ N. lat. and between 79° 23′ and 80° 26′ E. long. It has an area of 1746 square miles, and is bounded on the N. and N.W. by Pilibhit, on the E. by Hardoi and Kheri, on the S. by the Ganges, separating it from Farukhabad, and on the W. by Budaun and Bareilly. The district consists of a long and narrow tract running up from the Ganges towards the Himalayas, and is for the most part level and without any hills or considerable undulations. The principal rivers are the Gumti, Khanaut, Garái, and Rámganga. The last-named is the main waterway of the district, and is navigable as far as Kola Ghat near Jalálábád, whence grain is shipped for the Ganges ports. To the northeast beyond Gumti the country resembles the *tarai* in the preponderance of waste and forest over cultivated land, in the sparseness of population, and in general unhealthiness. Between the Gumti and the Khanaut the country varies from a rather wild and unhealthy northern region to a densely inhabited tract in the south, with a productive soil well cultivated with sugar-cane and other remunerative crops. The section between the Deoha and Garái comprises much marshy land; but south of the Garái, and between it and the Rámganga, the soil is mostly of a sandy nature. From Rámganga to the Ganges in the south is a continuous low country of marshy patches alternating with a hard clayey soil requiring much irrigation in parts. Sháhjahánpur contains a number of jhils or lakes, which afford irrigation for the spring crops in their neighborhood. The Oudh and Rohilkhand Railway traverses the district a distance of 39 miles. The climate of the district is very similar to that of most parts of Oudh and Rohilkhand, but moister than that of the Doab. Except in May and June, the country has a fresh and green appearance. Its average annual rainfall is about 38 inches.

In 1881 the population of Sháhjahánpur numbered 856,946 (males 460,064, females 396,882), of whom 735,244 were Hindus and 120,214 were Mohammedans. The district contains only two towns with a population exceeding 10,000, viz., SHÁHJAHÁNPUR (*q.v.*) and Tilhar (15,351). Of the total area of 1746 square miles 1090 were under cultivation in 1883–84, and 464 were returned as cultivable. The chief agricultural products are wheat and gram in spring, and in the autumn sugar-cane, rice, joar, and bajra, and several kinds of pulses. Exports are chiefly sugar, grain of all kinds, pulses, indigo, cotton, and timber, and the imports are mainly European goods, metals, and salt. The gross revenue raised in the district in 1883–84 amounted to £186,162 [$904,747.32], of which the land contributed £118,638 [$576,580.68]. The only manufactures of any importance under European supervision are those of sugar and rum and of indigo. Sháhjahánpur was ceded to the English by treaty in 1801. During the mutiny of 1857 it became the scene of open rebellion. The Europeans were attacked when in church; three were shot down, but the remainder, aided by a hundred faithful sepoys, escaped. The force under Lord Clyde put a stop to the anarchy in April, 1858, and shortly afterwards peace and authority were restored.

SHÁHJAHÁNPUR, municipal town and administrative headquarters of the above district, lies in 27° 53′ 41″ N. lat. and 79° 57′ 30″ E. long., on the left bank of the Deoha. It is a large place, with some stately old mosques and a castle now in ruins. The city was founded in 1647 during the reign of Sháh Jahán, whose name it bears, by Nawáb Bahádur Khán, a Pathán. It has a considerable export trade in cereals, pulses, and sugar. In 1881 the population was 74,830 (36,840 males, and 37,990 females).

SHÁHPUR, the southernmost district of the Rawal Pindi division in the lieutenant-governorship of the Punjab, India, between 31° 32′ and 32° 42′ N. lat. and between 71° 37′ and 73° 24′ E. long., with an area of 4691 square miles. The district is bounded on the N. by the Jhelum district, on the E. by Gujrát and the Chenab, on the S. by Jhang, and on the W. and N.W. by Dera Ismail Khan and Bannu. On both sides of the Jhelum stretch wide upland plains, utterly barren or covered only with brushwood; a considerable portion of this area, however, is composed of good soil, only requiring irrigation to make it productive. The most important physical subdivisions of the district are the Salt range in the north, the valleys of the Chenáb and Jhelum, and the plains between those

rivers and between the Jhelum and the Salt range. The characteristics of these two plains are widely different: the desert portion of the southern plain is termed the *bar;* the corresponding tract north of the Jhelum is known as the *thal.* That part of Sháhpur to the north of the Jhelum is by far the most interesting, containing as it does such varieties of scenery and climate, such contrasts of soil, vegetation, and natural capabilities. Communications are carried on by well-made roads, by the Jhelum, which is navigable for country craft throughout its course within the district, and by 52 miles of the Salt branch of the Punjab Northern State Railway. The climate of the plains is hot and dry, but in the Salt range it is much cooler; the average annual rainfall is about 15 inches. Tigers, leopards, and wolves are found in the Salt range, while small game and antelope abound among the thick jungle of the *bar.*

The census of 1881 disclosed a population of 421,508 (males 221,676, females 199,832); of these 59,026 were Hindus and 357,742 were Mohammedans. The only town in the district with more than 10,000 inhabitants is Bhera, with 15,165; but the administrative headquarters of the district are at the small town of Shahpur on the Jhelum river, the population of which in 1881 was 5424. Of the total area only 871 square miles were under cultivation in 1883–84, and 3053 square miles were returned as cultivable. Wheat is the chief staple, and covers nearly a half of the cultivated area; bajra and cotton are the next most extensively grown crops; among other crops are sugar-cane and opium. The commercial importance of the district depends almost entirely upon its connection with the Salt range, salt being found throughout these hills. The revenue derived from this product, however, though collected in the Shahpur district, cannot properly be credited to it, as the mineral, though abundant in the Shahpur portion of the range, is worked chiefly in that part of it which lies in the Jhelum district. The chief exports are grain, rice, cotton, wool, *ghi,* and saltpetre; the imports sugar, English piece-goods, and metals. Its manufactures consist of silk and cotton scarfs, toys, and felt and blankets. The gross revenue in 1883–84 amounted to £55,290 [$268,709.40], of which the land contributed £39,020 [$189,637.20].

Shahpur passed into the hands of the English along with the rest of the Punjab on the suppression of the Múltan rebellion in 1849. During the mutiny of 1857 the district remained tranquil, and though the villages of the *bar* gave cause for alarm no outbreak of sepoys occurred. Since annexation the limits and constitution of the district have undergone many changes.

SHAHRASTÁNÍ (1086–1153). Abu'l-Fath Mohammed ibn 'Abd al-Karím, called al-Shahrastání, a native of Shahrastán (Shehristán) in Khorásán, Persia, was noted as a jurisconsult and theologian of the Ash'arite school. He went to Baghdad in 1116 and stayed there three years, but afterwards returned to his native place, where he died. Sam'ání, the famous historian of Baghdad, was one of his hearers, and to him Ibn Khallikán (No. 622, Eng. tr. ii. 675 *sq.*) mainly owes the little that is known of Shahrastání's life.

He wrote various works, of which several still exist; that which gives him a claim to notice here is the interesting *Kitáb al-Milal wan-Nihal,* or "Account of Religious Sects and Philosophical Schools," published by Cureton in 1846 and translated into German by Haarbrücker (Halle, 1850–51). The book was already used by Pocock for his account of the ancient Arabs and has been much referred to since, but has to be read with caution, as the author is often very uncritical. It treats successively of the Mohammedan sects, of other religious bodies (Jews, Samaritans, Christians, Magians, Manichæans, etc.), of philosophical schools (including the Greeks), and of the ancient Arabs and Indians, and contains a great deal of curious and valuable matter.

SHAIRP, John Campbell (1819–1885), principal of the United College, St. Andrews, and professor of poetry at Oxford, was born at Houstoun House, Linlithgowshire, on July 30, 1819. He was the third son of Major Norman Shairp of Houstoun and E. Binning, daughter of J. Campbell of Kildaloig, Argyllshire. He was educated at Edinburgh Academy and Glasgow University, where he gained the Snell exhibition, and entered at Balliol College, Oxford, in 1840. While a student at Glasgow and an undergraduate at Oxford it was his privilege to make many warm friends and to be very widely loved. At Glasgow began his lifelong friendship with Dr. Norman M'Leod, while among those with whom he was most intimate at Oxford were the names of Bradley, Coleridge, Temple, Clough, Walrond, Riddell, Prichard, and Edwin Palmer. In 1842 he gained the Newdigate prize for a poem on Charles XII., and in 1844 took his degree with second class honors. During these years the "Oxford movement" was at its height. Shairp's earnest nature was greatly stirred by Newman's sermons, while Keble's poetry spoke home to his heart; but, though full of warm sympathy for many High Church views, he remained faithful to his Presbyterian upbringing. After leaving Oxford he took a mastership at Rugby under Dr. Tait; here he sought loyally to develop Dr. Arnold's system by appealing to the better feelings of his pupils and by giving them wide views of culture and education. And in this he was successful, making among his pupils warm and lasting friends. In 1857 he became assistant to the professor of humanity in the university of St. Andrews, and in 1861 he was appointed professor of that chair. In 1853 he married Eliza, daughter of Henry Alexander Douglas, Kilhead, Dumfriesshire, and had one surviving son, John Campbell, who became an advocate at the Scottish bar. Shairp was highly respected by the more earnest students, and much loved by some whose spiritual as well as mental nature he helped to quicken. In 1864 he published *Kilmahoe, a Highland Pastoral;* in this his devotion to the scenery and the people of the Scottish Highlands, where he always spent his vacations, found vent. In this poem there was a directness, simplicity, and moral earnestness which showed the true poet. In 1868 he republished some articles under the name of *Studies in Poetry and Philosophy;* this book showed him to be one of the foremost critics of his day; the chief subjects it discussed were Wordsworth, Coleridge, and Keble. He insisted strongly on the high spiritual teaching and the deep poetical power of the great lake bard. While not blind to his many faults of style, his occasional puerility, and his prosiness, he urged his claims as a unique interpreter of Nature and a spiritual philosopher. Coleridge interested him as a poet, but much more as a religious teacher; the *Aids to Reflection* was a favorite present to his young friends, and often gave a text for his deeper conversations. The most popular essay was that on Keble, in which he gave a vivid sketch of Newman's influence in Oxford, while he spoke of the author of *The Christian Year* with enthusiasm as a Christian teacher, and with discerning criticism as a poet. In 1868 he was presented to the principalship of the United College, vacant by the death of J. D. Forbes; he discharged the duties of this office with conscientious zeal and interest, and also continued to lecture from time to time on literary and ethical subjects. A course of the lectures, published in 1870, *Culture and Religion,* is one of his most popular works. In 1873 he helped to edit the life of Principal Forbes, and in 1874 he edited Dorothy Wordsworth's charming *Recollections of a Tour in Scotland in* 1803. In 1877 he was elected professor of poetry at Oxford in succession to Sir F. H. Doyle. Of his lectures from this chair the best were published in 1880 as *Aspects of Poetry.* In 1877 he had published *The Poetic Interpretation of Nature,* in which he enters fully into the "old quarrel," as Plato calls it, between science and poetry, and traces with great clearness and literary acumen the ideas of nature in all the chief Hebrew, classical, and English poets. In 1879 he published a short life of Robert Burns. Such were Shairp's chief literary works, though many uncollected magazine articles and a few poems show the versatility of his mind; attention may be specially called to his article Keble in this *Encyclopædia* as an example of his critical power. In 1882 he was re-

elected to the poetry chair and discharged his duties there and at St. Andrews till the end of 1884; but his health had been frail for some time, and in March, 1885, he sought a change of air in the Riviera. He returned in June somewhat benefited, but he caught a chill in the autumn, and, after a short illness, died at Ormsary, Argyllshire, on September 18, 1885.

SHAKERS is the name commonly applied to and not rejected by a religious denomination of which the official title is "The United Society of Believers in Christ's Second Appearing." The foundress was Ann Lee, who was born in Toad Lane, Manchester, 29th February, 1736, but only privately baptized 1st June, 1742. Her father was a blacksmith, and at an early age she found employment, being at one time a cutter of hatter's fur, and at another cook in the infirmary of her native town. She was a quiet child of a somewhat visionary temperament, and in 1758 joined a small religious body, a remnant of the French Prophets. The leader was Jane Wardley, who was regarded by her followers as the "spirit of John the Baptist operating in the female line." These people were called Shakers because, like the early Quakers, they were seized with violent tremblings and shakings when under the influence of strong religious emotion. Ann Lee in 1762 married a blacksmith whose character was not very good. Their four children died in infancy. She became "a seeker after salvation," and her conversion was followed by her taking the lead in the Shaker Society, to which she promulgated a doctrine of celibacy. Their previous training had led them to expect that the second coming of Christ would be in the form of a woman; as Eve was the mother of all living, so in their new leader the Shakers recognized "the first mother or spiritual parent in the line of the female." With their new-born zeal aflame, they preached their doctrine in season and out of season, and suffered something from mob violence and from the intolerance of the constituted authorities. In 1774 Ann the Word and eight of her disciples emigrated to America, and landed at New York on August 6th of that year. Abraham Stanley, not relishing his wife's celibate creed, abandoned her for another woman. The "Believers" settled at Niskayuna, now called Watervliet, and were imprisoned for refusing to take the oath, for which reason they were suspected of being unfavorable to the cause of the Revolution. On being released they preached their creed and gradually gained converts. Ann Lee died at Watervliet, 8th September, 1780.[1] She was succeeded by James Whittaker, who died in 1788, when Joseph Meacham succeeded to the leadership and organized the society on that communistic basis which now distinguishes it. In the early history of the Shakers various charges were brought against them, including flagellation and naked dancing, but they have outlived these scandals and are now generally respected. There is an interesting sketch of a Shaker community in Howells's *Undiscovered Country*. They all work; they are capital agriculturists; they have a widespread reputation for thoroughness, frugality, and temperance. They believe in the reality of constant intercourse with the world of spirits. There are "poems" by Mother Ann which it is claimed have been dictated by her from the spirit world. They claim from time to time the exercise of the gift of tongues and the gift of healing. The theological ideas of the Shakers are set forth in the *Testimony of Christ's Second Appearing exemplified by the Principle and Practice of the True Church of Christ*, of which a fourth edition, printed in 1856, was extensively circulated. A compacter statement is that in F. W. Evans's *Shakers' Compendium*, which was printed at New Lebanon in 1859. Elder Evans, who is the best-known representative of Shakerism, is of English birth, and has published an autobiography. In 1870 there were eighteen distinct Shaker communities, with eighteen church buildings capable of seating 8850 persons, and possessing property valued at $86,900.[2] These socialist villages are in Connecticut, Kentucky, Maine, Massachusetts, New York, New Hampshire, and Ohio.

The best known of the settlements is that at New Lebanon, where there are three separate societies in view of each other. The North Family, the Church Family, and the Second Family are distinct groups, whose members live together and have a common right to land, house, hats, tools, books, and all that there is. The only form of government is that supplied by the public opinion of the community, as expressed in its social meetings for mutual confession, counsel, and criticism. Mr. Hepworth Dixon's *New America* gives an interesting account of their communistic methods.[3]

There is an extensive literature respecting the Shakers; a bibliography is appended to W. E. A. Axon's *Biographical Notice of Ann Lee*, Liverpool, 1876.

SHAKESPEARE.

WILLIAM SHAKESPEARE (1564–1616), the national poet of England, the greatest dramatist that modern Europe has produced, was born in April, in the year 1564, at Stratford-upon-Avon, in the county of Warwick. The known facts of the poet's personal history are comparatively few, and before giving them in order we purpose considering in some detail the larger educational influences which helped to stimulate his latent powers, to evoke and strengthen his poetical and patriotic sympathies, and thus prepare and qualify him for his future work. In dealing with these influences we are on firm and fruitful ground. We know, for example, that Shakespeare was born and lived for twenty years at Stratford-upon-Avon; and we can say therefore with certainty that all the physical and moral influences of that picturesque and richly-storied Midland district melted as years went by into the full current of his ardent blood, became indeed the vital element, the very breath of life his expanding spirit breathed. We know a good deal about his home, his parents, and his domestic surroundings; and these powerful factors in the development of any mind gifted with insight and sensibility must have acted with redoubled force on a nature so richly and harmoniously endowed as that of the Stratford poet. It would be difficult indeed to overestimate the combined effect of these vital elements on his capacious and retentive mind, a mind in which the receptive and creative powers were so equally poised and of such unrivalled strength. This review of the larger influences operating with concentrated force during the critical years of youth and early manhood will help to connect and interpret the few and scattered particulars of

[1] [Died in 1784. See F. W. Evans's *Shakers' Compendium* (1859). —AM. ED.]

[2] [This estimate is too small. They own about 50,000 acres of highly improved land. At New Lebanon there are seven separate families in neighborhood. See Nordhoff's *Communistic Societies of the U. S.*—AM. ED.]

[3] There is considerable similarity between the American disciples of Ann Lee and the English Shakers of the New Forest, who came into public notice in 1874. One of their members had bought 31 acres of land, which they cultivated under the direction of "Mother" Mary Ann Girling, who was at once their foundress and prophetess. As the result of some litigation the Shakers were ejected in 1874, and, after having shelter for a time on a farm belonging to the Hon. Auberon Herbert, they then became a tent community. Charges were made against them of naked dancing in the course of their religious ecstasies. They believe in the second advent, regard Mrs. Girling as the woman Messiah, have all property in common, and preach the doctrine of celibacy.

Shakespeare's personal history. These particulars must indeed be to some extent connected and interpreted in order to be clearly understood, and any intelligible account of Shakespeare's life must therefore take the shape of a biographical essay, rather than of a biography proper. We may add that the sketch will be confined to the points connected with Shakespeare's local surroundings and personal history. The large literary questions connected with his works, such as the classification, the chronology, and analysis of the plays, could not of course be adequately dealt with in such a sketch. It is the less necessary that this wider task should be attempted as the main points it embraces have recently been well handled by competent Shakespearian scholars. The best and most convenient manuals embodying the results of recent criticism and research will be referred to at the close of the article. Meanwhile we have first to look at the locality of Shakespeare's birth, both in its material and moral aspects.

Warwickshire. Warwickshire was known to Shakespeare's contemporaries as the central county or heart of England. It was the middle shire of the Midlands, where the two great Roman roads crossing the island from east to west and west to east met,—forming at their point of junction the centre of an irregular St. Andrew's cross, of which the arms extended from Dover to Chester on the one side and from Totnes to Lincoln and the north on the other. The centre in which these roads—Watling Street and the Fosse Way—thus met was early known from this circumstance as the High Cross. Being the most important Midland position during the Roman occupation of the country, several Roman stations were formed in the neighborhood of this venerable Quatre Bras. Of these Camden specifies the ancient and flourishing city of Clychester, represented in part by the modern Clybrook, and Manduessidum, the memory of which is probably retained in the modern Mancettar. Important Roman remains have also been found within a few miles of Stratford, at Alcester, a central station on the third great Roman road, Ricknild Street, which runs from south to north across the western side of the county. In later times, when means of communication were multiplied, the great roads to the northwest still passed through the county, one of them, the mail road from London through Oxford to Birmingham, Stafford, and Chester, was the "streete" or public way that crossed the Avon at the celebrated ford spanned in 1483 by Sir Hugh Clopton's magnificent bridge of fourteen arches. Immediately beyond the bridge rose the homely gables and wide thoroughfares of Shakespeare's native place.

The Arden division. In Shakespeare's time Warwickshire was divided by the irregular line of the Avon into two unequal but well-marked divisions, known respectively, from their main characteristics, as the woodland and the open country, or more technically as the districts of Arden and Feldon. The former included the thickly-wooded region north of the Avon, of which the celebrated forest of Arden was the centre, and the latter the champaign country, the rich and fertile pasture-lands between the Avon and the line of hills separating Warwick from the shires of Oxford and Northampton. Shakespeare himself was of course familiar with this division of his native shire, and he has well expressed it in Lear's description of the section of the kingdom assigned to his eldest daughter Goneril :

> "Of all these bounds,—even from this line to this,
> With shadowy forests and with champaigns rich'd,
> With plenteous rivers and wide-skirted meads,—
> We make thee lady."

No better general description of Warwickshire could indeed be given than is contained in these lines. Taking the Roman roads, Watling and Ricknild Streets, as boundaries, they vividly depict the characteristic features of the county, including its plenteous rivers and wide-skirted meads. The old and central division of Arden and Feldon is clearly embodied in the second line, "with shadowy forests and with champaigns rich'd." This distinction, practically effaced in modern times by agricultural and mining progress, was partially affected by these causes even in Shakespeare's own day. The wide Arden, or belt of forest territory which had once extended not only across the county but from the Trent to the Severn, was then very much restricted to the centre of the shire, the line of low hills and undulating country which stretched away for upwards of twenty miles to the north of Stratford. The whole of the northern district was, it is true, still densely wooded, but the intervening patches of arable and pasture land gradually encroached more and more upon the bracken and brushwood, and every year larger areas were cleared and prepared for tillage by the axe and the plough. In the second half of the 16th century, however, the Arden district still retained enough of its primitive character to fill the poet's imagination with the exhilarating breadth and sweetness of woodland haunts, the beauty, variety, and freedom of sylvan life, and thus to impart to the scenery of *As You Like It* the vivid freshness and reality of a living experience. In this delightful comedy the details of forest-life are touched with so light but at the same time so sure a hand as to prove the writer's familiarity with the whole art of venery, his thorough knowledge of that "highest franchise of noble and princely pleasure" which the royal demesnes of wood and park afforded. In referring to the marches or wide margins on the outskirts of the forest, legally known as purlieus, Shakespeare indeed displays a minute technical accuracy which would seem to indicate that in his early rambles about the forest and casual talks with its keepers and woodmen he had picked up the legal incidents of sylvan economy, as well as enjoyed the freedom and charm of forest-life. Throughout the purlieus, for instance, the forest laws were only partially in force, while the more important rights of individual owners were fully recognized and established. Hence it happened that Corin's master, dwelling, as Rosalind puts it in a quaint but characteristic simile that betrays her sex, "here in the skirts of the forest, like fringe upon a petticoat," could sell "his eote, his flock, and bounds of feed," and that Celia and Rosalind were able to purchase "the cottage, the pasture, and the flock." It may be noted, too, that, in exchange for the independence the dwellers in the purlieus acquired as private owners, they had to relinquish their common right or customary privilege of pasturing their cattle in the forest. Sheep, indeed, were not usually included in this right of common, their presence in the forest being regarded as inimical to the deer. When kept in the purlieus, therefore, they had to be strictly limited to their bounds of feed, shepherded during the day and carefully folded every night, and these points are faithfully reflected by Shakespeare. Again, only those specially privileged could hunt venison within the forest. But if the deer strayed beyond the forest bounds they could be freely followed by the dwellers in the purlieus, and these happy hunting grounds outside the forest precincts were in many cases spacious and extensive. The special office of a forest ranger was indeed to drive back the deer straying in the purlieus. The banished duke evidently has this in mind when, as a casual denizen of the forest, he proposes to make war on its native citizens :

> "Come, shall we go and kill us venison?
> And yet it irks me, the poor dappled fools,
> Being native burghers of this desert city,
> Should, in their own confines, with forked heads,
> Have their round haunches gor'd."

And the melancholy Jaques, refining as usual with cynical sentimentalism on every way of life and every kind of action, thinks it would be a special outrage

> "To fright the animals, and to kill them up,
> In their assign'd and native dwelling place."

Not only in *As You Like It*, but in *Love's Labor's Lost*, in *A Midsummer Night's Dream*, in the *Merry Wives of Windsor*, and indeed throughout his dramatic works, Shakespeare displays the most intimate knowledge of the aspects and incidents of forest life; and it is certain that in the first instance this knowledge must have been gained from his early familiarity with the Arden district. This, as we have seen, stretched to the north of Stratford in all its amplitude and variety of hill and dale, leafy covert and sunny glade, giant oaks and tangled thickets,—the woodland stillness being broken at intervals not only by the noise of brawling brooks below and of feathered outcries and flutterings overhead, but by dappled herds sweeping across the open lawns or twinkling in the shadowy bracken, as well as by scattered groups of timid conies feeding, at matins and vespers, on the tender shoots and sweet herbage of the forest side. The deer-stealing tradition is sufficient evidence of the popular belief in the poet's love of daring exploits in the regions of vert and venison, and of his devotion, although in a somewhat irregular way perhaps, to the attractive woodcraft of the park, the warren, and the chase. The traditional scene of this adventure was Charlecote Park, a few miles northeast of Stratford: but the poet's early wanderings in Arden extended, no doubt, much further afield. Stirred by the natural desire of visiting at leisure the more celebrated places of his native district, he would pass from Stratford to Henley and Hampton, to Wroxall Priory and Kenilworth Castle, to Stoneleigh Abbey and Leamington Priors, to Warwick Keep and Guy's Cliffe. The remarkable beauty of this last storied spot stirs the learned and tranquil pens of the antiquaries Camden and Dugdale to an unwonted effort of description, even in the pre-descriptive era. "Under this hill," says Camden, "hard by the river Avon, standeth Guy-cliffe, others call it Gib-cliffe, the dwelling house at this day of Sir Thomas Beau-foe, descended from the ancient Normans line, and the very seate itselfe of pleasantnesse. There have yee a shady little wood, cleere and cristall springs, mossy bottomes and caves, medowes alwaies fresh and greene, the river rumbling here and there among the stones with his stream making a milde noise and gentle whispering, and besides all this, solitary and still quietnesse, things most grateful to the Muses." But the whole of the circuit was richly wooded, the towns, as the names indicate, being forest towns, —Henley-in-Arden, Hampton-in-Arden,—while the castles and secularized religious houses were paled off within their own parks and bounds from the sylvan wilderness around them. Some, like the celebrated castle of the Mountfords, called from its pleasant situation amongst the woods Beaudesert, having been dismantled during the Wars of the Roses were already abandoned, and had in Shakespeare's day relapsed from the stately revelry that once filled their halls into the silence of the surrounding woods. At every point of the journey, indeed, as the poet's eager and meditative eye embraced new vistas, it might be said,

> "Towers and battlements it sees
> Bosomed high in tufted trees."

On the southern margin of the Arden division, towards the Avon, small farms were indeed already numerous, and cultivation had become tolerably general. But the region as a whole still retained its distinctive character as the Arden or wooded division of the county. Even now, indeed, it includes probably more woods and parks than are to be found over the same area in any other English shire.

The Feldon division.

While parks of the Arden district were in this way under cultivation, it must not be supposed that the champaign or open country to the south of the Avon, the Feldon division of the county, was destitute of wood; on the contrary its extensive pastures were not only well watered by local streams overshadowed by willow and alder, but well wooded at intervals by groups of more stately trees. The numerous flocks and herds that grazed throughout the valley of the Red Horse found welcome shelter from the noonday heat and the driving wind under the green roofs and leafy screens that lined and dotted their bounds of feed. And, although even the grazing farms were comparatively small, almost every homestead had its group of protecting elms, its outlying patch of hanging beech and ash, or straggling copse of oak and hazel. This is still reflected in such local names as Wood Park, Shrub Lands, Ockley Wood, Furze Hill, Oakham, Ashborne, Alcott Wood, Berecote Wood, and Radland Gorse. These features gave interest and variety to the Feldon district, and justified the characteristic epithet which for centuries was popularly applied to the county as a whole, that of "woody Warwickshire." And Shakespeare, in passing out of the county on his London journeys, would quickly feel the difference, as beyond its borders he came upon stretches of less clothed and cultivated scenery. As his stout gelding mounted Edgehill, and he turned in the saddle to take a parting look at the familiar landscape he was leaving, he would behold what Speed, in his enthusiasm, calls "another Eden, as Lot the plain of Jordan." While the general aspect would be that of green pastures and grassy levels, there would be at the same time the picturesque intermingling of wood and water, of mill and grange and manor house, which gives light and shade, color and movement, interest and animation, to the plainer sweeps and more monotonous objects of pastoral scenery.

History.

On the historical side Warwickshire has points of interest as striking and distinctive as its physical features. During the Roman occupation of the country it was, as we have seen, the site of several central Roman stations, of which, besides those already noticed, the fortified camps of Tripontium and Præsidium on the line of the Avon were the most important. A Roman road crossed the Avon at Stratford, and radiating north and south soon reached some of the larger Roman towns of the west, such as Uriconium and Corinium. Between these towns were country villas or mansions, many of them being, like that at Woodchester, "magnificent palaces covering as much ground as a whole town." The entire district must in this way have been powerfully affected by the higher forms of social life and material splendor which the wealthier provincials had introduced. The immediate effect of this Roman influence on the native populations was, as we know, to divide them into opposed groups whose conflicts helped directly to produce the disastrous results which followed the withdrawal of the Romans from the island. But the more permanent and more important effect is probably to be traced in the far less obstinate resistance offered by the Celtic tribes of Mid Britain to the invading Angles from the north and Saxons from the south, by whom themselves and their district were eventually absorbed. Instead of the fierce conflicts and wrathful withdrawal or extermination of the conquered Britons which prevailed further east, and a for a time perhaps further west also, the intervening tribes appear to have accepted the overlordship of their Teutonic neighbors and united with them in the cultivation and defence of their common territory.

Early union of Celtic and Teutonic races.

The fact that no record of any early Angle conquest remains seems to indicate that, after at most a brief resistance, there was a gradual coalescence of the invading with the native tribes rather than any fierce or memorable struggle between them. Even the more independent and warlike tribes about the Severn repeatedly joined the Saxon Hwiccas, whose northern frontier was the forest of Arden, in resisting the advance of Wessex from the south. And for more than a hundred years after the establishment of the central kingdom of the Angles, the neighboring Welsh princes

are found acting in friendly alliance with the Mercian rulers. It was thus the very district where from an early period the two race elements that have gone to the making of the nation were most nearly balanced and most completely blended. The union of a strong Celtic element with the dominant Angles is still reflected in the local nomenclature, not only in the names of the chief natural features, such as rivers and heights, —Arden and Avon, Lickey, Alne, and Thame,—but in the numerous *combes* and *cotes* or *cots*, as in the reduplicative Cotswold, in the *duns*, *dons*, and *dens*, and in such distinctively Celtic elements as *man*, *pol*, *try*, in names of places scattered through the district. The *cotes* are, it is true, ambiguous, being in a majority of cases perhaps Saxon rather than Celtic, but in a forest country near the old Welsh marches many must still represent the Celtic *coet* or *coed*, and in some cases this is clear from the word itself, as in Kingscot, a variation of Kingswood, and even Charlecote exists in the alternative form of Charlewood. This union of the two races, combined with the stirring conditions of life in a wild and picturesque border country, gave a vigorous impulse and distinctive character to the population, the influence of which may be clearly traced in the subsequent literary as well as in the political history of the country. As early as the 9th century, when the ravages of the Danes had desolated the homes and scattered the representatives of learning in Wessex, it was to western Mercia that King Alfred sent for scholars and churchmen to unite with him in helping to restore the fallen fortunes of religion and letters. And after the long blank in the native literature produced by the Norman Conquest the authentic signs of its indestructible vitality first appeared on the banks of the Severn. Layamon's spirited poem dealing with the legendary history of Britain, and written at Redstone near Arley, within sight of the river's majestic sweep amidst its bordering woods and hills, is by far the most important literary monument of semi-Saxon. And, while the poem as a whole displays a Saxon tenacity of purpose in working out a comprehensive scheme of memorial verse, its more original parts have touches of passion and picturesqueness, as well as of dramatic vivacity, that recall the patriotic fire of the Celtic bards. A hundred and fifty years later the first great period of English literature was inaugurated by another poem of marked originality and power, written under the shadow of the Malvern Hills. The writer of the striking series of allegories known as *Piers Plowman's Visions* was a Shropshire man, and, notwithstanding his occasional visits to London and official employments there, appears to have spent his best and most productive years on the western border between the Severn and the Malvern Hills. In many points both of substance and form the poem may, it is true, be described as almost typically Saxon. But it has at the same time a power of vivid portraiture, a sense of color, with an intense and penetrating if not exaggerated feeling for local grievances which are probably due to the strain of Celtic blood in the writer's veins. Two centuries later, from the same district, from a small town on an affluent of the Severn, a few miles to the west of the river, came the national poet, who not only inherited the patriotic fire and keen sensibility of Layamon and Langland, but who combined in the most perfect form and carried to the highest point of development the best qualities of the two great races represented in the blood and history of the English nation. Mr. J. R. Green,[1] in referring to the moral effects arising from the mixture of races in the Midland district, has noted this fact in one of those sagacious side-glances that make his history so instructive. "It is not without significance," he says, "that the highest type of the race, the one Englishman who has combined in their largest measure the mobility and fancy of the Celt with the depth and energy of the Teutonic temper, was born on the old Welsh and English borderland, in the forest of Arden." And from the purely critical side Mr. Matthew Arnold has clearly brought out the same point. He traces some of the finest qualities of Shakespeare's poetry to the Celtic spirit which touched his imagination as with an enchanter's wand, and thus helped to brighten and enrich the profounder elements of his creative genius.

The history of Warwickshire in Anglo-Saxon times is identified with the kingdom of Mercia, which, under a series of able rulers, was for a time the dominant power of the country. In later times, from its central position, the county was liable to be crossed by military forces if rebellion made head in the north or west, as well as to be traversed and occupied by the rival armies during the periods of civil war. The most important events, indeed, connected with the shire before Shakespeare's time occurred during the two greatest civil conflicts in the earlier national annals—the Barons' War in the 13th century, and the Wars of the Roses in the 15th. The decisive battles that closed these long and bitter struggles, and thus became turning points in our constitutional history, were both fought on the borders of Warwickshire,—the battle of Evesham on the south-western and the battle of Bosworth Field on the north-eastern boundary. The great leaders in each conflict—the founder of the Commons House of Parliament and the "setter up and puller down of kings"—were directly connected with Warwickshire. Kenilworth belonged to Simon de Montfort, and its siege and surrender constituted the last act in the Barons' War. During the Wars of the Roses the county was naturally prominent in public affairs, as its local earl, the last and greatest of the lawless, prodigal, and ambitious barons of mediæval times, was for more than twenty years the leading figure in the struggle. But notwithstanding this powerful influence the county was, like the country itself, very much divided in its political sympathies and activities. The weakness and vacillation of Henry VI. had stimulated the rival house of York to assert its claims, and, as the trading and mercantile classes were always in favor of a strong government, London, with the eastern counties and the chief ports and commercial towns, favored the house of York. On the other hand, South Wales, some of the Midland and most of the western shires, under the leadership of the Beauforts, and the northern counties, under the leadership of Clifford and Northumberland, supported the house of Lancaster. Political feeling in the Principality itself was a good deal divided. The duke of York still possessed Ludlow Castle, and, the Welsh of the northern border being devoted to the houses of March and Mortimer, Prince Edward, the young earl of March, after the defeat and death of his father at Wakefield, was able to rally on the border a "mighty power of marchmen," and, after uniting his forces with those of Warwick, to secure the decisive victory of Towton which placed him securely on the throne. Still, during the earlier stages of the struggle the Beauforts, with the earls of Pembroke, Devon, and Wiltshire, were able to muster in the south and west forces sufficient to keep the Yorkists in check. And when the final struggle came,—when Henry of Richmond landed at Milford Haven,—the Welsh blood in his veins rallied to his standard so powerful a contingent of the southern marchmen that he was able at once to cross the Severn, and, traversing north Warwickshire, to confront the forces of Richard, with the assurance that in the hour of need he would be supported by Stanley and Northumberland. Warwickshire itself was, as already intimated, considerably divided even in the more active stages of the conflict, Coventry being strongly in favor of the Red Rose, while Warwick, under the influence of the earl, was for a while devoted to the cause of the White Rose. Kenilworth was still held by the house of Lancaster, and Henry VI. at the outset of the conquest had more than once taken refuge there. On the other hand Edward IV. and Richard III. both visited Warwick, the latter being so interested in the castle that he is said to have laid the foundation of a new and "mighty fayre" tower on the north side, afterwards known as the Bear's Tower. Edward IV., in harmony with his strong instinct for popularity, and command of the arts that secure it, tried to conciliate the people of Coventry by visiting the town and witnessing its celebrated pageants more than once—at Christmas in 1465 and at the festival of St. George in 1474. Although he was accompanied by his queen the efforts to win the town from its attachment to the rival house do not appear to have been very successful. Under Edward's rule the manifestation of active partisanship was naturally in abeyance, and no doubt the feeling may to some extent have declined. Indeed, in the later stages of the struggle Warwickshire, like so many other counties, was comparatively weary and quiescent. When

Wars of the Roses.

[1] [A clergyman (1837-83), librarian at Lambeth, author of *History of the English People* and *Conquest of England*, a brilliant and philosophical historian.—Am. Ed.]

Richard III. advanced to the north the sheriff of the shire had, it is true, in obedience to the royal mandate levied a force on behalf of the king, but as this force never actually joined the royal standard it is naturally assumed that it was either intercepted by Henry on his march to Bosworth Field or had voluntarily joined him on the eve of the battle. In view of the strong Lancasterian sympathies in the north and east of the shire the latter is by far the more probable supposition. In this case, or indeed on either alternative, it may be true, as asserted in the patent of arms subsequently granted to Shakespeare's father, that his ancestors had fought on behalf of Henry VII. in the great battle that placed the crown on his head. Many families bearing the name of Shakespeare were scattered through Warwickshire in the 15th century, and it is therefore not at all unlikely that some of their members had wielded a spear with effect in the battle that, to the immense relief of the country, happily closed the most miserable civil conflict in its annals.

Influence of local traditions.

But, whether any of his ancestors fought at Bosworth Field or not, Shakespeare would be sure in his youth to hear, almost at first hand, a multitude of exciting stories and stirring incidents connected with so memorable and far-reaching a victory. After the battle Henry VII. had slept at Coventry, and was entertained by the citizens and presented with handsome gifts. He seems there also to have first exercised his royal power by conferring knighthood on the mayor of the town. The battle was fought only eighty years before Shakespeare's birth, and public events of importance are vividly transmitted by local tradition for more than double that length of time. At this hour the quiet farmsteads of Mid Somerset abound with stories and traditions of Monmouth and his soldiers, and of the events that preceded and followed the battle of Sedgemoor. And a century earlier local traditions possessed still more vitality and power. In the 16th century, indeed, the great events of the nation's life, as well as more important local incidents, were popularly preserved and transmitted by means of oral tradition and scenic display. Only a small and cultured class could acquire their knowledge of them through literary chronicles and learned records. The popular mind was of necessity largely fed and stimulated by the spoken narratives of the rustic festival and the winter fireside. And a quiet settled neighborhood like Stratford, out of the crush, but near the great centres of national activity, would be peculiarly rich in these stored-up materials of unwritten history. The very fact that within eight miles of Shakespeare's birthplace arose from their cedared slopes the halls and towers of the great earl who for more than a quarter of a century wielded a political and military power mightier than any subject had wielded before would give the district an exceptional prominence in the national annals, which would be locally reflected in an answering wealth of historic tradition. In Shakespeare's day Warwickshire thus supplied the materials of a liberal elementary training in the heroic annals of the past, and especially in the great events of the recent past that had established the Tudors on the throne, consolidated the permanent interests of the Government and the country, and helped directly to promote the growing unity and strength, prosperity and renown, of the kingdom. The special value of Shakespeare's dramatic interpretation of this period, arising from his early familiarity with the rich and pregnant materials of unwritten history, has recently been insisted on afresh by one of our most careful and learned authorities. In the preface to his work on *The Houses of Lancaster and York*, Mr. James Gairdner says: "For this period of English history we are fortunate in possessing an unrivalled interpreter in our great dramatic poet Shakespeare. A regular sequence of historical plays exhibits to us, not only the general character of each successive reign, but nearly the whole chain of leading events from the days of Richard II. to the death of Richard III. at Bosworth. Following the guidance of such a master mind, we realize for ourselves the men and actions of the period in a way we cannot do in any other epoch. And this is the more important as the age itself, especially towards the close, is one of the most obscure in English history. During the period of the Wars of the Roses we have, comparatively speaking, very few contemporary narratives of what took place, and anything like a general history of the times was not written till a much later date. But the doings of that stormy age,—the sad calamities endured by kings—the sudden changes of fortune in great men—the glitter of chivalry and the horrors of civil war,—all left a deep impression upon the mind of the nation, which *was kept alive by vivid traditions of the past at the time that our great dramatist wrote.* Hence, notwithstanding the scantiness of records and the meagreness of ancient chronicles, we have singularly little difficulty in understanding the spirit and character of the times." Familiar as he must have been in his youth with the materials that enabled him to interpret so stirring a period, it is not surprising that even amidst the quiet hedgerows and meadows of Stratford Shakespeare's pulse should have beat high with patriotic enthusiasm, or that when launched on his new career in the metropolis he should have sympathized to the full extent of his larger powers with the glow of loyal feeling that, under Elizabeth's rule, and especially in the conflict with Spain, thrilled the nation's heart with an exulting sense of full political life, realized national power, and gathering European fame.

In the interval that elapsed between the battle of Bosworth Field and the birth of Shakespeare Warwickshire continued to be visited by the reigning monarch and members of the royal family. The year after his accession to the crown Henry VIII., with Queen Catherine, visited Coventry in state, and witnessed there a series of magnificent pageants. In 1525 the Princess Mary spent two days at the priory, being entertained with the usual sports and shows, and presented by the citizens on her departure with handsome presents. The year after Shakespeare's birth Queen Elizabeth made a state visit to Coventry, Kenilworth, and Warwick, the young queen being received at every point of her progress with unusually splendid demonstrations of loyalty and devotion. And eleven years before Shakespeare's birth King Edward VI., in the last months of his reign, had specially interested himself in the reëstablishment by royal charter of the free grammar school of the guild at Stratford, which had been suppressed at the dissolution of religious houses during his father's reign.

Stratford.

The town of Stratford lies on the north bank of the Avon, at a point about midway in its course from its rise in Northamptonshire hills to its junction with the Severn at Tewkesbury. On entering the town, across Sir Hugh Clopton's noble bridge, the road from the southeast fans out in three main directions,—on the right to Warwick and Coventry, on the left to Alcester, while between runs the central street, the modern representative of the old Roman way to Birmingham, Chester, and the north. Further to the left a fourth and less important road leaves the town beyond the church, and, keeping in the main the line of the river, goes to Bidford, Salford Priors, and Evesham. It is a picturesque country road, connecting a string of undulating villages and hamlets with Stratford. The town itself consisted in the 16th century of the low gable-roofed wood-and-plaster houses dotted at intervals along these roads and down the cross streets that connected them with each other and with the river. Most of the houses in Shakespeare's time had gardens at the back, and many at the sides also; and the space between the houses, combined with the unusual width of the streets, gave the town an open, cheerful look, which enabled it to retain pleasant touches of its earlier rural state. As its prosperity increased the scattered dwellings naturally tended to close up their ranks and present a more united front of exposed wares and convenient hostelries to the yeomen and graziers, who, with their wives and families, frequented the place on fair and market days. But in Shakespeare's time the irregular line of gables and porches, of penthouse walls and garden palings, with patches of flowers and overarching foliage between, still varied the view and refreshed the eye in looking down the leading thoroughfares. These thoroughfares took the shape of a central cross, of which Church, Chapel, and High Streets, running in a continuous line north and south, constituted the shaft or stem, while Bridge and Wood Streets, running in another line east and west, were the transverse beam or bar. At the point of intersection stood the High Cross, a solid stone building with steps below and open arches above, from which public proclamations were made, and, as in London and other large towns, sermons sometimes delivered. The open space around the High Cross was the centre of trade and merchandise on market days, and from the force of custom it naturally became the site on which, at a later period, the market-house was built. Opposite the High

Cross the main road, carried over Sir Hugh Clopton's arches and along Bridge Street, turns to the left through Henley Street on its way to Henley-in-Arden and the more distant northerly towns. At the western end of Wood Street was a large and open space called Rother Market, whence Rother Street, running parallel with High Street, led through narrower lanes into the Evesham Road.

The Rother Market.

This open ground was, as the name indicates, the great cattle market of Stratford, one of the most important features of its industrial history from very early times. In the later Middle Ages most of the wealthier inhabitants were engaged in farming operations, and the growth and prosperity of the place resulted from its position as a market town in the midst of an agricultural and grazing district. In the 13th century a number of charters were obtained from the early Plantagenet kings, empowering the town to hold a weekly market and no fewer than five annual fairs, four of which were mainly for cattle. In later times a series of great cattle markets, one for each month in the year, was added to the list. The name of the Stratford cattle market embodies this feature of its history, "rother" being a good Saxon word for horned cattle, a word freely employed in Early English, both alone and in composition. In the 16th century it was still in familiar use, not only in literature but in official documents, and especially in statutes of the realm. Thus Cowell, in his law dictionary, under the heading "Rother-beasts," explains that "the name comprehends oxen, cows, steers, heifers, and such like horned beasts," and refers to statutes of Elizabeth and James in support of the usage. And Arthur Golding in 1567 translates Ovid's lines:

> "Mille greges illi totidemque *armenta* per herbas
> Errabant—"
>
> "A thousand flocks of sheep,
> A thousand herds of *rother-beasts*, he in his fields did keep."

The word seems to have been longer retained and more freely used in the Midland counties than elsewhere, and Shakespeare himself employs it with colloquial precision in the restored line of *Timon of Athens:* "It is the pasture lards the rother's sides." Many a time, no doubt, as a boy, during the spring and summer fairs, he had risen with the sun, and, making his way from Henley Street to the bridge, watched the first arrivals of the "large-eyed kine" slowly driven in from the rich pastures of the "Red Horse Valley." There would be some variety and excitement in the spectacle as the droves of meditative oxen were invaded from time to time by groups of Herefordshire cows lowing anxiously after their skittish calves, as well as by the presence and disconcerting activity of still smaller deer. And the boy would be sure to follow the crowding cattle to the Rother Market and observe at leisure the humors of the ploughmen and drovers from the Feldon district, whose heavy intermittent talk would be in perfect keeping with the bovine stolidity of the steers and heifers around them. There was a market-cross at the head of the Rother expanse, and this was the chief gathering-place for the cattle-dealers, as the High Cross was the rallying-point of the dealers in corn and country produce. In modern Stratford Rother Market retains its place as the busiest centre at the annual fairs, during one of which it is still customary to roast an ox in the open street, often amidst a good deal of popular excitement and convivial uproar.

Chief streets and suburbs.

The cross ways going from Rother Street to the river side, which cut the central line, dividing it into three sections, are Ely Street and Sheep Street in a continuous line, and Scholar's Lane and Chapel Lane in another line. They run parallel with the head line of Bridge and Wood Streets, and like them traverse from east to west the northern shaft of the cross that constituted the ground plan of the town. Starting down this line from the market house at the top, the first division, the High Street, is now, as it was in Shakespeare's day, the busiest part for shops and shopping, the solid building at the further corner to the left being the Corn Exchange. At the first corner of the second division called Chapel Street, stands the town-hall, while at the further corner are the site and railed-in gardens of New Place, the large mansion purchased by Shakespeare in 1597. Opposite New Place, at the corner of the third and last division, known as Church Street, is the gray mass of Gothic buildings belonging to the guild of the Holy Cross, and consisting of the chapel, the hall, the grammar school, and the almshouses of the ancient guild. Turning to the left at the bottom of Church Street, you enter upon what was in Shakespeare's day a well-wooded suburb, with a few good houses scattered among the ancient elms, and surrounded by ornamental gardens and extensive private grounds. In one of these houses, with a sunny expanse of lawn and shrubbery, lived in the early years of the 17th century Shakespeare's eldest daughter Susanna with her husband, Dr. John Hall, and here in spring mornings and summer afternoons the great poet must have often strolled, either alone or accompanied by his favorite daughter, realizing to the full the quiet enjoyment of the sylvan scene and its social surroundings. This pleasant suburb, called then as now Old Town, leads directly to the church of the Holy Trinity, near the river side. The church, a fine specimen of Decorated and Perpendicular Gothic with a lofty spire, is approached on the northern side through an avenue of limes, and sheltered on the east and south by an irregular but massive group of elms towering above the churchway path between the transepts, the chancel, and the river. Below the church, on the margin of the river, were the mill, the mill-bridge, and the weir, half hidden by gray willows, green alders, and tall beds of rustling sedge. And, beyond the church, the college, and the line of streets already described, the suburbs stretched away into gardens, orchards, meadows, and cultivated fields, divided by rustic lanes with mossy banks, flowering hedgerows, and luminous vistas of bewildering beauty. These cross and country roads were dotted at intervals with cottage homesteads, isolated farms, and the small groups of both which constituted the villages and hamlets included within the wide sweep of old Stratford parish. Amongst these were the villages and hamlets of Welcombe, Ingon, Drayton, Shottery, Luddington, Little Wilmcote, and Bishopston. The town was thus girdled in the spring by daisied meadows and blossoming orchards, and enriched during the later months by the orange and gold of harvest fields and autumn foliage, mingled with the coral and purple clusters of elder, hawthorn, and mountain ash, and, around the farms and cottages, with the glow of ripening fruit for the winter's store.

Forest survivals.

But perhaps the most characteristic feature of the scenery in the neighborhood of Stratford is to be found in the union of this rich and varied cultivation with picturesque survivals of the primæval forest territory. The low hills that rise at intervals above the well-turned soil still carry on their serrated crests the lingering glories of the ancient woodland. Though the once mighty forest of Arden has disappeared, the after-glow of its sylvan beauty rests on the neighboring heights formerly enclosed within its ample margin. The traces of the forest wildness and freedom were of course far more striking and abundant in Shakespeare's day than now. At that time many of the farms had only recently been reclaimed from the forest, and most of them still had their bosky acres "of tooth'd briars, sharp furzes, pricking goss and thorns," their broom groves, hazel copses, and outlying patches of unshrubbed down. And the hills that rose above the chief villages of the neighborhood were still clothed and crowned with the green and mystic mantle of the leafy Arden. But, though much of the ancient woodland has disappeared since Shakespeare's day, many traces of it still remain. Any of the roads out of Stratford will soon bring the pedestrian to some of these picturesque survivals of the old forest wilderness. On the Warwick road, at the distance of about a mile from the town, there are on the left the Welcombe Woods, and just beyond the woods the well-known Dingles, a belt of straggling ash and hawthorn winding irregularly through blue-bell depths and briery hollows from the pathway below to the crest of the hill above, while immediately around rise the Welcombe Hills, from the top of which is obtained the finest local view of Stratford and the adjacent country. Looking southwest and facing the central line of the town, you see below you, above the mass of roofs, the square tower of the guild chapel, the graceful spire of the more distant church, the sweep of the winding river, and beyond the river the undulating valley of the Red Horse shut in by the blue range of the Costwold Hills. A couple of miles to the east of the Welcombe Hills is the village of Snitterfield, where Shakespeare's grandfather, Richard Shakespeare, lived and cultivated to the end of his days the acres around his rustic dwelling. Beyond the village

on its western side there is an upland reach of wilderness in the shape of a hill, covered with shrub and copsewood, and known as the Snitterfield Bushes. Here Shakespeare as a boy must have often rambled, enjoying the freedom of the unfenced downs, and enlarging his knowledge of nature's exuberant vitality. On the opposite side of the town, about a mile on the Evesham road, or rather between Evesham and Alcester roads, lies the hamlet of Shottery, half concealed by ancestral elms and nestling amongst its homestead fruits and flowers. From one of these homesteads Shakespeare obtained his bride, Anne Hathaway. A mile or two on the central road, passing out of the town through Henley Street, is the village of Bearley, and above the village another sweep of wooded upland known as Bearley Bushes. And at various more distant points between these roads the marl and sandstone heights, fringed with woods or covered with wilding growths, still bear eloquent testimony to the time when Guy of Warwick and his tutor in chivalry, Heraud of Arden, still roamed the forest in search of the wild ox and savage boar that frayed the infrequent travellers and devastated at intervals the slender cultivation of the district. The subtle power of this order of scenery, arising from the union of all that is rich and careful in cultivation with all that is wild and free in natural beauty, is exactly of the kind best fitted to attract and delight imaginative and emotional minds. It possesses the peculiar charm that in character arises from the union of refined culture with the bright and exhilarating spontaneity of a free and generous nature.

Moral influences of scenery.

On its moral side such scenery has an expanding illuminating power which links it to the wider and deeper interests of humanity as a whole. Nature seems to put forth her vital energies expressly for the relief of man's estate, appearing as his friend and helper and consoler. Instead of being absorbed in her own inaccessible grandeurs and solitary sublimities, she exerts her benign influences expressly as it were for his good, to cheer and brighten his evanescent days, and beautify his temporary home. Bolder and more rugged landscapes, gloomy glens, and thunder-scarred peaks may excite more passionate feelings, may rouse and strengthen by reaction the individualistic elements of mind and character, and thus produce the hardy, daring type of mountaineer, the intense self-centred and defiant local patriot or hero, the chieftain and his clansmen, *contra mundum*. No doubt it is also true that the vaster and loftier mountain ranges have a unique power of exciting in susceptible minds the emotions of awe, wonder, and sublimity. But the very power and permanence of these mighty solitudes, the grandeur and immobility of their measureless strength and imperial repose, dwarf by comparison all merely human interests; and to the meditative mind swept by the spirit of such immensities the moments of our mortal life seem to melt as dew-drops into the silence of their eternal years. The feelings thus excited, being in themselves of the essence of poetry, may indeed find expression in verse and in verse of a noble kind, but the poetry will be lyrical and reflective, not dramatic, or if dramatic in form it will be lyrical in substance. As Mr. Ruskin has pointed out, the overmastering effect of mountain scenery tends to absorb and preoccupy the mind, and thus to disturb the impartial view, the universal vision of nature and human nature as a complex whole, or rather of nature as the theatre and scene of human life, which the dramatist must preserve in order to secure success in his higher work. Mountain scenery is, however, not only rare and exacting in the range and intensity of feeling it excites, but locally remote in its separation from the interests and occupations of men. It is thus removed from the vital element in which the dramatist works, if not in its higher influence antagonistic to that element. Mr. Hamerton, who discusses the question on a wider basis of knowledge and experience than perhaps any living authority except Mr. Ruskin, supports this view. "As a general rule," he says, "I should say there is an antagonism between the love of mountains and the knowledge of mankind, that the lover of mountains will often be satisfied with their appearances of power and passion, their splendor and gloom, their seeming cheerfulness or melancholy, when a mind indifferent to this class of scenery might study the analogous phases of human character." Where, indeed, the influence of nature is overpowering, as in the East, wonder,—the wonder excited by mere physical vastness, power, and infinitude,—takes the place of intelligent interest in individual life and character.

But the dramatic poet has to deal primarily with human power and passion; and not for him therefore is the life of lonely raptures and awful delights realized by the mountain wanderer or the Alps-inspired bard. His work lies nearer the homes and ways of men, and his choicest scenery will be found in the forms of natural beauty most directly associated with their habitual activities, most completely blended with their more vivid emotional experiences. A wooded undulating country, watered by memorable streams, its ruder features relieved by the graces of cultivation, and its whole circuit rich in historical remains and associations, is outside the domain of cities, the natural stage and theatre of the dramatist and story-teller. This was the kind of scenery that fascinated Scott's imagination, amidst which he fixed his chosen home, and where he sleeps his last sleep. It is a border country of gray waving hills, divided by streams renowned in song and enriched by the monuments of the piety, splendor, and martial power of the leaders whose fierce raids and patriotic conflicts filled with romantic tale and minstrelsy the whole district from the Lammermoors to the Cheviots, and from the Leader and the Tweed to the Solway Firth. In earlier times Shakespeare's own district had been virtually a border country also. The mediæval tide of intermittent but savage warfare, between the unsubdued Welsh and the Anglo-Normans under the feudal lords of the marches, ebbed and flowed across the Severn, inundating at times the whole of Powis-land, and sweeping on to the very verge of Warwickshire. In the 12th and 13th centuries the policy of intermarriage between their own families and the Welsh princes was tried by the English monarchs, and King John, on betrothing his daughter Joan to the Welsh prince Llewelyn, gave the manor of Bidford, six miles from Stratford-on-Avon, as part of her dower. The fact of this English princess being thus identified with South Warwickshire may help to explain the prevalence of the name Joan in the county, but the early impulse towards the giving of this royal name would no doubt be strengthened by the knowledge that John of Gaunt's daughter, the mother of the great earl of Warwick, had also borne the favorite local name. Shakespeare himself it will be remembered had two sisters of this name, the elder Joan, born some time before him, the first-born of the family indeed, who died in infancy, and the younger Joan, who survived him. But the local popularity of a name, familiarly associated with the kitchen and the scullery rather than with the court or the palace, is no doubt due to one of the more striking incidents of the long conflict between the English and the Welsh on the western border. As we have seen, during the Barons' War and the Wars of the Roses the western border was the scene of active conflict, each party seeking Welsh support, and each being able in turn to rally a power of hardy marchmen to its banner. And that the insurgent Welsh were not idle during the interval between these civil conflicts we have the emphatic testimony of Glendower:

The old Welsh border.

> "Three times hath Henry Bolingbrooke made head
> Against my power: thrice from the banks of Wye
> And sedgy-bottomed Severn have I sent him
> Bootless home, and weather-beaten back."

The Hotspur and Mortimer revolt against Henry IV. well illustrates, indeed, the kind of support which English disaffection found for centuries in the Welsh marches. A rich heritage of stirring border life and heroic martial story was thus transmitted from the stormy ages of faith and feudalism to the more settled Tudor times. Apart from the border warfare there were also the multiplied associations connected with the struggles between the nobles and the crown, and the rise of the Commons as a distinctive power in the country. The whole local record of great names and signal deeds was in Shakespeare's day so far withdrawn

into the past and mellowed by secular distance as to be capable of exerting its full enchantment over the feelings and the imagination. The historical associations thus connected with the hills and streams, the abbeys and castles, of Warwickshire added elements of striking moral interest to the natural beauty of the scenery. To the penetrating imagination of poetic natures these elements reflected the continuity of national life as well as the greatness and splendor of the personalities and achievements by which it was developed from age to age. They also helped to kindle within them a genuine enthusiasm for the fortunes and the fame of their native land. And scenery beautiful in itself acquired a ten-fold charm from the power it thus possessed of bringing vividly before the mind the wide and moving panorama of the heroic past. The facts sufficiently prove that scenery endowed with this multiplied charm takes, if a calmer, still a deeper and firmer hold of the affections than any isolated and remote natural features, however beautiful and sublime, have power to do. This general truth is illustrated with even exceptional force in the lives of Scott and Shakespeare. Both were passionately attached to their native district, and the memorable scenes amidst which their early years were passed. So intense was Scott's feeling that he told Washington Irving that if he did not see the gray hills and the heather once a year he thought he should die. And one of the few traditions preserved of Shakespeare is that even in the most active period of his London career he always visited Stratford at least once every year. We know indeed from other sources that during his absence Shakespeare continued to take the liveliest interest in the affairs of his native place, and that, although London was for some years his professional residence, he never ceased to regard Stratford as his home.

Feeling of local attachment.

Amongst other illustrations of this strong feeling of local attachment that might be given there is one that has recently excited a good deal of attention and is worth noticing in some detail. Mr. Hallam, in a well-known passage, has stated that "no letter of Shakespeare's writing, no record of his conversation, has been preserved." But we certainly have at least one conversation reported at first hand, and it turns directly on the point in question. It relates to a proposal made in 1614 by some of the local proprietors for the enclosure of certain common lands at Welcombe and Old Stratford. The corporation of Stratford strongly opposed the project on the ground that it would be a hardship to the poorer members of the community, and their clerk, Mr. Thomas Greene, who was related to Shakespeare, was in London about the business in November of the same year. Under date November 17th Greene says, in notes which still exist, "My cosen Shakespear comyng yesterdy to town, I went to see him how he did. He told me that they assured him they ment to inclose no further than to Gospell Bush, and so upp straight (leavyng out part of the Dyngles to the ffield) to the gate in Clopton hedg, and take in Salisburyes peece; and that they mean in Aprill to survey the land, and then to gyve satisfaction, and not before; and he and Mr. Hall say they think ther will be nothyng done at all." This proves that the agents of the scheme had seen Shakespeare on the subject, that he had gone carefully into the details of their plan, consulted his son-in-law Dr. John Hall about them, and arrived at the conclusion that for the present they need take no decided action in the matter. There is evidently on Shakespeare's part a strong feeling against the proposed enclosure, and the agents of the scheme had clearly done their best to remove his objections, promising amongst other things that if it went forward he should suffer no pecuniary loss, a promise already confirmed by a legal instrument. But nine months later, when the local proprietors seemed bent on pushing the scheme, Shakespeare takes a more decided stand, and pronounces strongly against the whole business. We have a notice, dated September 1, 1615, to the effect that Mr. Shakespeare had on that day told the agent of the corporation "that he was not able to bear the enclosing of Welcombe." As his proprietary rights and pecuniary interests were not to be affected by the proposed enclosure, this strong expression of feeling must refer to the public advantages of the Welcombe common fields, and especially to what in Scotland would be called their "amenity," the element of value arising from their freedom and beauty, their local history and associations. Welcombe, as we have seen, was the most picturesque suburb of Stratford. The hills divided by the leafy Dingles afforded the finest panoramic view of the whole neighborhood. On their Eastern slope they led to Fulbroke Park, the probable scene of the deer-stealing adventure, and towards the northwest to the village of Snitterfield with its wooded sweep of upland "bushes." Every acre of the ground was associated with the happiest days of Shakespeare's youth. In his boyish holidays he had repeatedly crossed and recrossed the unfenced fields at the foot of Welcombe Hills on his ways to the rustic scenes and occupations of his uncle Henry's farm in the outlying forest village. He knew by heart every boundary tree and stone and bank, every pond and sheep-pool, every barn and cattle-shed, throughout the whole well-frequented circuit. And in his later years, when after the turmoil and excitement of his London life he came to reside at Stratford, and could visit at leisure the scenes of his youth, it was perfectly natural that he should shrink from the prospect of having these scenes partially destroyed and their associations broken up by the rash hand of needless innovation. In his own emphatic language, "he could not bear the enclosing of Welcombe," and the only authoritative fragment of his conversation preserved to us thus brings vividly out one of the best known and most distinctive features of his personal character and history—his deep and life-long attachment to his native place. Another illustration of the same feeling, common both to Scott and Shakespeare, is supplied by the prudence and foresight they both displayed in husbanding their early gains in order to provide, amidst the scenery they loved, a permanent home for themselves and their families. Shakespeare, the more careful and sharp-sighted of the two, ran no such risks and experienced no such reverses of fortune as those which saddened Scott's later days. Both, however, spent the last years of their lives in the home which their energy and affection had provided, and both sleep their last sleep under the changing skies and amidst the fields and streams that gave light and music to their earliest years. Hence, of all great authors, they are the two most habitually thought of in connection with their native haunts and homesteads. Even to his contemporaries Shakespeare was known as the Swan of Avon. The two spots on British ground most completely identified with the noblest energies of genius, consecrated by life-long associations, and hallowed by sacred dust are the banks of the Tweed from Abbotsford to Dryburgh Abbey, and the sweep of the Avon from Charlecote Park to Stratford church. To all lovers of literature, to all whose spirits have been touched to finer issues by its regenerating influences, these spots, and above all the abbey grave and the chancel tomb, are holy ground,—national shrines visited by pilgrims from every land, who breathe with pride and gratitude and affection the household names of Shakespeare and of Scott.

Shakespeare name and family.

The name Shakespeare is found in the Midland counties two centuries before the birth of the poet, scattered so widely that it is not easy at first sight to fix the locality of its rise or trace the lines of its progress. Several facts, however, would seem to indicate that those who first bore it entered Warwickshire from the north and west, and may therefore have migrated in early times from the neighboring marches. The name itself

is of course thoroughly English, and it is given by Camden and Verstegan as an illustration of the way in which surnames were fabricated when first introduced into England in the 13th century. But it is by no means improbable that some hardy borderers who had fought successfully in the English ranks may have received or assumed a significant and sounding designation that would help to perpetuate the memory of their martial prowess. We have indeed a distinct and authoritative assertion that some of Shakespeare's ancestors had served their country in this way. However this may be, families bearing the name are found during the 15th and 16th centuries in the Arden district, especially at Wroxhall and Rowington,—some being connected with the priory of Wroxhall, while during the 15th century the names of more than twenty are enumerated as belonging to the guild of St. Ann, at Knoll near Rowington. In the roll of this guild or college are also found the representatives of some of the best families in the county, such as the Ferrerses of Tamworth and the Clintons of Coleshill. Among the members of the guild the poet's ancestors are to be looked for, and it is not improbable, as Mr. French suggests, that John and Joan Shakespeare, entered on the Knoll register in 1527, may have been the parents of Richard Shakespeare of Snitterfield, whose sons gave each to his children the favorite family names. Richard Shakespeare, the poet's grandfather, occupied a substantial dwelling and cultivated a forest farm at Snitterfield, between 3 and 4 miles from Stratford. He was the tenant of Robert Arden, of Wilmcote, "a gentleman of worship," who farmed his own estate, situated a few miles to the west of Snitterfield. Richard Shakespeare was settled at the latter hamlet and doing well as early as 1543, Thomas Atwood of Stratford having in that year bequeathed to him four oxen which were then in his keeping; and he continued to reside there certainly till 1560, and probably till his death. He appears to have had two sons, John and Henry, of whom John, the eldest, early broke through the contracted circle of rustic life at Snitterfield, made his way to Stratford, and established himself as a trader in one of the leading thoroughfares of the town. This movement to the town probably took place in 1551, as in 1552 John Shakespeare is described in an official document as residing in Henley Street, where the poet was subsequently born. As to the precise nature of his occupation, the kind of wares in which he principally dealt, there are various and conflicting statements that have given rise to a good deal of discussion. The earliest official statement on the subject occurs in the register of the bailiff's court for the year 1556. He is there described as a "glover," which, according to the verbal usage of the time, included dealing in skins, as well as in the various leather-made articles of farming gear, such as rough gauntlets and leggings for hedging and ditching, white leather gloves for chopping wood and the like. But in addition to the trade of glover and fell-monger tradition assigns to John Shakespeare the functions of butcher, wool-stapler, corn-dealer, and timber-merchant. These occupations are not incompatible, and together they represent the main lines some of which at least a young farmer going into the town for trading purposes would be likely to pursue. He would naturally deal with the things he knew most about, such as corn, wool, timber, skins, and leather-made articles used in farm work—in a word, he would deal in farm conveniences and farm products. In a town that was the centre and chief market of an agricultural and grazing district, and as the member of a family whose wide connections were nearly all engaged in farming operations, his prospects were certainly rather favorable than otherwise. And he soon began to turn his country connection to account. There is distinct evidence that he early dealt in corn and wood as well as gloves and leather, for in 1556 he sues a neighbor for eighteen quarters of barley, and a few years later is paid three shillings by the corporation for a load of timber.

The poet's father.

The poet's father was evidently a man of energy, ambition, and public spirit, with the knowledge and ability requisite for pushing his fortune with fair success in his new career. His youthful vigor and intelligence soon told in his favor, and in a short time we find him taking an active part in public affairs. He made way so rapidly indeed amongst his fellow-townsmen, that within five years after entering Stratford he is recognized as a fitting recipient of municipal honors; and his official appointments steadily rise in dignity and value through the various gradations of leet-juror, ale-taster, constable, affeeror, burgess, chamberlain, and alderman, until in 1568 he gains the most distinguished post of official dignity, that of high-bailiff or mayor of the town. Within twenty years after starting in business in Henley Street he thus rises to the highest place in the direction of municipal affairs, presiding as their head over the deliberations of his fellow aldermen and burgesses, and as chief magistrate over the local court of record. Three years later, in 1571, he was again elected as chief alderman. There is ample evidence, too, that during these years he advanced in material prosperity as well as in municipal dignities and honors. As early as 1556 he had means at his command which enabled him to purchase two houses in the town, one in Henley Street with a considerable garden, and another in Greenhill Street with a garden and croft attached to it. In the following year he married an heiress of gentle birth, Mary Arden of the Asbies, who had recently inherited under her father's will a substantial sum of ready money, an estate at Wilmcote, consisting of nearly 60 acres of land with two or three houses, and a reversionary interest in houses and lands at Snitterfield, including the farm tenanted by Richard Shakespeare, her husband's father. Being now a landed proprietor and a man of rising position and influence, John Shakespeare would be able to extend his business operations, and it is clear that he did so, though whether always with due prudence and foresight may be fairly questioned. To a man of his sanguine and somewhat impetuous temper the sudden increase of wealth was probably by no means an unmixed good. But for some years, at all events, he was able to maintain his more prosperous state, and his new ventures appear for a time to have turned out well. He is designated in official documents as yeoman, freeholder, and gentleman, and has the epithet "master" prefixed to his name; this, being equivalent to esquire, was rarely used except in relation to men of means and station, possessing landed property of their own. In a note to another official document it is stated that about the time of his becoming chief magistrate of Stratford John Shakespeare had "lands and tenements of good worth and substance" estimated in value at £500 [$2430], and though there may be some exaggeration in this estimate his property from various sources must have been worth nearly that sum. And in 1575 he increased the total amount by purchasing two houses in Henley Street, the two that still remain identified with the name and are consecrated by tradition as the birthplace of the poet. But this was his last purchase, the tide of his hitherto prosperous fortunes being but too clearly already on the turn. Having passed the highest point of social and commercial success, he was now facing the downward slope, and the descent once begun was for some years continuous, and at times alarmingly and almost inscrutably rapid.

Early prosperity.

Reverse of fortune.

It seems clear indeed from the facts of the case that, notwithstanding John Shakespeare's intelligence, activity, and early success, there was some defect of character which introduced an element of instability into his career, and in the end very much neutralized the workings of his nobler powers. Faintly discernible perhaps from the first, and overpowered only for a time by the access of prosperity that followed his

fortunate marriage, this vital flaw ultimately produced its natural fruit in the serious embarrassments that clouded his later years. The precise nature of the defect can only be indicated in general terms, but it seems to have consisted very much in a want of measure and balance, of adequate care and foresight, in his business dealings and calculations. He seems to have possessed the eager sanguine temperament which, absorbed in the immediate object of pursuit, overlooks difficulties and neglects the wider considerations on which lasting success depends. Even in his early years at Stratford there are signs of this ardent, impatient, somewhat unheedful temper. He is not only active and pushing, but too restless and excitable to pay proper attention to necessary details, or discharge with punctuality the minor duties of his position. The first recorded fact in his local history illustrates this feature of his character. In April, 1552, John Shakespeare is fined twelve pence, equal to between eight and ten shillings [$1.94 and $2.43] of our English money now, for not removing the heap of household dirt and refuse that had accumulated in front of his own door. Another illustration of his want of thorough method and system in the management of his affairs is supplied by the fact that in the years 1556–57 he allowed himself to be sued in the bailiff's court for comparatively small debts. This could not have arisen from any want of means, as during the same period, in October, 1556, he made the purchase already referred to of two houses with extensive gardens. The actions for debt must therefore have been the result of negligence or temper on John Shakespeare's part, and either alternative tells almost equally against his habits of business coolness and regularity. Another illustration of his restless, ill-considered, and unbalanced energy may be found in the number and variety of occupations which he seems to have added to his early trade of glover and leather-dealer. As his prospects improved he appears to have seized on fresh branches of business, until he had included within his grasp the whole circle of agricultural products that could in any way be brought to market. It would seem also that he added farming, to a not inconsiderable extent, to his expanding retail business in Stratford. But it is equally clear that he lacked the orderly method, the comprehensive outlook, and the vigilant care for details essential for holding well in hand the threads of so complicated a commercial web. Other disturbing forces may probably be discovered in the pride and ambition, the love of social excitement and display, which appear to be among the ground notes of John Shakespeare's character so far as it is revealed to us in the few facts of his history. His strong social feeling and love of pleasurable excitement are illustrated by the fact that during the year of his mayoralty he brought companies of players into the town, and inaugurated dramatic performances in the guild hall. It is during the year of his filling the post of high-bailiff that we first hear of stage plays at Stratford, and the players must have visited the town, if not, as is most likely, at the invitation and desire of the poet's father, at least with his sanction and support. In such cases the players could not act at all without the permission of the mayor and council, and their first performance was usually a free entertainment, patronized and paid for by the corporation, and called the mayor's play. In all this John Shakespeare took the initiative, and in so doing probably helped to decide the future career of his son. The notes of personal pride and social ambition are equally apparent. It is on record, for example, that soon after reaching the highest post of municipal distinction the poet's father applied to the heralds' college for a grant of arms. This application was not at the time successful, but it seems to have been so far seriously entertained that official inquiries were made into the family history and social standing of the Shakespeares. But the remarkable fact is that such an application should have been made at all by a Stratford burgess whose position and prospects were so unstable and precarious as the events of the next few years showed those of John Shakespeare to be. At the time of the application his increasing family must have enlarged his household expenses, while his official position, combined with his open and generous nature, his love of social sympathy, distinction, and support, would probably have led him into habits of free-handed hospitality and inconsiderate expenditure. All this must have helped to introduce a scale of lavish domestic outlay that would tend directly to hasten the financial collapse in his affairs that speedily followed. And on finding things going against him John Shakespeare was just the man to discount his available resources, and, as the pressure increased, mortgage his future and adopt any possible expedient for maintaining the increased port and social consequence he had imprudently assumed.

This seems to have been the course actually pursued when pecuniary difficulties arose. During the three years that elapsed after his last purchase of house property his affairs became so seriously embarrassed that it was found necessary, if not to sacrifice, at least to jeopardize the most cherished future of the family in order to meet the exigencies of the moment. In 1578 John and Mary Shakespeare mortgaged for forty pounds [$194.40] their most considerable piece of landed property, the estate of the Asbies. The mortgagee was a family connection of their own, Edmund Lambert, who had married Mary Shakespeare's sister Joan. The subsequent history of this transaction shows how bitter must have been the need that induced the Shakespeares to surrender, even for a time, their full control over the ancestral estate. The next year, however, the pressure, instead of being relieved by the sacrifice, had become still more urgent, and the only outlying property that remained to meet it was the reversionary interest in the Snitterfield estate. Under a family settlement Mary Shakespeare, on the death of her stepmother, would come into the possession of houses and land at Snitterfield almost equal in value to the Asbies estate. But in 1579 the Shakespeares found it necessary to dispose altogether of this reversionary interest. In that year it was sold to Robert Webb for the sum of forty pounds [$194.40]. The buyer was a nephew of Mary Shakespeare, being the son of Alexander Webb, who had married her sister Margaret. In thus applying to relatives or family connections in their need, and disposing of their property to them, the Shakespeares may have hoped it would be more easily regained should times of prosperity return. The sacrifice of the remaining interests in the Snitterfield property afforded, however, only a temporary relief, quite insufficient to remove the accumulating burden of debt and difficulty which now weighed the Shakespeares down. The notes of the proceedings of the Stratford corporation and of the local court of record sufficiently show that John Shakespeare's adverse fortune continued through a series of years, and they also enable us in part to understand how he bore himself under the changes in his social position that followed. These changes begin in the critical year 1578. In January of that year, when his brother aldermen were called upon to pay a considerable sum each as a contribution to the military equipment to be provided by the town, John Shakespeare is so far relieved that only one half the amount is required from him. Later in the year we find him wholly exempted from the weekly tax paid by his fellow-aldermen for the relief of the poor. In the spring of the following year, on a further tax for military purposes being laid on the town, he is unable to contribute anything, and is accordingly reported as a defaulter. A few years later, in an action for a debt, a verdict is recorded against him, with the official report that he had no goods on which distraint could be made. About the same time he appears to have been under some restraint, if not actually imprisoned for debt. And as late as 1592 it is officially stated, as a result of an inquiry into the number who fail to attend the church service once a month according to the statutory requirement, that John Shakespeare with some others, two of whom, curiously enough, are named Fluellen and Bardolph, "come not to church for fear of process for debt." In the year 1586 another alderman had at length been chosen in his place, the reason given being expressly because "John Shakespeare doth not come to the halles when they are warned, nor hath not done for a long time."

Moral effects.

From this brief official record it would seem that under his reverse of fortune he was treated with marked sympathy and consideration by his fellow townsmen. For at least seven years after his troubles first began his fellow-burgesses persist in keeping his name in its place of honor on their roll, partly no doubt as a mark of respect for his character and past services, and partly it may be in the hope that his fortunes might improve and prosperous days return. And, when at length he is superseded by the appointment of another in his place, this is done, not on the ground of his reduced circumstances, but simply because he voluntarily absents himself from the council, never attends its meetings or takes any part in its affairs. This is a noteworthy fact illustrating still further John Shakespeare's character. The statement clearly indicates the kind of moral collapse that had followed the continuous pressure of material reverses. The eager sanguine nature that had so genially expanded in prosperity was, it is clear, sorely chilled and depressed by adversity. He abandons the usual places of resort, withdraws himself from the meetings of the corporation, and ceases to associate with his fellow-burgesses. And, what is perhaps still more noticeable, he gives up attending church, and no longer even worships with his fellow-townsmen. All this is the more significant because his circumstances, though seriously embarrassed, and for some years much reduced, were never so desperate as to compel him to part with his freehold property in Henley

Street. In the darkest hours of his clouded fortune he still retained the now world-famous houses associated with the poet's birth and early years. There was no adequate reason therefore why John Shakespeare should have so completely forsaken the usual haunts and regular assemblies of his fellow-towusmen and friends. But it seems clear, as already imtimated, that, while gifted with a good deal of native energy and intelligence, and possessing a temper that was proud, sensitive, and even passionate, John Shakespeare lacked the kind of fortitude and moral courage which enables men to meet serious reverses of fortune with dignity and reserve, if not with cheerfulnesss and hope. With the instinct of a wounded animal he seems to have left the prosperous herd and retired apart to bear his pain and loss in solitude and alone. Nor apparently did he hold up his head again until the efficient support of his prosperous son enabled him to take active measures for the recovery of his alienated estate and lost position in the town. By the middle of the last decade of the 16th century the poet's success in his profession was thoroughly assured, and he was on the high road to wealth and fame. As actor, dramatist, and probably also as sharer in the Blackfriars theatre, he was in the receipt of a large income, and according to tradition received a considerable sum from the young earl of Southamptou, to whom his poems were dedicated. The son was now therefore as able as he had always been willing to help his father to regain the position of comfort and dignity he had formerly occupied. We find accordingly that in 1597 Johu and Mary Shakespeare filed a bill in Chancery against John Lambert for the recovery of the Asbies estate, which had been mortgaged to his father nearly twenty years before. There had indeed been some movemeut in the matter ten years earlier, on the death of Edward Lambert the mortgagee. His son John being appareutly auxious to settle the dispute, it was proposed that he should pay an additional sum of twenty pounds [$97.20] in order to convert the mortgage into a sale, and that he should then receive from the Shakespeares an absolute title to the estate. The arrangement was not, however, carried out, and in 1589 John Shakespeare brought a bill of complaint against Lambert in the Court of Queen's Bench. Nothing further, however, seems to have been done, probably because Lambert may have felt that in the low state of the Shakespeares' fortune the action could not be pressed. In 1597, however, there was a change in the relative position of the litigants, John Shakespeare having now the purse of his son at his command, and a bill iu Chancery was accordingly filed against John Lambert. The plea in support of the Shakespeares' claim was that the original conditions of the mortgage had been fulfilled, the mouey in discharge having been offered to Edward Lambert at the proper date, but refused by him on the ground that other sums were owiug which must also be repaid at the same time. To this plea John Lambert replied, and there is a still further "replication" on the part of the Shakespeares. How the matter was eventually decided is not known, no decree of the court in the case having been discovered. But the probabilities are that it was settled out of court, and, as the estate did not return to the Shakespeares, probably on the basis of the proposal already made, —that of the payment of an additional sum by John Lambert. About the same date, or rather earlier, in 1596, Johu Shakespeare also renewed his application to the herald's college for a grant of arms, and this time with success. The grant was made on the ground that the history and position of the Shakespeare and Arden families fully entitled the applicant to receive coat armor. There can be no doubt that the means required for supporting these applications were supplied by the poet, and he would be well rewarded by the knowledge that in the evening of his days his father had at length realized the desire of his heart, being officially recognized as a "gentleman of worship." And, what would now perhaps please his father still better, he would be able to hand on the distinction to his son, whose profession prevented him at the time from gaining it on his own account. John Shakespeare died in 1601, having through the affectionate care of his son spent the last years of his life in the ease and comfort befitting one who had not only been a prosperous burgess, but chief alderman and mayor of Stratford.

The poet's mother.

Of Mary Arden, the poet's mother, we know little, hardly anything directly indeed; but the little known is wholly in her favor. From the provisions of her father's will it is clear that of his seven daughters she was his favorite; and the links of evidence are now complete connecting her father Robert Arden with the great Warwickshire family of Arden, whose members had more than once filled the posts of high-sheriff and lord-lieutenant of the county. She was thus descended from an old county family, the oldest in Warwickshire, and had inherited the traditions of gentle birth and good breeding. Her ancestors are traced back, not only to Norman, but to Anglo-Saxon times, Alwin, an early representative of the family, and himself connected with the royal house of Athelstane, having been *vice-comes* or sheriff of Warwickshire in the time of Edward the Confessor. His son Turchill retained his extensive possessions under the Conqueror; and, when they were divided on the marriage of his daughter Margaret to a Norman noble created by William Rufus earl of Warwick, Turchill betook himself to his numerous lordships in the Arden district of the county, and assumed the name of De Ardern or Arden. His descendants, who retained the name, multiplied in the shire, and were united in marriage from time to time with the best Norman blood of the kingdom. The family of Arden thus represented the union, under somewhat rare conditions of original distinction and equality, of the two great race elements that have gone to the making of the typical modern Englishman. The immediate ancestors of Mary Shakespeare were the Ardens of Parkhall, near Aston in the northwestern part of the shire. During the Wars of the Roses Robert Arden of Parkhall, being at the outset of the quarrel a devoted Yorkist, was seized by the Lancastrians, attached for high treason, and executed at Ludlow in 1452. He left an only son, Walter Arden, who was restored by Edward IV. to his position in the country, and received back his hereditary lordships and lands. At his death in 1502 he was buried with great state in Aston church, where three separate monuments were erected to his memory. He had married Eleanor, second daughter of John Hampden of Bucks, and by her had eight children, six sons and two daughters. The eldest son, Sir John Arden of Parkhall, having been for some years esquire of the body of Henry VII., was knighted and rewarded by that monarch. Sir John was the great-uncle of Mary Shakespeare,—his brother Thomas, the second son of Walter Arden, being her grandfather. Thomas Arden is found residing at Aston Cantlowe during the first half of the 16th century, and in the year 1501 he united with his son Robert Arden, Mary Shakespeare's father, in the purchase of the Snitterfield estate. Mary Shakespeare was thus directly connected by birth and lineage with those who had taken, and were to take, a foremost part in the great conflicts which constitute turning-points in the history of the country. On her father's side she was related to Robert Arden, who in the 15th century lost his life while engaged in rallying local forces on behalf of the White Rose, and on her mother's side to John Hampden, who took a still more distinguished part in the momentous civil struggles of the 17th century.

Family of Arden.

A very needless and abortive attempt has been made to call in question Robert Arden's social and family position on the ground that in a contemporary deed he is called a husbandman (*agricola*),—the assumption being that a husbandman is simply a farm-laborer. But the term husbandman was often used in Shakespeare's day to designate a landed proprietor who farmed one of his own estates. The fact of his being spoken of in official documents as a husbandman does not therefore in the least affect Robert Arden's social position, or his relation to the great house of Arden, which is now established on the clearest evidence. He was, however, a younger member of the house, and would naturally share in the diminished fortune and obscurer career of such a position. But, even as a cadet of so old and distinguished a family, he would tenaciously preserve the generous traditions of birth and breeding he had inherited. Mary Arden was thus a gentlewoman in the truest sense of the term, and she would bring into her hus-

band's household elements of character and culture that would be of priceless value to the family, and especially to the eldest son, who naturally had the first place in her care and love. A good mother is to an imaginative boy his earliest ideal of womanhood, and in her for him are gathered up, in all their vital fulness, the tenderness, sympathy, and truth, the infinite love, patient watchfulness, and self-abnegation of the whole sex. And the experience of his mother's bearing and example during the vicissitudes of their home life must have been for the future dramatist a vivid revelation of the more sprightly and gracious, as well as of the profounder elements, of female character. In the earlier and prosperous days at Stratford, when all within the home circle was bright and happy, and in her intercourse with her boy Mary Shakespeare could freely unfold the attractive qualities that had so endeared her to her father's heart, the delightful image of the young mother would melt unconsciously into the boy's mind, fill his imagination, and become a storehouse whence in after years he would draw some of the finest lines in his matchless portraiture of women. In the darker days that followed he would learn something of the vast possibilities of suffering, personal and sympathetic, belonging to a deep and sensitive nature, and as the troubles made head he would gain some insight into the quiet courage and self-possession, the unwearied fortitude, sweetness, and dignity which such a nature reveals when stirred to its depth by adversity, and rallying all its resources to meet the inevitable storms of fate. These storms were not simply the ever-deepening pecuniary embarrassments and consequent loss of social position. In the very crisis of the troubles, in the spring of 1579, death entered the straitened household, carrying off Ann, the younger of the only two remaining daughters of John and Mary Shakespeare. A characteristic trait of the father's grief and pride is afforded by the entry in the church books that a somewhat excessive sum was paid on this occasion for the tolling of the bell. Even with ruin staring him in the face John Shakespeare would forego no point of customary respect nor abate one jot of the ceremonial usage proper to the family of an eminent burgess, although the observance might involve a very needless outlay. In passing through these chequered domestic scenes and vividly realizing the alternations of grief and hope, the eldest son, even in his early years, would gain a fund of memorable experiences. From his native sensibility and strong family affection he would passionately sympathize with his parents in their apparently hopeless struggle against the slings and arrows of outrageous fortune. Above all he would cherish the memory of his mother's noble bearing alike under serene and clouded skies, and learn to estimate at their true worth the refined strength of inherited courage, the dignified grace and silent helpfulness of inherited courtesy and genuine kindness of heart. These recollections were vitalized in the sprightly intelligence, quick sympathy, and loving truthfulness belonging to the female characters of his early comedies, as well as in the profounder notes of womanly grief and suffering, struck with so sure a hand and with such depth and intensity of tone, in the early tragedies.

Mary Arden —character and influence.

But in addition to her constant influence and example the poet was probably indebted to his mother for certain elements of his own mind and character directly inherited from her. This position may be maintained without accepting the vague and comparatively empty dictum that Shakespeare derived his genius from his mother, as many eminent men are loosely said to have done. The sacred gift of genius has ever been, and perhaps always will be, inexplicable. No analysis, however complete, of the forces acting on the individual mind can avail to extract this vital secret. The elements of race, country, parentage, and education, though all powerful factors in its development, fail adequately to account for the mystery involved in pre-eminent poetical genius. Like the unseen wind from heaven it bloweth where it listeth, and the inspired voice is gladly heard of men, but none can tell whence it cometh or whither it goeth. While, however, genius is thus without ancestry or lineage, there are elements of character and qualities of mind that, like the features of the countenance and the lines of the bodily frame, appear to be clearly transmissible from parent to child. Shakespeare not unfrequently recognizes this general truth, especially in relation to moral qualities; and it is mainly qualities of this kind that he himself appears to have inherited from his gently born and nurtured mother, Mary Arden of the Asbies. At least it is hardly fanciful to say that in the life and character of the poet we may trace elements of higher feeling and conduct derived from the hereditary culture and courtesy, the social insight and refinement of the Ardens. Amongst such elements may be reckoned his strong sense of independence and self-respect, his delicate feeling of honor, his habitual consideration for others, and, above all perhaps, his deep instinctive regard for all family interests and relationships, for everything indeed connected with family character and position. The two epithets which those who knew Shakespeare personally most habitually applied to him appear to embody some of these characteristics. They unite in describing him as "gentle" and "honest" in character, and of an open and free, a frank and generous disposition. The epithet "gentle" may be taken to represent the innate courtesy, the delicate consideration for the feelings of others, which belongs in a marked degree to the best representatives of gentle birth, although happily it is by no means confined to them. The second epithet, "honest," which in the usage of the time meant honorable, may be taken to express the high spirit of independence and self-respect which carefully respects the just claims and rights of others. One point of the truest gentle breeding, which, if not inherited from his mother, must have been derived from her teaching and example, is the cardinal maxim, which Shakespeare seems to have faithfully observed, as to nice exactness in money matters—the maxim not lightly to incur pecuniary obligations, and if incurred to meet them with scrupulous precision and punctuality. This he could not have learnt from his father, who, though an honest man enough, was too eager and careless to be very particular on the point. Indeed, carelessness in money matters seems rather to have belonged to the Snitterfield family, the poet's uncle Henry having been often in the courts for debt, and, as we have seen, this was true of his father also. But, while his father was often prosecuted for debt, no trace of any such action against the poet himself, for any amount however small, has been discovered. He sued others for money due to him and at times for sums comparatively small, but he never appears as a debtor himself. Indeed, his whole life contradicts the supposition that he would ever have rendered himself liable to such a humiliation. The family troubles must have very early developed and strengthened the high feeling of honor on this vital point he had inherited. He must obviously have taken to heart the lesson his father's imprudence could hardly fail to impress on a mind so capacious and reflective. John Shakespeare was no doubt a warm-hearted lovable man, who would carry the sympathy and affection of his family with him through all his troubles, but his eldest son, who early understood the secret springs as well as the open issues of life, must have realized vividly the rock on which their domestic prosperity had been wrecked, and before he left home he had evidently formed an invincible resolution to avoid it at all hazards. This helps to explain what has often excited surprise in relation to his future career—his

Qualities inherited from his mother.

business industry, financial skill, and steady progress to what may be called worldly success. Few things are more remarkable in Shakespeare's personal history than the resolute spirit of independence he seems to have displayed from the moment he left his straitened household to seek his fortunes in the world to the time when he returned to live at Stratford as a man of wealth and position in the town. While many of his fellow dramatists were spendthrifts, in constant difficulties, leading disorderly lives, and sinking into unhonored graves, he must have husbanded his early resources with a rare amount of quiet firmness and self-control. Chettle's testimony as to Shakespeare's character and standing during his first years in London is decisive on this head. Having published a posthumous work by Greene, in which Marlowe and Shakespeare were somewhat sharply referred to, Chettle expressed his regret in a preface to a work of his own issued a few months later, in December, 1592; he intimates that at the time of publishing Greene's *Groatsworth of Wit* he knew neither Marlowe nor Shakespeare, and that he does not care to become acquainted with the former. But having made Shakespeare's acquaintance in the interval he expresses his regret that he should, even as editor, have published a word to his disparagement, adding this remarkable testimony: "Because myself have seen his demeanor, no less civil than he excellent in the qualities he professes: besides, divers of worship have reported his uprightness of dealing, which argues his honesty, and his facetious grace in writing, which approves his art." So that Shakespeare, during his earliest and most anxious years in London, had not only kept himself out of debt and difficulty, but had established a reputation of strictly honorable conduct, "divers of worship,"—*i.e.*, men of position and authority entitled to speak on such a point, "having reported his uprightness of dealing, which argued his honesty." Now, considering the poet's associates, occupation, and surroundings, this is significant testimony, and conclusively proves that, although fond of social life and its enjoyments, and without a touch of harshness or severity in his temper, he yet held himself thoroughly in hand, that amidst the ocean of new experiences and desires on which he was suddenly launched he never abandoned the helm, never lost command over his course, never sacrificed the larger interests of the future to the clamorous or excessive demands of the hour. And this no doubt indicates the direction in which he was most indebted to his mother. From his father he might have derived ambitious desires, energetic impulses, and an excitable temper capable of rushing to the verge of passionate excess, but, if so, it is clear that he inherited from his mother the firmness of nerve and fibre as well as the ethical strength required for regulating these violent and explosive elements. If he received as a paternal heritage a very tempest and whirlwind of passion, the maternal gift of temperance and measure would help to give it smoothness and finish in the working, would supply in some degree at least the power of concentration and self-control indispensable for moulding the extremes of exuberant sensibility and passionate impulse into forms of intense and varied dramatic portraiture; and of course all the finer and regulative elements of character and disposition derived from the spindle side of the house would, throughout the poet's early years, be strengthened and developed by his mother's constant presence, influence, and example.

Shakespeare's birth.

John and Mary Shakespeare had eight children, four sons and four daughters. Of the latter, two, the first Joan and Margaret, died in infancy, before the birth of the poet, and a third, Anne, in early childhood. In addition to the poet, three sons, Gilbert, Richard, and Edmund, and one daughter, the second Joan, lived to maturity and will be referred to again. William Shakespeare was christened in Stratford church on April 26, 1564, having most probably been born, according to tradition, on the 23d. In July of the same year the town was visited by a severe outbreak of the plague, which in the course of a few months carried off one-sixth of the inhabitants. Fortunately, however, the family of the Shakespeares wholly escaped the contagion, their exemption being probably due to the fact that they lived in the healthiest part of the town, away from the river side, on a dry and porous soil. At the back of Henley street, indeed, were the gravel pits of the guild, which were in frequent use for repairing the inundated pathways near the river after its periodical overflows. For two years and a half William, their first-born son, remained the only child of his parents, and all his mother's love and care would naturally be lavished upon him. A special bond would in this way be established between mother and child, and, his father's affairs being at the time in a highly prosperous state, Mary Shakespeare would see to it that the boy had all the pleasures and advantages suitable to his age, and which the family of a foremost Stratford burgess could easily command.

Early life.

Healthy outdoor enjoyment is not the least valuable part of a boy's education, and the chief recreations available for the future dramatist in those early years would be the sports and pastimes, the recurring festivals, spectacles, and festivities, of the town and neighborhood, especially the varying round of rural occupations and the celebration in the forest farms and villages of the chief incidents of the agricultural year. Seed time and harvest, summer and winter, each brought its own group of picturesque merry-makings, including some more important festivals that evoked a good deal of rustic pride, enthusiasm, and display. There were, during these years, at least three of the forest farms where the poet's parents would be always welcome, and where the boy must have spent many a happy day amidst the freedom and delights of outdoor country life. At Snitterfield his grandfather would be proud enough of the curly-headed youngster with the fine hazel eyes, and his uncle Henry would be charmed at the boy's interest in all he saw and heard as he trotted with him through the byres and barns, the poultry yard and steading, or, from a safe nook on the bushy margin of the pool, enjoyed the fun and excitement of sheep-washing, or later on watched the mysteries of the shearing and saw the heavy fleece fall from the sides of the palpitating victim before the sure and rapid furrowing of the shears. He would no doubt also be present at the shearing feast and see the queen of the festival receive her rustic guests and distribute amongst them her floral gifts. At Wilmecote, in the solid oak-timbered dwelling of the Asbies, with its well-stocked garden and orchard, the boy would be received with cordial hospitality, as well as with the attention and respect due to his parents as the proprietors and to himself as the heir of the maternal estate. At Shottery the welcome of the Shakespeares would not be less cordial or friendly, as there is evidence to show that as early as 1566 the families were known to each other, John Shakespeare having in that year rendered Richard Hathaway an important personal service. Here the poet met his future bride, Anne Hathaway, in all the charm of her sunny girlhood, and they may be said to have grown up together, except that from the difference of their ages she would reach early womanhood while he was yet a stripling. In his later youthful years he would thus be far more frequently at the Hathaway farm than at Snitterfield or the Asbies. There were, however, family connections of the Shakespeares occupying farms further afield,—Hills and Webbs at Bearley and Lamberts at Barton-on-the-Heath. There was thus an exceptionally wide circle of country life open to the poet during his growing years. And in those years he must have repeatedly gone the whole picturesque round with the fresh senses and eager feel-

Rural sports and country rambles.

ing, the observant eye and open mind, that left every detail, from the scarlet hips by the wayside to the proud tops of the eastern pines, imprinted indelibly upon his heart and brain. Hence the apt and vivid reference to the scenes and scenery of his youth, the intense and penetrating glances at the most vital aspects as well as the minutest beauties of nature, with which his dramas abound. These glances are so penetrating, the result of such intimate knowledge and enjoyment, that they often seem to reveal in a moment, and by a single touch as it were, all the loveliness and charm of the objects thus rapidly flashed on the inward eye. In relation to the scenes of his youth what fresh and delightful hours at the farms are reflected in the full summer beauty and motley humors of a sheep-shearing festival in the *Winter's Tale;* in the autumn glow of the "sun-burnt sicklemen and sedge-crowned nymphs" of the masque in the *Tempest;* and in the vivid pictures of rural sights and sounds in spring and winter so musically rendered in the owl and cuckoo songs of *Love's Labor's Lost!* But, in addition to the festivities and merry-makings of the forest farms, it is clear that, in his early years, the poet had some experience of country sports proper, such as hunting, hawking, coursing, wild-duck shooting, and the like. Many of these sports were pursued by the local gentry and yeomen together, and the poet as the son of a well-connected burgess of Stratford, who had recently been mayor of the town and possessed estates in the county, would be well entitled to share in them, while his handsome presence and courteous bearing would be likely to ensure him a hearty welcome. If any of the stiffer local magnates looked coldly upon the high-spirited youth, or resented in any way his presence amongst them, their conduct would be likely enough to provoke the kind of sportive retaliations that might naturally culminate in the deer-stealing adventure. However this may be, it is clear from internal evidence that the poet was practically familiar with the field sports of his day.

Holiday spectacles and festivities.

In the town the chief holiday spectacles and entertainments were those connected with the Christmas, New Year, and Easter festivals, the May-day rites and games, the pageants of delight of Whitsuntide, the beating of the bounds during Rogation week, and the occasional representation of mysteries, moralities, and stage-plays. In relation to the main bent of the poet's mind, and the future development of his powers, the latter constituted probably the most important educational influence and stimulus which the social activities and public entertainments of the place could have supplied. Most of these recurring celebrations involved, it is true, a dramatic element,—some hero or exploit, some emblem or allegory, being represented by means of costumed personations, pantomime and dumb show, while in many cases songs, dances, and brief dialogues were interposed as part of a performance. There were

May day.

masques and morris-dancing on May-day, as well as mummers and waits at Christmas. In a number of towns and villages the exploits of Robin Hood and his associates were also celebrated on May-day, often amidst a picturesque confusion of floral emblems and forestry devices. In Shakespeare's time the May-day rites and games thus included a variety of elements charged with legendary, historical and emblematical significance. But, notwithstanding this mixture of festive elements, the celebration as a whole retained its leading character and purpose. It was still the spontaneous meeting of town and country to welcome the fresh beauty of the spring, the welcome being reflected in the open spaces of the sports by tall painted masts decked with garlands, streamers, and flowery crowns, and in the public thoroughfares by the leafy screens and arches, the bright diffused blossoms and fragrant spoils brought from the forest by rejoicing youths and maidens at the dawn. May-day was thus well-fitted to be used, as it often is by Shakespeare, as the comprehensive symbol of all that is delightful and exhilarating in the renewed life and vernal freshness of the opening year.

Whitsuntide.

After May-day, Whitsuntide was at Stratford perhaps the most important season of festive pageantry and scenic display. In addition to the procession of the guild and trades and the usual holiday ales and sports, it involved a distinct and somewhat noteworthy element of dramatic representation. And, as in the case of the regular stage-plays, the high-bailiff and council appear to have patronized and supported the performances. We find in the chamberlain's accounts entries of sums paid "for exhibiting a pastyme at Whitsuntide." Shakespeare himself refers to these dramatic features of the celebration, and in a manner that almost suggests he may in his youth have taken part in them. However this may be, the popular celebrations of Shakespeare's youth must have supplied a kind of training in the simpler forms of poetry and dramatic art, and have afforded some scope for the early exercise of his own powers in both directions. This view is indirectly confirmed by a passage in the early scenes of *The Return from Parnassus*, where the academic speakers sneer at the poets who come up from the country without any university training. The sneer is evidently the more bitter as it implies that some of these poets had been successful,—more successful than the college-bred wits. The academic critics suggest that the nurseries of these poets were the country ale-house and the country green,—the special stimulus to their powers being the May-day celebrations, the morris-dances, the hobby-horse, and the like.

Interludes and stage-plays.

But the moralities, interludes, and stage-plays proper afforded the most direct and varied dramatic instruction available in Shakespeare's youth. The earliest popular form of the drama was the mystery or miracle play, dealing in the main with Biblical subjects; and, Coventry being one of the chief centres for the production and exhibition of the mysteries, Shakespeare had ample opportunities of becoming well acquainted with them. Some of the acting companies formed from the numerous trade guilds of the "shire-town" were moreover in the habit of visiting the neighboring cities for the purpose of exhibiting their plays and pageants. There is evidence of their having performed at Leicester and Bristol in Shakespeare's youth, and on returning from the latter city they would most probably have stopped at Stratford and given some performances there. And in any case, Coventry being so near to Stratford, the fame of the multiplied pageants presented during the holiday weeks of Easter and Whitsuntide, and especially of the brilliant concourse that came to witness the grand series of Corpus Christi plays, would have early attracted the young poet; and he must have become familiar with the precincts of the Gray Friars at Coventry during the celebration of these great ecclesiastical festivals. The indirect evidence of this is supplied by Shakespeare's references to the well-known characters of the mysteries, such as Herod and Pilate, Cain and Judas, Termagaunt with his turbaned Turks and infidels, black-burning souls, grim and gaping hell, and the like. The moralities and interludes that gradually took the place of the Biblical mysteries were also acted by companies of strolling players over a wide area in the towns and cities of the Midland and western counties. Malone gives from an eye-witness a detailed and graphic account of the public acting of one of these companies at Gloucester in 1569, the year during which the poet's father as high-bailiff had brought the stage-players into Stratford and inaugurated a series of performances in the guild hall. The play acted at Gloucester was *The Cradle of Security*, one of the most striking and popular of the early moralities or interludes. Willis, the writer of the account, was just Shakespeare's age, having been born in 1564. As a

boy of five years old he had been taken by his father to see the play, and, standing between his father's knees, watched the whole performance with such intense interest that, writing about it seventy years afterwards, he says, "the subject took such an impression upon me that when I came afterwards towards man's estate it was as fresh in my memory as if I had seen it newly enacted." In proof of this he gives a clear and detailed outline of the play. Willis was evidently a man of no special gifts, and, if the witnessing a play when a child could produce on an ordinary mind so memorable an impression, we may imagine what the effect would be on the mind of the marvellous boy who, about the same time and under like circumstances, was taken by his father to see the performances at Stratford. The company that first visited Stratford being a distinguished one, their plays were probably of a higher type and better acted than *The Cradle of Security* at Gloucester: and their effect on the young poet would be the more vivid and stimulating from the keener sensibilities and latent dramatic power to which in his case they appealed. These early impressions would be renewed and deepened with the boy's advancing years. During the decade of Shakespeare's active youth from 1573 to 1584 the best companies in the kingdom constantly visited Stratford, and he would thus have the advantage of seeing the finest dramas yet produced acted by the best players of the time. This would be for him a rich and fruitful experience of the flexible and impressive form of art which at a moment of exuberant national vitality was attracting to itself the scattered forces of poetic genius, and soon gained a position of unrivalled supremacy. As he watched the performance in turn of the various kinds of interlude, comedy, and pastoral, of chronicle and biographical plays, of historical, domestic, or realistic tragedy, he would gain in instructive insight into the wide scope and vast resources of the rising drama. And he would have opportunities of acquiring some knowledge of stage business, management, and effects, as well as of dramatic form. Amongst the companies that visited Stratford were those of the powerful local earls of Leicester, Warwick, and Worcester, whose members were largely recruited from the Midland counties. The earl of Leicester's company, the most eminent of all, included several Warwickshire men, while some of the leading members, like the elder Burbage, appear to have been natives of Stratford or the immediate neighborhood. And the poet's father being, as we have seen, so great a friend of the players, and during his most prosperous years in constant communication with them, his son would have every facility for studying their art. Curiosity and interest and the like would prompt him to find out all he could about the use of the stage "books," the distribution of the parts, the cues and exits, the management of voice and gesture, the graduated passion and controlled power of the leading actors in the play, the just subordination of the less important parts, and the measure and finish of each on which the success of the whole so largely depended. It is not improbable, too, that in connection with some of the companies Shakespeare may have tried his hand both as poet and actor even before leaving Stratford. His poetical powers could hardly be unknown, and he may have written scenes and passages to fill out an imperfect or complete a defective play; and from his known interest in their work he may have been pressed by the actors to appear in some secondary part on the stage. In any case he would be acquainted with some of the leading players in the best companies, so that when he decided to adopt their profession he might reasonably hope on going to London to find occupation amongst them without much difficulty or delay.

Shakespeare received the technical part or scholastic elements of his education in the grammar school of his native town. The school was an old foundation dating from the second half of the 15th century and connected with the guild of the Holy Cross. But, having shared the fate of the guild at the suppression of religious houses, it was restored by Edward VI. in 1553, a few weeks before his death. The "King's New School," as it was now called, thus represented the fresh impulse given to education throughout the kingdom during the reign of Henry VIII.'s earnest-minded son, and well sustained under the enlightened rule of his sister, the learned virgin queen. What the course of instruction was in these country schools during the second half of the 16th century has recently been ascertained by special research,[1] and may be stated, at least in outline, with some degree of certainty and precision. As might have been expected, Latin was the chief scholastic drill, the thorough teaching of the Roman tongue being, as the name implies, the very purpose for which the grammar schools were originally founded. The regular teaching of Greek was indeed hardly introduced into the country school until a somewhat later period. But the knowledge of Latin, as the language of all the learned professions, still largely used in literature, was regarded as quite indispensable. Whatever else might be neglected, the business of "gerund-grinding" was vigorously carried on, and the methods of teaching, the expedients and helps devised for enabling the pupils to read, write and talk Latin, if rather complex and operose, were at the same time ingenious and effective. As a rule the pupil entered the grammar school at seven years old, having already acquired either at home or at the petty school the rudiments of reading and writing. During the first year the pupils were occupied with the elements of Latin grammar, the accidence, and lists of common words which were committed to memory and repeated two or three times a week, as well as further impressed upon their minds by varied exercises. In the second year the grammar was fully mastered, and the boys were drilled in short phrase-books, such as the *Sententiæ Pueriles*, to increase their familiarity with the structure and idioms of the language. In the third year the books used were Æsop's *Fables*, Cato's *Maxims*, and some good manual of school conversation, such as the *Confabulationes Pueriles*. The most popular of these manuals in Shakespeare's day was that by the eminent scholar and still more eminent teacher Corderius. His celebrated *Colloquies* were probably used in almost every school in the kingdom; and Hoole, writing in 1652, says that the worth of the book had been proved "by scores if not hundreds of impressions in this and foreign countries." Bayle, indeed, says that from its universal use in the schools the editions of the book might be counted by thousands. This helps to illustrate the colloquial use of Latin, which was so essential a feature of grammar school discipline in the 16th and 17th centuries. The evidence of Brinsley, who was Shakespeare's contemporary, conclusively proves that the constant speaking of Latin by all the boys of the more advanced forms was indispensable even in the smallest and poorest of the country grammar schools. The same holds true of letter-writing in Latin; and this, as we know from the result, was diligently and successfully practiced in the Stratford grammar school. During his school days, therefore, Shakespeare would be thoroughly trained in the conversational and epistolary use of Latin, and several well-known passages in his dramas show that he did not forget this early experience, but that like everything else he acquired it turned to fruitful uses in his hands. The books read in the more advanced forms of the school were the *Eclogues* of Mantuanus, the *Tristia* and *Metamorphoses* of Ovid, Cicero's *Offices*, *Orations*, and *Epistles*, the *Georgics* and *Æneid* of Virgil, and in the highest form parts of Juvenal, of the comedies of Terence and Plautus, and of the tragedies of Seneca. Shakespeare, having remained at school for at least six years, must

School education.

[1] "What Shakespeare learnt at School," *Fraser's Magazine*, Nov. 1879, Jan. and May, 1880.

have gone through a greater part of this course, and, being a pupil of unusual quickness and ability, endowed with rare strength of mental grip and firmness of moral purpose, he must during those years have acquired a fair mastery of Latin, both colloquial and classical. After the difficulties of the grammar had been overcome, his early intellectual cravings and poetic sensibilities would be alike quickened and gratified by the new world of heroic life and adventure opened to him in reading such authors as Ovid and Virgil. Unless the teaching at Stratford was very exceptionally poor he must have become so far familiar with the favorite school authors, such as Ovid, Tully, and Virgil, as to read them intelligently and with comparative ease.

And there is no reason whatever for supposing that the instruction at the Stratford grammar school was less efficient than in the grammar schools of other provincial towns of about the same size. There is abundant evidence to show that, with the fresh impulse given to education under energetic Protestant auspices in the second half of the 16th century, the teaching even in the country grammar schools was as a rule painstaking, intelligent, and fruitful. Brinsley himself was for many years an eminent and successful teacher in the grammar school of Ashby-de-la-Zouche, a small town on the borders of Warwickshire, only a few miles indeed from Coventry; and in his *Ludus Literarius*, referring to a book of exercises on the Latin accidence and grammar he had prepared, he says that he had chiefly followed the order of the questions "of that ancient schoolmaster Master Brunsword of Maxfield (Macclesfield) in Cheshire, so much commended for his order and schollers; who, of all other, commeth therein the nearest unto the marke." Another provincial schoolmaster, Mr. Robert Doughty, a contemporary of Shakespeare, who was for nearly fifty years at the head of the Wakefield grammar school, is celebrated by Hoole, not only as an eminent teacher who had constantly sent out good scholars, but as one who had produced a class of teachers emulating his own educational zeal and intelligence. The masters of the Stratford grammar school in Shakespeare's time seem to have been men of a similar stamp. One of them, John Brunsword, who held the post for three years during the poet's childhood, was almost certainly a relative, probably a son, of the eminent Macclesfield master whose character and work Brinsley praises so highly. At least Brunsword being an uncommon name, when we find it borne by two grammar-school masters in neighboring counties who flourished either together or in close succession to each other, it is natural to conclude that there must have been some relationship between them, and if so we may be sure that the Stratford master, who was evidently the younger man, had been well trained and must have proved an efficient teacher. The masters who followed Brunsword were university men of at least average attainments and ability, as they rapidly gained promotion in the church. Thomas Hunt, who was head-master during the most important years of Shakespeare's school course, became incumbent of the neighboring village of Luddington; and, if there is any truth in the tradition that the poet's marriage was celebrated there, it is not improbable that, from having been a favorite pupil, he may have become the personal friend of his former master. In any case, during the years of his school attendance the poet must have gained sufficient knowledge of Latin to read for his own instruction and delight the authors included in the school curriculum who had struck his fancy and stimulated his awakening powers. While his writings supply clear evidence in support of this general position, they also bring out vividly the fact that Ovid was a special favorite with Shakespeare at the outset of his career. The influence of this romantic and elegiac Roman poet is indeed strongly marked and clearly traceable in the poems as well as in the early plays.

Home life on leaving school.

According to Rowe's account, Shakespeare was withdrawn from school about 1578, a year or two before he had completed the usual course for boys going into business or passing on to the universities. The immediate cause of the withdrawal seems to have been the growing embarrassments of John Shakespeare's affairs, the boy being wanted at home to help in the various departments of his father's business. The poet had just entered on his fifteenth year, and his school attainments and turn for affairs, no less than his native energy and ability, fitted him for efficient action in almost any fairly open career. But open careers were not numerous at Stratford, and John Shakespeare's once prosperous way of life was now hampered by actual and threatening difficulties which the zeal and affection of his son were powerless to remove or avert. No doubt the boy did his best, trying to understand his father's position, and discharging with prompt alacrity any duties that came to be done. But he would soon discover how hopeless such efforts were, and with this deepening conviction there would come upon him the reaction of weariness and disappointment, which is the true *inferno* of ardent youthful minds. His father's difficulties were evidently of the chronic and complicated kind against which the generous and impulsive forces of youth and inexperience are of little avail. And, after his son had done his utmost to relieve the sinking fortunes of the family, the aching sense of failure would be among the bitterest experiences of his early years, would be indeed a sharp awakening to the realities and responsibilities of life. Within the narrow circle of his own domestic relationships and dearest interests he would feel with Hamlet that the times were out joint, and in his gloomier moods be ready to curse the destiny that seemed to lay upon him, in part at least, the burden of setting the obstinately crooked straight. As a relief from such moods and a distraction from the fruitless toils of home affairs, he would naturally plunge with keener zest into such outlets for youthful energy and adventure as the town and neighborhood afforded. What the young poet's actual occupations were during the four years and a half that elapsed between his leaving school and his marriage we have no adequate materials for deciding in any detail. But the local traditions on the subject would seem to indicate that after the adverse turn in his fortunes John Shakespeare had considerably contracted the area of his commercial transactions. Having virtually alienated his wife's patrimony by the mortgage of the Asbies and the disposal of all interest in the Snitterfield property, he seems to have given up the agricultural branches of his business, retaining only his original occupation of dealer in leather, skins, and sometimes carcasses as well. His wider speculations had probably turned out ill, and having no longer any land of his own he apparently relinquished the corn and timber business, restricting himself to the town trades of fellmonger, wool-stapler, and butcher. Aubrey at least had heard that Shakespeare after leaving school assisted his father in these branches,—and at times with a deal of youthful extravagance indicative of irrepressible energy and spirit. Aubrey also reports, on the authority of Beeston, and as incidentally proving he knew Latin fairly well, that for a time the poet was a teacher in a country school; while Malone believed from the internal evidence of his writings that he had spent two or three years in a lawyer's office. These stories may be taken to indicate, what is no doubt true, that at a time of domestic need the poet was ready to turn his hand to anything that offered. It is no doubt also true that he would prefer the comparative retirement and regularity of teaching or clerk's work to the intermittent drudgery and indolence of a retail shop in a small market-town. There is, however, no direct evidence in favor of either supposition; and the indirect evidence for the lawyer's office theory which has found favor with several recent critics is by no means decisive. Whether engaged in a lawyer's office or not, we may be quite sure that during the years of adolescence he was actively occupied in work of some kind or other. He was far too sensible and energetic to remain without employment; shapeless idleness had no attraction for his healthy nature, and his strong family feeling is certainly in favor of the tradition that for a time he did his best to help his father in his business.

But, however he may have been employed, this interval of home life was for the poet a time of active

growth and development, and no kind of business routine could avail to absorb his expanding powers or repress the exuberant vitality of his nature. During these critical years, to a vigorous and healthy mind such as Shakespeare possessed, action—action of an adventurous and recreative kind, in which the spirit is quickened and refreshed by new experiences—must have become an absolute necessity of existence. The necessity was all the more urgent in Shakespeare's case from the narrower circle within which the once prosperous and expanding home life was now confined. We have seen that the poet occasionally shared the orthodox field sports organized by the country gentlemen, where landlords and tenants, yeomen and squires, animated by a kindred sentiment, meet to a certain extent on common ground. But this long-drawn pursuit of pleasure as an isolated unit in a local crowd would hardly satisfy the thirst for passionate excitement and personal adventure which is so dominant an impulse in the hey-day of youthful blood. It is doubtful, too, whether in the decline of his father's fortunes Shakespeare would have cared to join the prosperous concourse of local sportsmen. He would probably be thrown a good deal amongst a somewhat lower, though no doubt energetic and intelligent, class of town companions. And they would devise together exploits which, if somewhat irregular, possessed the inspiring charm of freedom and novelty, and would thus be congenial to an ardent nature with a passionate interest in life and action. Such a nature would eagerly welcome enterprises with a dash of hazard and daring in them, fitted to bring the more resolute virtues into play, and develop in moments of emergency the manly qualities of vigilance and promptitude, courage and endurance, dexterity and skill. It would seem indeed at first sight as though a quiet neighborhood like Stratford could afford little scope for such adventures. But even at Stratford there were always the forest and the river, the outlying farms with adjacent parks and manor houses, the wide circle of picturesque towns and villages with their guilds and clubs, their local Shallows and Slenders, Dogberries and Verges; and in the most quiet neighborhoods it still remains true that adventures are to the adventurous. That this dictum was verified in Shakespeare's experience seems clear alike from the internal evidence of his writings and the concurrent testimony of local tradition. In its modern form the story of the Bidford challenge exploit may indeed be little better than a myth. But in substance it is by no means incredible, and if we knew all about the incident we should probably find there were other points to be tested between the rival companies besides strength of head to resist the effects of the well-known Bidford beer. The prompt refusal to return with his companions and renew the contest on the following day,—a decision playfully expressed and emphasized in the well-known doggerel lines,—implies that in Shakespeare's view such forms of good fellowship were to be accepted on social not self-indulgent grounds, that they were not to be resorted to for the sake of the lower accessories only, or allowed to grow into evil habits from being unduly repeated or prolonged. It is clear that this general principle of recreative and adventurous enterprise, announced more than once in his writings, guided his own conduct even in the excitable and impulsive season of youth and early manhood. If he let himself go, as he no doubt sometimes did, it was only as a good rider on coming to the turf gives the horse his head in order to enjoy the exhilaration of a gallop, having the bridle well in hand the while, and able to rein in the excited steed at a moment's notice. It may be said of Shakespeare at such seasons, as of his own Prince Hal, that he—

> "Obscur'd his contemplation
> Under the veil of wildness; which, no doubt,
> Grew like the summer grass, fastest by night,
> Unseen, yet crescive in his faculty."

Deer-stealing tradition.

The deer-stealing tradition illustrates the same point; and though belonging perhaps to a rather later period it may be conveniently noticed here. This fragment of Shakespeare's personal history rests on a much surer basis than the Bidford incident, being supported not only by early multiplied and constant traditions, but by evidence which the poet himself has supplied. Rowe's somewhat formal version of the narrative is to the effect that Shakespeare in his youth was guilty of an extravagance which, though unfortunate at the time, had the happy result of helping to develop his dramatic genius. This misfortune was that of being engaged with some of his companions more than once in robbing a park belonging to Sir Thomas Lucy, of Charlecote. Sir Thomas, it is said, prosecuted him sharply for the offence, and in retaliation he wrote a satirical ballad upon him, which so incensed the baronet that Shakespeare thought it prudent to leave Stratford and join his old friends and associates, the players in London. Other versions of the tradition exist giving fresh details, some of which are on the face of them later additions of a fictitious and fanciful kind. But it would be useless to discuss the accretions incident to any narrative, however true, orally transmitted through two or three generations before being reduced to a written shape. All that can be required or expected of such traditions is that they should contain a kernel of biographical fact, and be true in substance although possibly not in form. And tried by this test the tradition in question must certainly be accepted as a genuine contribution to our knowledge of the poet's early years. Indeed it could hardly have been repeated again and again by inhabitants of Stratford within a few years of Shakespeare's death if it did not embody a characteristic feature of his early life which was well known in the town. This feature was no doubt the poet's love of woodland life, and the woodland sports through which it is realized in the most animated and vigorous form.

The neighborhood of Stratford in Shakespeare's day afforded considerable scope for this kind of healthy recreation. There was the remnant of the old Arden forest, which, though still nominally a royal domain, was virtually free for many kinds of sport. Indeed, the observance of the forest laws had fallen into such neglect in the early years of Elizabeth's reign that even unlicensed deer-hunting in the royal domains was common enough. And hardly any attempt was made to prevent the pursuit of the smaller game belonging to the warren and the chase. Then, three or four miles to the east of Stratford, between the Warwick road and the river, stretched the romantic park of Fulbroke, which, as the property of an attainted exile, sequestered though not seized by the crown, was virtually open to all comers. There can be little doubt that when Shakespeare and his companions wished a day's outing in the woods they usually resorted to some part of the Arden forest still available for sporting purposes. But sometimes, probably on account of its greater convenience, they seem to have changed the venue to Fulbroke Park, and there they might easily come into collision with Sir Thomas Lucy's keepers. There has been a good deal of discussion as to the scene of the traditional adventure, but the probabilities of the case are strongly in favor of Fulbroke. When Sir Walter Scott visited Sir Thomas Lucy at Charlecote in 1828, Sir Thomas told him that the park from which Shakespeare stole the deer was not Charlecote, but one belonging to a mansion at some distance, the context indicating Fulbroke as the scene of the exploit. And Mr. Bracebridge, in his interesting pamphlet *Shakespeare no Deer-Stealer*, has thrown fresh light on the subject, and made the whole incident more intelligible by marshalling the reasons in favor of this view. The park had, it seems, been held by the Lucys under the crown in the time of Henry VIII., but was afterwards granted by Queen Mary to one of her privy councillors—Sir Francis Englefield. Being a devoted Romanist, he fled to Spain on the accession of Elizabeth and was subsequently adjudged a traitor, the Fulbroke estate being sequestered though not administered by the crown. The park being thus without a legal custodian for more than a quarter of a century became disparked, the palings having fallen into decay and the fences being in many places broken down. The deer with which it

abounded were thus left without any legal protection, and might be hunted at will by enterprising sportsmen. The only person likely to check this freedom or to attempt to do so was Sir Thomas Lucy, whose own park of Charlecote ran for a mile along the other side of the river just below Fulbroke. As the nearest large landed proprietor, having a direct interest in the state of the neighboring park, he might naturally think himself entitled to act as a kind of *ad interim* custodian of Fulbroke. And with his aristocratic feeling, his severe and exacting temper, he would be likely enough to push his temporary guardianship of custom or courtesy into an exclusive right, at least so far as the venison of the park was concerned. In any case Sir Thomas's keepers would occasionally perambulate Fulbroke Park as a protection to Charlecote, and in doing so they probably came upon Shakespeare and his companions after they had brought down a buck and were about to break it up for removal. Or the hunted deer may have crossed the river at the shallow ford between the two parks, and, pursued by the eager sportsmen, have been brought down within the Charlecote grounds. In either case the keepers would denounce the trespass, and possibly with menacing and abusive words demand the buck for their master. On being treated in this insulting way, Shakespeare, who had pride and personal dignity as well as courage, would deny any intentional or actual trespass, refuse to give up the venison, and plainly tell the keepers that they might report the matter to Sir Thomas Lucy and he would answer for himself and his companions. On finding what had happened, Sir Thomas would be all the more incensed and indignant from the consciousness that he had pushed his claims beyond the point at which they could legally be enforced. And, being to some extent in a false position, he would be proportionately wrathful and vindictive against the youthful sportsmen, and especially against their leader who had dared to resist and defy his authority. Sir Thomas was the great man of Stratford, who came periodically to the town on magistrate's business, was appealed to as arbitrator in special cases, and entertained by the corporation during his visits. In character he seems to have combined aristocratic pride and narrowness with the harshness and severity of the Puritan temper. As a landed proprietor and local magnate he was exacting and exclusive, looking with a kind of Puritanical sourness on all youthful frolics, merriment, and recreation. He would thus have a natural antipathy to young Shakespeare's free, generous, and enjoying nature, and would resent as an unpardonable outrage his high-spirited conduct in attempting to resist any claims he chose to make. Sir Thomas would no doubt vent his indignation to the authorities at Stratford, and try to set the law in motion, and failing in this might have threatened, as Justice Shallow does, to make a Star-Chamber matter of it. This was the kind of extreme course which a man in his position might take where there was no available local redress for any wrong he imagined himself to have suffered. And the Stratford authorities, being naturally anxious to propitiate the great man, may have suggested that it would be well if young Shakespeare could be out of the way for a time. This would help him to decide on the adoption of a plan already seriously entertained of going to London to push his fortune among the players.

Sir Thomas Lucy.

There is, however, another aspect in which this traditional incident may be looked at, which seems at least worthy of consideration. It is possible that Sir Thomas Lucy may have been prejudiced against the Shakespeares on religious grounds, and that this feeling may have prompted him to a display of exceptional severity against their eldest son. As we have seen, he was a narrow and extreme, a persecuting and almost fanatical Protestant, and several events had recently happened calculated to intensify his bitterness against the Romanists. In particular, Mary Shakespeare's family connections—the Ardens of Parkhall—had been convicted of conspiracy against the queen's life. The son-in-law of Edward Arden, John Somerville, a rash and "hot-spirited young gentleman," instigated by Hall, the family priest, had formed the design of going to London and assassinating Queen Elizabeth with his own hand. He started on his journey in November, 1583, but talked so incautiously by the way that he was arrested, conveyed to the Tower, and under a threat of the rack confessed everything, accusing his father-in-law as an accomplice and the priest as the instigator of the crime. All three were tried and convicted, their fate being probably hastened, as Dugdale states, by the animosity of Leicester against the Ardens. Somerville strangled himself in prison, and Edward Arden was hanged at Tyburn. These events produced a deep impression in Warwickshire, and no one in the locality would be more excited by them than Sir Thomas Lucy. His intensely vindictive feeling against the Romanists was exemplified a little later by his bringing forward a motion in parliament in favor of devising some new and lingering tortures for the execution of the Romanist conspirator Parry. As Mr. Froude puts it, "Sir Thomas Lucy,—Shakespeare's Lucy, the original perhaps of Justice Shallow, with an English fierceness at the bottom of his stupid nature,—having studied the details of the execution of Gerard, proposed in the House of Commons 'that some new law should be devised for Parry's execution, such as might be thought fittest for his extraordinary and horrible treason.'" The Ardens were devoted Romanists; the terrible calamity that had befallen the family occurred only a short time before the deer-stealing adventure; and the Shakespeares themselves, so far from being Puritans, were suspected by many of being but indifferent Protestants. John Shakespeare was an irregular attendant at church, and soon ceased to appear there at all, so that Sir Thomas Lucy probably regarded him as little better than a recusant. In any case Sir Thomas would be likely to resent the elder Shakespeare's convivial turn and profuse hospitality as alderman and bailiff, and especially his official patronage of the players and active encouragement of their dramatic representations in the guild hall. The Puritans had a rooted antipathy to the stage, and to the jaundiced eye of the local justice the reverses of the Shakespeares would probably appear as a judgment on their way of life. He would all the more eagerly seize any chance of humiliating their eldest son, who still held up his head and dared to look upon life as a scene of cheerful activity and occasional enjoyment. The young poet, indeed, embodied the very characteristics most opposed to Sir Thomas's dark and narrow conceptions of life and duty. His notions of public duty were very much restricted to persecuting the Romanists and preserving the game on Protestant estates. And Shakespeare probably took no pains to conceal his want of sympathy with these supreme objects of aristocratic and Puritanical zeal. And Sir Thomas, having at length caught him, as he imagined, in a technical trespass, would be sure to pursue the culprit with the unrelenting rigor of his hard and gloomy nature. But, whatever may have been the actual or aggravating circumstances of the original offence, there can be no doubt that an element of truth is contained in the deer-stealing tradition. The substantial facts in the story are that Shakespeare in his youth was fond of woodland sport, and that in one of his hunting adventures he came into collision with Sir Thomas Lucy's keepers, and fell under the severe ban of that local potentate. The latter point is indirectly confirmed by Shakespeare's inimitable sketch of the formal country justice in the *Second Part of Henry IV.* and the *Merry Wives of Windsor*,—Robert Shallow, Esq., being sufficiently identified with Sir Thomas Lucy by the pointed allusion to the coat of arms, as well as by other allusions of a more indirect but hardly less decisive kind. To talk of the sketch as an act of revenge is to treat it too seriously, or rather in too didactic and pedestrian a spirit. Having been brought into close relations with the justice, Shakespeare could hardly be expected to resist the temptation of turning to dramatic account so admirable a subject for humorous portraiture. The other point of the tradition, Shakespeare's fondness for woodland life, is supported by the internal evidence of his writings, and especially by the numerous allusions to the subject in his poems and earlier plays. The many references to woods and sports in the poems are well known; and in the early plays the allusions are not less frequent and in some

respects even more striking. Having no space, however, to give these in detail, a general reference must suffice. The entire action of *Love's Labor's Lost* takes place in a royal park, while the scene of the most critical events of the *Two Gentlemen of Verona* is a forest inhabited by generous outlaws whose offences appear to have been youthful follies, and who on being pardoned by the duke become his loyal followers. In these early plays it seems as though Shakespeare could hardly conceive of a royal palace or capital city without a forest close at hand as the scene of princely sport, criminal intrigue, or fairy enchantment. Outside the gates of Athens swept over hill and dale the wonderful forest which is the scene of the *Midsummer Night's Dream;* and in *Titus Andronicus* imperial Rome seems to be almost surrounded by the brightness and terror, the inspiring charm and sombre shades of rolling forest lawns and ravines, the "ruthless, vast, and gloomy woods."

Shakespeare's marriage.

There can be no doubt, therefore, that during the years of home life at Stratford Shakespeare was often in the forest. But in the latter part of the time he would be found still more frequently hastening through the fields to Shottery, paying long visits at the Hathaway farm, followed by late and reluctant leave-takings. For the next important fact in Shakespeare's history is his marriage with Anne Hathaway. This event, or rather the formal and ecclesiastical part of it, took place in the end of November, 1582, the bond for the license from the consistory court being dated on the 28th of the month. Mr. Halliwell-Phillipps[1] has, however, sufficiently proved by detailed instances that the formal and public part of the ceremony would, according to the usage of the time, have been preceded some months earlier by the betrothal or pre-contract, which was in itself of legal validity. Shakespeare's marriage may therefore be dated from the summer of 1582, he being then in his nineteenth year, while his bride was between seven and eight years older. Many of the poet's biographers have assumed that the marriage was a hasty, unsuitable, and in its results an unhappy one. It is necessary therefore to repeat with all possible emphasis the well-founded statement of Mr. Halliwell-Phillipps that "there is not a particle of direct evidence" for either of these suppositions. The marriage could hardly have been a hasty one, for, as we have seen, the two families had been intimate for fifteen years, and Shakespeare had known Anne Hathaway from his early boyhood. As to whether it was suitable or not Shakespeare himself was the best and only adequate judge, and there is not, in the whole literature of the subject, even the shadow of a successful appeal against his decision. And, so far from the marriage having been unhappy, all the evidence within our reach goes to show that it was not only a union of mutual affection but a most fortunate event for the poet himself, as well as for the wife and mother who remained at the head of his family, venerated and loved by her children, and a devoted helpmate to her husband to the very end. Looking at the matter in its wider aspects, and especially in relation to his future career, it may be said that Shakespeare's early marriage gave him at the most emotional and unsettled period of life a fixed centre of affection and a supreme motive to prompt and fruitful exertion. This would have a salutary and steadying effect on a nature so richly endowed with plastic fancy and passionate impulse, combined with rare powers of reflective foresight and self-control. If Shakespeare's range and depth of emotional and imaginative genius had not been combined with unusual force of character and strength of ethical and artistic purpose, and these elements had not been early stimulated to sustained activity, he could never have had so great and uninterrupted a career. And nothing perhaps is a more direct proof of Shakespeare's manly character than the prompt and serious way in which, from the first, he assumed the full responsibility of his acts, and unflinchingly faced the wider range of duties they entailed. He himself has told us that

> "Love is too young to know what conscience is:
> Yet who knows not conscience is born of love?"

and it remains true that conscience, courage, simplicity, and nobleness of conduct are all, in generous natures, evoked and strengthened by the vital touch of that regenerating power. Shakespeare's whole course was changed by the new influence; and with his growing responsibilities his character seems to have rapidly matured, and his powers to have found fresh and more effective development. His first child Susanna was born in May, 1583, and, as she was baptized on the 26th, the day of her birth may have been the 23d, which would be exactly a month after her father completed his nineteenth year. In February, 1585, the family was unexpectedly enlarged by the birth of twins, a boy and a girl, who were named respectively Hamnet and Judith, after Hamnet and Judith Sadler, inhabitants of Stratford, who were lifelong friends of Shakespeare. Before he had attained his majority the poet had thus a wife and three children dependent upon him, with little opportunity or means apparently of advancing his fortunes in Stratford. The situation was in itself sufficiently serious. But it was complicated by his father's increasing embarrassments and multiplied family claims. Four children still remained in Henley Street to be provided for,—the youngest, Edmund, born in May, 1580, being scarcely five years old. John Shakespeare, too, was being sued by various creditors, and apparently in some danger of being arrested for debt. All this was enough to make a much older man than the poet look anxiously about him. But, with the unfailing sense and sagacity he displayed in practical affairs, he seems to have formed a sober and just estimate of his own powers, and made a careful survey of the various fields available for their remunerative exercise. As the result of his deliberations he decided in favor of trying the metropolitan stage and theatre. He had already tested his faculty of acting by occasional essays on the provincial stage; and, once in London amongst the players, where new pieces were constantly required, he would have full scope for the exercise of his higher powers as a dramatic poet. At the outset he could indeed only expect to discharge the lower function, but, with the growing popular demand for dramatic representations, the actor's calling, though not without its social drawbacks, was in the closing decades of the 16th century a lucrative one. Greene, in his autobiographical sketch *Never Too Late*, one of the most interesting of his prose tracts, illustrates this point in the account he gives of his early dealings with the players and experiences as a writer for the stage. Speaking through his hero Francesco, he says that "when his fortunes were at the lowest ebb he fell in amongst a company of players who persuaded him to try his wit in writing of comedies, tragedies, or pastorals, and if he could perform anything worth the stage, then they would largely reward him for his pains." Succeeding in the work, he was so well paid that he soon became comparatively wealthy, and went about with a well-filled purse. Although writing from the author's rather than the actor's point of view, Greene intimates that the players grew rapidly rich and were entitled both to praise and profit so long as they were "neither covetous nor insolent." In the *Return from Parnassus* (1601) the large sums, fortunes indeed, realized by good actors are referred to as matter of notoriety. One of the disappointed academic scholars, indeed, moralizing on the fact with some bitterness, exclaims:

> "England affords those glorious vagabonds,
> That carried erst their fardles on their backs,
> Coursers to ride on through the gazing streets,
> Sweeping it in their glaring satin suits,
> And pages to attend their masterships:
> With mouthing words that better wits have framed
> They purchase lands, and now esquires are made."

[1] [J. O. Halliwell (1820–89), took the name Phillipps to inherit a fortune, published limited and expensive editions of Shakespeariana, promoted the Stratford museum, and left in MS. a history of the English theatre.—Am. Ed.]

And in a humorous sketch entitled *Ratseis Ghost*, and published in the first decade of the 17th century, an apparent reference to Shakespeare himself brings out the same point. The hero of the tract, Ratsey, a highwayman, having compelled a set of strolling players to act before him, advised their leader to leave the country and get to London, where, having a good presence for the stage and a turn for the work, he would soon fill his pockets, adding, "When thou feelest thy purse well-lined, buy thee some place of lordship in the country, that, growing weary of playing, thy money may bring thee dignity and reputation." The player, thanking him for his advice, replies, "I have heard indeed of some that have gone to London very meanly, who have in time become exceedingly wealthy." The movement to the London stage was therefore from a worldly point of view a prudent one, and for the higher purposes of Shakespeare's life it was equally wise and necessary. For besides the economic and practical considerations in favor of the step there must have pressed on the poet's mind the importance of a wider sphere of life and action for the enlargement of his inward horizon, and the effective development of his poetical and dramatic gifts.

Goes to London and becomes an actor.

The exact date of this event—of Shakspeare's leaving Stratford for London—cannot be fixed with any certainty. All the probabilities of the case, however, indicate that it must have taken place between the spring of 1585 and the autumn of 1587. In the latter year three of the leading companies visited Stratford, those belonging to the queen, Lord Leicester, and Lord Essex; and, as Lord Leicester's included three of Shakespeare's fellow townsmen,—Burbage, Heminge, and Greene,—it is not improbable that he may then have decided on trying his fortune in London. At the same time it is quite possible, and on some grounds even likely, that the step may have been taken somewhat earlier. But for the five years between 1587 and 1592 we have no direct knowledge of Shakspeare's movements at all, the period being a complete biographical blank, dimly illuminated at the outset by one or two doubtful traditions. We have indeed the assurance that after leaving Stratford he continued to visit his native town at least once every year; and if he had left it in 1586 we may confidently assume that he returned the next year for the purpose, amongst others, of consulting with his father and mother about the Asbies mortgage and of taking part with them in their action against John Lambert. His uniting with them in this action deserves special notice, as showing that he continued to take the keenest personal interest in all home affairs, and, although living mainly in London, was still looked upon, not only as the eldest son, but as the adviser and friend of the family. The anecdotes of Shakespeare's occupations on going to London, are, that at first he was employed in a comparatively humble capacity about the theatre, and that for a time he took charge of the horses of those who rode to see the plays, and was so successful in this work that he soon had a number of juvenile assistants who were known as Shakespeare's boys. Even in their crude form these traditions embody a tribute to Shakespeare's business promptitude and skill. If there is any truth in them they may be taken to indicate that while filling some subordinate post in the theatre Shakespeare perceived a defective point in the local arrangements, or heard the complaints of the mounted gallants as to the difficulty of putting up their horses. His provisions for meeting the difficulty seem to have been completely and even notoriously successful. There were open sheds or temporary stables in connection with the theatre in Shoreditch, and Shakespeare's boys, if the tradition is true, probably each took charge of a horse in these stables while its owner was at the play. But in any case this would be simply a brief episode in Shakespeare's multifarious employments when he first reached the scene of his active labors in London. He must soon have had more serious and absorbing professional occupations in the green room, on the stage, and in the laboratory of his own teeming brain, "the quick forge and working house of thought."

Continues his education.

But his leisure hours during his first years in London would naturally be devoted to continuing his education and equipping himself as fully as possible for his future work. It was probably during this time, as Mr. Halliwell-Phillipps suggests, that he acquired the working knowledge of French and Italian that his writings show he must have possessed. And it is perhaps now possible to point out the the sources whence his knowledge of these languages was derived, or at least the master under whom he chiefly studied them. The most celebrated and accomplished teacher of French and Italian in Shakespeare's day was the resolute John Florio, who, after leaving Magdalen College, Oxford, lived for years in London, engaged in tutorial and literary work and intimately associated with eminent men of letters and their noble patrons. After the accession of James I., Florio was made tutor to Prince Henry, received an appointment about the court, became the friend and personal favorite of Queen Anne (to whom he dedicated the second edition of his Italian dictionary, entitled the *World of Words*), and died full of years and honors in 1625, having survived Shakespeare nine years. Florio had married the sister of Daniel the poet, and Ben Jonson presented a copy of *The Fox* to him with the inscription, "To his loving father and worthy friend Master John Florio, Ben Jonson seals this testimony of his friendship and love." Daniel writes a poem of some length in praise of his translation of Montaigne, while other contemporary poets contribute commendatory verses which are prefixed to his other publications. There are substantial reasons for believing that Shakespeare was also one of Florio's friends, and that during his early years in London he evinced his friendship by yielding for once to the fashion of writing this kind of eulogistic verse. Prefixed to Florio's *Second Fruits*, Prof. Minto discovered a sonnet so superior and characteristic that he was impressed with the conviction that Shakespeare must have written it. The internal evidence is in favor of this conclusion, while Mr. Minto's critical analysis and comparison of its thought and diction with Shakespeare's early work tends strongly to support the reality and value of the discovery. In his next work, produced four years later, Florio claims the sonnet as the work of a friend "who loved better to be a poet than to be called one," and vindicates it from the indirect attack of a hostile critic, H. S., who had also disparaged the work in which it appeared. There are other points of connection between Florio and Shakespeare. The only known volume that certainly belonged to Shakespeare and contains his autograph is Florio's version of Montaigne's *Essays* in the British Museum; and critics have from time to time produced evidence to show that Shakespeare must have read it carefully and was well acquainted with its contents. Victor Hugo in a powerful critical passage strongly supports this view. The most striking single proof of the point is Gonzalo's ideal republic in the *Tempest* which is simply a passage from Florio's version turned into blank verse. Florio and Shakespeare were both, moreover, intimate personal friends of the young earl of Southampton, who, in harmony with his generous character and strong literary tastes, was the munificent patron of each. Shakespeare, it will be remembered, dedicated his *Venus and Adonis* and his *Lucrece* to this young nobleman; and three years later, in 1598, Florio dedicated the first edition of his Italian dictionary to the earl in terms that almost recall Shakespeare's words. Shakespeare had said in addressing the earl, "What I have done is yours, what I have to do is yours, being part in all I have devoted yours." And

Connection with Florio.

Florio says, "In truth I acknowledge an entire debt, not only of my best knowledge, but of all, yea of more than I know or can to your bounteous lordship, most noble, most virtuous, and most honorable earl of Southampton, in whose pay and patronage I have lived some years, to whom I owe and vow the years I have to live." Shakespeare was also familiar with Florio's earlier works, his *First Fruits* and *Second Fruits*, which were simply carefully prepared manuals for the study of Italian, containing an outline of the grammar, a selection of dialogues in parallel columns of Italian and English, and longer extracts from classical Italian writers in prose and verse. We have collected various points of indirect evidence showing Shakespeare's familiarity with these manuals, but these being numerous and minute cannot be given here. It must suffice to refer in illustration of this point to a single instance —the lines in praise of Venice which Holofernes gives forth with so much unction in *Love's Labor's Lost*. The *First Fruits* was published in 1578, and was for some years the most popular manual for the study of Italian. It is the book that Shakespeare would naturally have used in attempting to acquire a knowledge of the language after his arrival in London ; and on finding that the author was the friend of some of his literary associates he would probably have sought his acquaintance and secured his personal help. As Florio was also a French scholar and habitually taught both languages, Shakespeare probably owed to him his knowledge of French as well as of Italian. If the sonnet is accepted as Shakespeare's work he must have made Florio's acquaintance within a year or two after going to London, as in 1591 he appears in the character of a personal friend and well-wisher. In any case Shakespeare would almost certainly have met Florio a few years later at the house of Lord Southampton, with whom the Italian scholar seems to have occasionally resided. It also appears that he was in the habit of visiting at several titled houses, amongst others those of the earl of Bedford and Sir John Harrington. It seems also probable that he may have assisted Harrington in his translation of Ariosto. Another and perhaps even more direct link connecting Shakespeare with Florio during his early years in London is found in their common relation to the family of Lord Derby. In the year 1585 Florio translated a letter of news from Rome, giving an account of the sudden death of Pope Gregory XIII. and the election of his successor. This translation, published in July, 1585, was dedicated "To the Right Excellent and Honorable Lord, Henry Earl of Derby," in terms expressive of Florio's strong personal obligations to the earl and devotion to his service. Three years later, on the death of Leicester in 1588, Lord Derby's eldest son Ferdinando Lord Strange became the patron of Leicester's company of players, which Shakespeare had recently joined. The new patron must have taken special interest in the company, as they soon became (chiefly through his influence) great favorites at court, superseding the Queen's players, and enjoying something like a practical monopoly of royal representations. Shakespeare would thus have the opportunity of making Florio's acquaintance at the outset of his London career, and everything tends to show that he did not miss the chance of numbering amongst his personal friends so accomplished a scholar, so alert, energetic, and original a man of letters, as the resolute John Florio. Warburton, it is well-known, had coupled Florio's name with Shakespeare in the last century. He suggested, or rather asserted, that Florio was the original of Holofernes in *Love's Labor's Lost*. Of all Warburton's arbitrary conjectures and dogmatic assumptions this is perhaps the most infelicitous. That a scholar and man of the world like Florio, with marked literary powers of his own, the intimate friend and associate of some of the most eminent poets of the day, living in princely and noble circles, honored by royal personages and welcomed at noble houses,—that such a man should be selected as the original of a rustic pedant and dominie like Holofernes, is surely the climax of guesswork and absurd suggestion. There is, it is true, a distant connection between Holofernes and Italy—the pedant being a well-known figure in the Italian comedies that obviously affected Shakespeare's early work. This usage calls forth a kind of sigh from the easy-going and tolerant Montaigne as he thinks of his early tutors and youthful interest in knowledge. "I have in my youth," he tells us, "oftentimes been vexed to see a pedant brought in in most of Italian comedies for a vice or sport-maker, and the nickname of magister (dominie) to be of no better signification amongst us." We may be sure that, if Shakespeare knew Florio before he produced *Love's Labor's Lost*, it was not as a sport-maker to be mocked at, but as a friend and literary associate to whom he felt personally indebted.

Italian studies.

But, whatever his actual relation to the Italian scholar may have been, Shakespeare, on reaching London and beginning to breathe its literary atmosphere, would naturally betake himself to the study of Italian. At various altitudes the English Parnassus was at that time fanned by soft airs, swept by invigorating breezes, or darkened by gloomy and infected vapors from the south. In other words, the influence of Italian literature, so dominant in England during the second half of the 16th century, may be said to have reached its highest point at the very time when Shakespeare entered on his poetic and dramatic labors. This influence was in part a revival of the strong impulse communicated to English literature from Italy in Chaucer's day. The note of the revival was struck in the title of Thomas's excellent Italian manual, "Principal rules of Italian grammar, with a dictionarie for the better understandyng of *Boccace*, *Petrarcha*, and *Dante*" (1550). The first fruits of the revival were the lyrical poems of Surrey and Wyatt, written somewhat earlier, but published for the first time in Tottle's *Miscellany* (1557). The sonnets of these poets—the first ever written in English—produced in a few years the whole musical choir of Elizabethan sonneteers. Surrey and Wyatt were sympathetic students of Petrarch, and, as Puttenham says, reproduced in their sonnets and love poems much of the musical sweetness, the tender and refined sentiment, of the Petrarchian lyric. This perhaps can hardly in strictness of speech be called a revival, for, strong as was the influence of Boccaccio, and in a less degree of Dante, during the first period of English literature, the lyrical poetry of the south, as represented by Petrarch, affected English poetry almost for the first time in the 16th century. This influence, as subsequently developed by Lyly in his prose comedies and romances, indirectly affected the drama, and clear traces of it are to be found in Shakespeare's own work. Surrey, however, rendered the Elizabethans a still greater service by introducing from Italy the unrhymed verse, which, with the truest instinct, was adopted by the great dramatists as the metrical vehicle best fitted to meet the requirements of the most flexible and expressive form of the poetic art. But, although in part the revival of a previous impulse, the Italian literature that most powerfully affected English poetry during the Elizabethan period was in the main new. During the interval the prolific genius of the south had put forth fresh efforts which combined, in new and characteristic products, the forms of classical poetry and the substance of southern thought and feeling with the spirit of mediæval romance. The chivalrous and martial epics of Ariosto and Tasso represented a new school of poetry which embraced within its expanding range every department of imaginative activity. There appeared in rapid succession romantic pastorals, romantic elegies, romantic satires, and romantic dramas, as well as romantic epics. The epics were occupied with marvels of knightly daring and chivalrous adventure, expressed in flowing and

melodious numbers: while the literature as a whole dealt largely in the favorite elements of ideal sentiment, learned allusion, and elaborate ornament, and was brightened at intervals by grave and sportive, by highly wrought but fanciful, pictures of courtly and Arcadian life. While Sidney and Spenser represented in England the new school of allegorical and romantic pastoral and epic, Shakespeare and his associates betook themselves to the study of the romantic drama and the whole dramatic element in recent and contemporary southern literature. The Italian drama proper, so far as it affected the form adopted by English playwrights, had indeed virtually done its work before any of Shakespeare's characteristic pieces were produced. His immediate predecessors, Greene, Peele, and Lodge, Nash, Kyd, and Marlowe, had all probably studied Italian models more carefully than Shakespeare himself ever did: and the result is seen in the appearance among these later Elizabethans of the romantic drama, which united the better elements of the English academic and popular plays with features of diction and fancy, incident and structure, that were virtually new. Many members of this dramatic group were, like Greene, good Italian scholars, had themselves travelled in Italy, knew the Italian stage at first hand, and, as their writings show, were well acquainted with recent Italian literature. But the dramatic element in that literature extended far beyond the circle of regular plays, whether tragedies, comedies, or pastorals. It included the collections of short prose stories which appeared, or were published for the first time in such numbers during the 16th century, the novels or novelettes of Ser Giovanni, Cinthio, Bandello, and their associates. These stories, consisting of the humorous and tragic incidents of actual life, told in a vivid and direct way, naturally attracted the attention of the dramatists. We know from the result that Shakespeare must have studied them with some care, as he derived from this source the plots and incidents of at least a dozen of his plays. Many of the stories, it is true, had already been translated, either directly from the Italian, or indirectly from French and Latin versions. Of Cinthio's hundred tales, however, only two or three are known to have been rendered into English; and Shakespeare derived the story of Othello from the untranslated part of this collection. Many of the Italian stories touched on darker crimes or more aggravated forms of violence than those naturally prompted by jealousy and revenge, and are indeed revolting from the atrocities of savage cruelty and lust related so calmly as to betray a kind of cynical insensibility to their true character. Shakespeare, however, with the sound judgment and strong ethical sense that guided the working of his dramatic genius, chose the better and healthier materials of this literature, leaving the morbid excesses of criminal passion to Webster and Ford. But the Italian influence on Shakespeare's work is not to be estimated merely by the outlines of plot and incident he borrowed from southern sources and used as a kind of canvas for his matchless portraiture of human character and action. It is apparent also in points of structure and diction, in types of character and shades of local coloring, which realize and express in a concentrated form the bright and lurid, the brilliant and passionate, features of southern life. The great majority of the *dramatis personæ* in his comedies, as well as in some of the tragedies, have Italian names, and many of them, such as Mercutio and Gratiano on the one hand, Iachimo and Iago on the other, are as Italian in nature as in name. The moonlight scene in the *Merchant of Venice* is southern in every detail and incident. And, as M. Philarète Chasles justly points out, *Romeo and Juliet* is Italian throughout, alike in coloring, incident, and passion. The distinctive influence is further traceable in Shakespeare's use of Italian words, phrases, and proverbs, some of which, such as "traneet" (from *tranare*), or possibly, as Rowe suggested "traject" (*traghetto*), are of special local significance. In the person of Hamlet Shakespeare even appears as a critic of Italian style. Referring to the murderer who in the players' tragedy poisons the sleeping duke, Hamlet exclaims, "He poisons him in the garden for his estate. His name's Gonzago; the story is extant and written in very choice Italian." In further illustration of this point Mr. Grant White has noted some striking turns of thought and phrase which seem to show that Shakespeare must have read parts of Berni and Ariosto in the original. No doubt in the case of Italian poets, as in the case of Latin authors like Ovid, whose works he was familiar with in the original, Shakespeare would also diligently read the translations, especially the translation into English verse. For in reading such works as Golding's Ovid, Harrington's Ariosto, and Fairfax's Tasso, he would be increasing his command over the elements of expressive phrase and diction which were the verbal instruments, the material vehicle, of his art. But, besides studying the translations of the Italian poets and prose writers made available for English readers, he would naturally desire to possess, and no doubt acquired for himself, the key that would unlock the whole treasure-house of Italian literature. The evidence of Shakespeare's knowledge of French is more abundant and decisive, so much so as hardly to need express illustration. There can be little doubt, therefore, that during his early years in London he acquired a fair knowledge both of French and Italian.

Early dramatic efforts.

But while pursuing these collateral aids to his higher work, there is abundant evidence that Shakespeare also devoted himself to that work itself. As early as 1592 he is publicly recognized, not only as an actor of distinction, but as a dramatist whose work had excited the envy and indignation of his contemporaries, and especially of one so accomplished and so eminent, so good a scholar and master of the playwright's craft, as Robert Greene. Greene had, it is true, a good deal of the irritability and excitable temper often found in the subordinate ranks of poetical genius, and he often talks of himself, his doings, and associates in a highly-colored and extravagant way. But his reference to Shakespeare is specially deliberate, being in the form of a solemn and last appeal to his friends amongst the scholarly dramatists to relinquish their connection with the presumptuous and ungrateful stage. In his *Groatsworth of Wit*, published by his friend Chettle a few weeks after his death, Greene urges three of his friends, apparently Marlowe, Lodge, and Peele, to give up writing for the players. "Base-minded men, all three of you, if by my misery ye be not warned; for unto none of you like me sought those burs to cleave; those puppets, I mean, who speak from our mouths, those anticks garnisht in our colours. Is it not strange that I, to whom they have all been beholding; is it not like that you, to whom they have all been beholding, shall (were ye in that case that I am now) be both of them at once forsaken? Yes, trust them not; for there is an upstart Crow, beautified in our feathers, that, with his *tiger's heart wrapt in a player's hide*, supposes he is as well able to bombast out a blank verse as the best of you, and, being an absolute *Johannes fac totum*, is, in his own conceit, the only Shakescene in a country. Oh that I might intreat your rare wits to be employed in more profitable courses, and let these apes imitate your past excellence, and never more acquaint them with your admired inventions." This curious passage tells us indirectly a good deal about Shakespeare. It bears decisive testimony to his assured position and rapid advance in his profession. The very term of reproach applied to him, "Johannes Factotum," is a tribute to Shakespeare's industry and practical ability. From the beginning of his career he must have been in the widest and best sense a utility man, ready to do any work connected with the theatre and stage, and emi-

nently successful in anything he undertook. In the first instance he had evidently made his mark as an actor, as it is in that character he is referred to by Greene, and denounced for going beyond his province and usurping the functions of the dramatist. Greene's words imply that Shakespeare not only held a foremost place as an actor, but that he was already distinguished by his dramatic success in revising and rewriting existing plays. This is confirmed by the parodied line from the *Third Part of Henry VI.* recently revised if not originally written by Shakespeare. This must have been produced before Greene's death which took place in September, 1592. Indeed, all the three parts of *Henry VI.* in the revised form appear to have been acted during the spring and summer of that year. It is not improbable that two or three of Shakespeare's early comedies may also have been produced before Greene's death. And if so, his resentment, as an academic scholar, against the country actor who had not only become a dramatist but had excelled Greene himself in his chosen field of romantic comedy becomes intelligible enough. Even in his wrath, however, Greene bears eloquent witness to Shakespeare's diligence, ability, and marked success, both as actor and playwright. All this is fully confirmed by the more deliberate and detailed language of Chettle's apology, already quoted. Of Shakespeare's amazing industry and conspicuous success the next few years supply ample evidence. Within six or seven years he not only produced the brilliant reflective and descriptive poems of *Venus and Adonis* and *Lucrece*, but at least fifteen of his dramas, including tragedies, comedies, and historical plays. Having found his true vocation, Shakespeare works during these years as a master, having full command over the materials and resources of his art. The dramas produced have a fulness of life and a richness of imagery, a sense of joyousness and power, that speak of the writer's exultant absorption and conscious triumph in his chosen work. The sparkling comedies and great historical plays belonging to this period evince the ease and delight of an exuberant mind realizing its matured creations.

Conditions favorable to success.

Nor after all is this result so very surprising. Shakespeare entered on his London career at the very moment best fitted for the full development of his dramatic genius. From the accession of Elizabeth all the dominant impulses and leading events of her reign had prepared the way for the splendid triumph of policy and arms that closed its third decade, and for the yet more splendid literary triumph of the full-orbed drama that followed. After the gloom and terror of Mary's reign the coming of Elizabeth to the crown was hailed with exultation by the people, and seemed in itself to open a new and brighter page of the nation's history. Elizabeth's personal charms and mental gifts, her high spirit and dauntless courage, her unfailing political tact and judgment, her frank bearing and popular address, combined with her unaffected love for her people and devotion to their interests, awakened the strongest feelings of personal loyalty, and kindled into passionate ardor the spirit of national pride and patriotism that made the whole kingdom one. The most powerful movements of the time directly tended to reinforce and concentrate these awakened energies. While the Reformation and Renaissance impulses had liberalized men's minds and enlarged their moral horizon, the effect of both was at first of a political and practical rather than of a purely religious or literary kind. The strong and exhilarating sense of civil and religious freedom realized through the Reformation was inseparably associated with the exultant spirit of nationality it helped to stimulate and diffuse. The pope and his emissaries, the Jesuits, were looked upon far more as foreign enemies menacing the independence of the kingdom than as religious foes and firebrands seeking to destroy the newly established faith. The conspiracies, fomented from abroad, that gathered around the captive queen of Scots, the plots successively formed for the assassination of Elizabeth, were regarded as murderous assaults on the nation's life, and the Englishmen who organized them abroad or aided them at home were denounced and prosecuted with pitiless severity as traitors to their country. Protestantism thus came to be largely identified with patriotism, and all the active forces of the kingdom, its rising wealth, energy, and intelligence, were concentrated to defend the rights of the liberated empire against the assaults of despotic Europe represented by Rome and Spain. These forces gained volume and impetus as the nation was thrilled by the details of Alva's ruthless butcheries, and the awful massacre of St. Bartholomew, until at length they were organized and hurled with resistless effect against the grandest naval and military armament ever equipped by a Continental power,—an armament that had been sent forth with the assurance of victory by the wealthiest, most absolute, and most determined monarch of the time. There was a vigorous moral element in that national struggle and triumph. It was the spirit of freedom, of the energies liberated by the revolt from Rome, and illuminated by the fair humanities of Greece and Italy, that nerved the arm of that happy breed of men in the day of battle, and enabled them to strike with fatal effect against the abettors of despotic rule in church and state. The material results of the victory were at once apparent. England became mistress of the seas, and rose to an assured position in Europe as a political and maritime power of the first order. The literary results at home were equally striking. The whole conflict reacted powerfully on the genius of the race, quickening into life its latent seeds of reflective knowledge and wisdom, of poetical and dramatic art.

Growth of the native drama.

Of these effects the rapid growth and development of the national drama was the most brilliant and characteristic. There was indeed at the time a unique stimulus in this direction. The greater number of the eager excited listeners who crowded the rude theatres from floor to roof had shared in the adventurous exploits of the age, while all felt the keenest interest in life and action. And the stage represented with admirable breadth and fidelity the struggling forces, the mingled elements, humorous and tragic, the passionate hopes, deep-rooted animosities, and fitful misgivings of those eventful years. The spirit of the time had made personal daring a common heritage : with noble and commoner, gentle and simple, alike, love of queen and country was a romantic passion, and heroic self-devotion at the call of either a beaten way of ordinary life. To act with energy and decision in the face of danger, to strike at once against any odds in the cause of freedom and independence, was the desire and ambition of all. This complete unity of national sentiment and action became the great characteristic of the time. The dangers threatening the newly liberated kingdom were too real and pressing to admit of anything like seriously divided councils, or bitterly hostile parties within the realm. Everything thus conspired to give an extraordinary degree of concentration and brilliancy to the national life. For the twenty years that followed the destruction of the Armada London was the centre and focus of that life. Here gathered the soldiers and officers who had fought against Spain in the Low Countries, against France in Scotland, and against Rome in Ireland. Along the river side, and in noble houses about the Strand, were the hardy mariners and adventurous sea captains, such as Drake, Hawkins, and Frobisher, who had driven their dauntless keels into unknown seas, who had visited strange lands and alien races in order to enlarge the knowledge, increase the dominions, and augment the wealth of their fellow-countrymen. Here assembled the noble councillors, scholars, and cavaliers whose foresight and skill guided the helm of state, whose accomplishment in letters and arms gave refinement and distinction to court pageants and cere-

monials, and whose patronage and support of the rising drama helped to make the metropolitan theatre the great centre of genius and art, the great school of historical teaching, the great mirror of human nature in all the breadth and emphasis of its interests, convictions, and activities. The theatre was indeed the living organ through which all the marvellous and mingled experiences of a time incomparably rich in vital elements found expression. There was no other, no organized or adequate means, of popular expression at all. Books were a solitary entertainment in the hands of few; newspapers did not exist; and the modern relief of incessant public meetings was, fortunately perhaps, an unknown luxury. And yet, amidst the plenitude of national life centred in London, the need for some common organ of expression was never more urgent or imperious. New and almost inexhaustible springs from the well-heads of intellectual life had for years been gradually fertilizing the productive English mind. The heroic life of the past, in clear outline and stately movement, had been revealed in the recovered masterpieces of Greece and Rome. The stores of more recent wisdom and knowledge, discovery and invention, science and art were poured continually into the literary exchequer of the nation, and widely diffused amongst eager and open-minded recipients. Under this combined stimulus the national intellect and imagination had already reacted fruitfully in ways that were full of higher promise. The material results of these newly awakened energies were, as we have seen, not less signal nor momentous. The number, variety, and power of the new forces thus acting on society effected in a short period a complete moral revolution. The barriers against the spread of knowledge and the spirit of free inquiry erected and long maintained by mediæval ignorance and prejudice were now thrown down. The bonds of feudal authority and Romish domination that had hitherto forcibly repressed the expanding national life were effectually broken. Men opened their eyes upon a new world which it was an absorbing interest and endless delight to explore,—a new world physically, where the old geographical limits had melted into the blue haze of distant horizons—a new world morally, where the abolition of alien dogma and priestly rule gave free play to fresh and vigorous social energies; and, above all, more surprising and mysterious than all, they opened their eyes with a strange sense of wonder and exultation on the new world of the emancipated human spirit. At no previous period had the popular curiosity about human life and human affairs been so vivid and intense. In an age of deeds so memorable, man naturally became the centre of interest, and the whole world of human action and passion, character and conduct, was invested with irresistible attraction. All ranks and classes had the keenest desire to penetrate the mysterious depths, explore the unknown regions, and realize as fully as might be the actual achievements and ideal possibilities of the nature throbbing with so full a pulse within themselves and reflected so powerfully in the world around them. Human nature, released from the oppression and darkness of the ages, and emerging with all its infinite faculties and latent powers into the radiant light of a secular day, was the new world that excited an admiration more profound and hopes far more ardent than any recently discovered lands beyond the sinking sun. At the critical moment Shakespeare appeared as the Columbus of that new world. Pioneers had indeed gone before and in a measure prepared the way, but Shakespeare still remains the great discoverer, occupying a position of almost lonely grandeur in the isolation and completeness of his work.

The theatres.

Never before, except perhaps in the Athens of Pericles, had all the elements and conditions of a great national drama met in such perfect union. As we have seen, the popular conditions supplied by the stir of great public events and the stimulus of an appreciative audience were present in exceptional force. With regard to the stage conditions,—the means of adequate dramatic representation,—public theatres had for the first time been recently established in London on a permanent basis. In 1574 a royal license had been granted by the queen to the earl of Leicester's company "to use, exercise, and occupy the art and faculty of playing Comedies, Tragedies, Interludes, and Stage Plays, and such other like as they have been already used and studied, as well for the recreation of our loving subjects as for our solace and pleasure when we shall think good to see them;" and, although the civil authorities resisted the attempt to establish a public theatre within the city, two or three were speedily erected just outside its boundaries, in the most convenient and accessible suburbs,—the Curtain and the Theatre in Shoreditch, beyond the northern boundary, and the Blackfriars theatre within the precincts of the dissolved monastery, just beyond the civic jurisdiction on the western side. A few years later other houses were built on the southern side of the river,—the Rose near the foot of London Bridge, and the Hope and Swan further afield. There was also at Newington Butts a place of recreation and entertainment for the archers and holiday people, with a central building which, like the circus at Paris Garden, was used during the summer months for dramatic purposes. These theatres were occupied by different companies in turn, and Shakespeare during his early years in London appears to have acted at several of them. But from his first coming up it seems clear that he was more identified with the earl of Leicester's players, of whom his energetic fellow townsman, James Burbage, was the head, than with any other group of actors. To Burbage indeed belongs the distinction of having first established public theatres as a characteristic feature of metropolitan life. His spirit and enterprise first relieved the leading companies from the stigma of being strolling players, and transferred their dramatic exhibitions, hitherto restricted to temporary scaffolds in the court-yards of inns and hostelries, to the more reputable stage and convenient appliances of a permanent theatre. In 1575 Burbage, having secured the lease of a piece of land at Shoreditch, erected there the house which proved so successful, and was known for twenty years as *the* Theatre, from the fact that it was the first ever erected in the metropolis. He seems also to have been concerned in the erection of a second theatre in the same locality called the Curtain; and later on, in spite of many difficulties, and a great deal of local opposition, he provided the more celebrated home of the rising drama known as the Blackfriars theatre. When Shakespeare went to London there were thus theatres on both sides of the water—the outlying houses being chiefly used during the summer and autumn months, while the Blackfriars, being roofed in and protected from the weather, was specially used for performances during the winter season. In spite of the persistent opposition of the lord mayor and city aldermen, the denunciations of Puritan preachers and their allies in the press, and difficulties arising from intermittent attacks of the plague and the occasional intervention of the court authorities, the theatres had now taken a firm root in the metropolis; and, strong in royal favor, in noble patronage, and above all in popular support, the stage had already begun to assume its higher functions as the living organ of the national voice, the many-colored mirror and reflection of the national life. A few years later the companies of players and the theatres they occupied were consolidated and placed on a still firmer public basis. For some years past, in addition to the actors really or nominally attached to noble houses, there had existed a body of twelve performers, selected by royal authority (in 1583) from different companies and known as the Queen's players. The earl of Leicester's, being the leading company, had naturally

furnished a number of recruits to the Queen's players, whose duty it was to act at special seasons before Her Majesty and the court. But within a few years after Shakespeare arrived in London the chief groups of actors were divided into two great companies, specially licensed and belonging respectively to the Lord Chamberlain and the Lord Admiral. Under the new arrangement the earl of Leicester's actors (who, as already stated, after the earl's death in 1588 found for a time a new patron in Lord Strange[1]) became the servants of the Lord Chamberlain. James Burbage had already retired from the company, his place being taken by his more celebrated son Richard Burbage, the Garrick of the Elizabethan stage, who acted with so much distinction and success all the great parts in Shakespeare's leading plays. In order that the Lord Chamberlain's company might have houses of their own both for summer and winter use, Richard Burbage, his brother Cuthbert, and their associates, including Shakespeare, undertook in 1599 to build a new theatre on the bank side, not far from the old Paris Garden circus. We know from a subsequent document, which refers incidentally to the building of this theatre, that the Burbages had originally introduced Shakespeare to the Blackfriars company. He had indeed proved himself so useful, both as actor and poet, that they were evidently glad to secure his future services by giving him a share as part proprietor in the Blackfriars property. The new theatre now built by the company was that known as the Globe, and it was for fifteen years, during the summer and autumn months, the popular and highly successful home of the Shakespearian drama. Three years earlier Richard Burbage and his associates had rebuilt the Blackfriars theatre on a more extended scale; and this well-known house divided with the Globe the honor of producing Shakespeare's later and more important plays. Shakespeare's position indeed of actor and dramatist is identified with these houses and with the Lord Chamberlain's company to which they belonged. On the accession of James I., this company, being specially favored by the new monarch, received a fresh royal charter, and the members of it were henceforth known as the King's servants. In the early years of Shakespeare's career the national drama had thus a permanent home in theatres conveniently central on either side of the river, and crowded during the summer and winter months by eager and excited audiences. Even before the building of the Globe, the house at Newington where three of Marlowe's most important plays and some of Shakespeare's early tragedies were produced, was often crowded to the doors. In the summer of 1592, when the *First Part of Henry VI.*, as revised by Shakespeare, was acted, the performance was so popular that, we are told by Nash, ten thousand spectators witnessed it in the course of a few weeks. It is true that even in the best theatres the appliances in the way of scenes and stage machinery were of the simplest description, change of scene being often indicated by the primitive device of a board with the name painted upon it. But players and playwrights, both arts being often combined in the same person, knew their business thoroughly well, and justly relied for success on the more vital attractions of powerful acting, vigorous writing, and practiced skill in the construction of their pieces. In the presence of strong passions expressed in kindling words and powerfully realized in living action, gesture, and incident, the absence of canvas sunlight and painted gloom was hardly felt. Or, as the stirring choruses in *Henry V.* show, the want of more elaborate and realistic scenery was abundantly supplied by the excited fancy, active imagination, and concentrated interest of the spectators.

The dramatic conditions of a national theatre were indeed, at the outset of Shakespeare's career, more complete, or rather in a more advanced state of development, than the playhouses themselves or their stage accessories. If Shakespeare was fortunate in entering on his London work amidst the full tide of awakened patriotism and public spirit, he was equally fortunate in finding ready to his hand the forms of art in which the rich and complex life of the time could be adequately expressed. During the decade in which Shakespeare left Stratford the playwright's art had undergone changes so important as to constitute a revolution in the form and spirit of the national drama. For twenty years after the accession of Elizabeth the two roots whence the English drama sprung—the academic or classical, and the popular, developed spontaneously in the line of mysteries, moralities, and interludes—continued to exist apart, and to produce their accustomed fruit independently of each other. The popular drama, it is true, becoming more secular and realistic, enlarged its area by collecting its materials from all sources,—from novels, tales, ballads, and histories, as well as from fairy mythology, local superstitions, and folklore. But the incongruous materials were, for the most part, handled in a crude and semi-barbarous way, with just sufficient art to satisfy the cravings and clamors of unlettered audiences. The academic plays, on the other hand, were written by scholars for courtly and cultivated circles, were acted at the universities, the inns of court, and at special public ceremonials, and followed for the most part the recognized and restricted rules of the classic drama. But in the third decade of Elizabeth's reign another dramatic school arose intermediate between the two elder ones, which sought to combine in a newer and higher form the best elements of both. The main impulse guiding the efforts of the new school may be traced indirectly to a classical source. It was due, not immediately to the masterpieces of Greece and Rome, but to the form which classical art had assumed in the contemporary drama of Italy, France, and Spain, especially of Italy, which was that earliest developed and best known to the new school of poets and dramatists. This southern drama, while academic in its leading features, had nevertheless modern elements blended with the ancient form. As the Italian epics, following in the main the older examples, were still charged with romantic and realistic elements unknown to the classical epic, so the Italian drama, constructed on the lines of Seneca and Plautus, blended with the severer form essentially romantic features. With the choice of heroic subjects, the orderly development of the plot, the free use of the chorus, the observance of the unities, and constant substitution of narrative for action were united the vivid coloring of poetic fancy and diction, and the use of materials and incidents derived from recent history and contemporary life. The influence of the Italian drama on the new school of English playwrights was, however, very much restricted to points of style and diction of rhetorical and poetical effect. It helped to produce among them the sense of artistic treatment, the conscious effort after higher and more elaborate forms and vehicles of imaginative and passionate expression. For the rest, the rising English drama, in spite of the efforts made by academic critics to narrow its range and limit its interests, retained and thoroughly vindicated its freedom and independence. The central characteristics of the new school are sufficiently explained by the fact that its leading representatives were all of them scholars and poets, living by their wits and gaining a somewhat precarious livelihood amidst the stir and bustle, the temptations and excitement, of concentrated London life. The distinctive note of their work is the reflex of their position as academic scholars working under poetic and popular impulses for the public theatres. The new and striking combination in their dramas of elements hitherto wholly separated is but the natural result of their attainments and literary

New school of dramatic art.

[1] This is maintained by Mr. Fleay in his recent *Life and Work of Shakespeare*. But the history of the early dramatic companies is so obscure that it is difficult to trace their changing fortunes with absolute certainty.

activities. From their university training and knowledge of the ancients they would be familiar with the technical requirements of dramatic art, the deliberate handling of plot, incident, and character, and the due subordination of parts essential for producing the effect of an artistic whole. Their imaginative and emotional sensibility, stimulated by their studies in Southern literature, would naturally prompt them to combine features of poetic beauty and rhetorical finish with the evolution of character and action; while from the popular native drama they derived the breadth of sympathy, sense of humor, and vivid contact with actual life which gave reality and power to their representations.

Leading members of the school.

The leading members of this group or school were Kyd, Greene, Lodge, Nash, Peele, and Marlowe, of whom in relation to the future development of the drama, Greene, Peele, and Marlowe are the most important and influential. They were almost the first poets and men of genius who devoted themselves to the production of dramatic pieces for the public theatres. But they all helped to redeem the common stages from the reproach their rude and boisterous pieces had brought upon them, and make the plays represented poetical and artistic as well as lively, bustling, and popular. Some did this rather from a necessity of nature and stress of circumstances than from any higher aim or deliberately formed resolve. But Marlowe, the greatest of them, avowed the redemption of the common stage as the settled purpose of his labors at the outset of his dramatic career. And during his brief and stormy life he nobly discharged the self-imposed task. His first play, *Tamburlaine the Great*, struck the authentic note of artistic and romantic tragedy. With all its extravagance, and over-straining after vocal and rhetorical effects, the play throbs with true passion and true poetry, and has throughout the stamp of emotional intensity and intellectual power. His later tragedies, while marked by the same features, bring into fuller relief the higher characteristics of his passionate and poetical genius. Alike in the choice of subject and method of treatment Marlowe is thoroughly independent, deriving little, except in the way of general stimulus, either from the classical or popular drama of his day. The signal and far-reaching reform he effected in dramatic metre by the introduction of modulated blank verse illustrates the striking originality of his genius. Gifted with a fine ear for the music of English numbers, and impatient of "the gigging veins of rhyming mother wits," he introduced the noble metre which was at once adopted by his contemporaries and became the vehicle of the great Elizabethan drama. The new metre quickly abolished the rhyming couplets and stanzas that had hitherto prevailed on the popular stage. The rapidity and completeness of this metrical revolution is in itself a powerful tribute to Marlowe's rare insight and feeling as a master of musical expression. The originality and importance of Marlowe's innovation are not materially affected by the fact that one or two classical plays, such as *Gorboduc* and *Jocasta*, had been already written in unrhymed verse. In any case these were private plays, and the monotony of cadence and structure in the verse excludes them from anything like serious comparison with the richness and variety of vocal effect produced by the skilful pauses and musical interlinking of Marlowe's heroic metre. Greene and Peele did almost as much for romantic comedy as Marlowe had done for romantic tragedy. Greene's ease and lightness of touch, his freshness of feeling and play of fancy, his vivid sense of the pathos and beauty of homely scenes and thorough enjoyment of English rural life, give to his dramatic sketches the blended charm of romance and reality hardly to be found elsewhere except in Shakespeare's early comedies. In special point of lyrical beauty and dramatic portraiture, such as his sketches of pure and devoted women and of witty and amusing clowns, Greene anticipated some of the more delightful and characteristic features of Shakespearian comedy. Peele's lighter pieces and Lyly's prose comedies helped in the same direction. Although not written for the public stage, Lyly's court comedies were very popular, and Shakespeare evidently gained from their light and easy if somewhat artificial tone, their constant play of witty banter and sparkling repartee, valuable hints for the prose of his own comedies. Marlowe again prepared the way for another characteristic development of Shakespeare's dramatic art. His *Edward II.* marks the rise of the historical drama, as distinguished from the older chronicle play, in which the annals of a reign or period were thrown into a series of loose and irregular metrical scenes. Peele's *Edward I.*, Marlowe's *Edward II.*, and the fine anonymous play of *Edward III.*, in which many critics think Shakespeare's hand may be traced, show how thoroughly the new school had felt the rising national pulse, and how promptly it responded to the popular demand for the dramatic treatment of history. The greatness of contemporary events had created a new sense of the grandeur and continuity of the nation's life, and excited amongst all classes a vivid interest in the leading personalities and critical struggles that had marked its progress. There was a strong and general feeling in favor of historical subjects, and especially historical subjects having in them elements of tragical depth and intensity. Shakespeare's own early plays—dealing with the distracted reign of King John, the Wars of the Roses, and the tragical lives of Richard II. and Richard III.—illustrate this bent of popular feeling. The demand being met by men of poetical and dramatic genius reacted powerfully on the spirit of the age, helping in turn to illuminate and strengthen its loyal and patriotic sympathies.

Superiority of the English stage.

This is in fact the key-note of the English stage in the great period of its development. It was its breadth of national interest and intensity of tragic power that made the English drama so immeasurably superior to every other contemporary drama in Europe. The Italian drama languished because, though carefully elaborated in point of form, it had no fulness of national life, no common elements of ethical conviction or aspiration, to vitalize and ennoble it. Even tragedy, in the hands of Italian dramatists, had no depth of human passion, no energy of heroic purpose, to give higher meaning and power to its evolution. In Spain the dominant courtly and ecclesiastical influences limited the development of the national drama, while in France it remained from the outset under the artificial restrictions of classical and pseudo-classical traditions. Shakespeare's predecessors and contemporaries, in elevating the common stages, and filling them with poetry, music, and passion, had attracted to the theatre all classes, including the more cultivated and refined; and the intelligent interest, energetic patriotism, and robust life of so representative an English audience supplied the strongest stimulus to the more perfect development of the great organ of national expression. The forms of dramatic art in the three main departments of comedy, tragedy, and historical drama, had been, as we have seen, clearly discriminated and evolved in their earlier stages. It was a moment of supreme promise and expectation, and in the accidents of earth, or, as we may more appropriately and gratefully say, in the ordinances of heaven, the supreme poet and dramatist appeared to more than fulfil the utmost promise of the time. By right of imperial command over all the resources of imaginative insight and expression Shakespeare combined the rich dramatic materials already prepared into more perfect forms, and carried them to the highest point of ideal development. He quickly surpassed Marlowe in passion, music, and intellectual power; Greene in lyrical beauty, elegiac grace, and narrative interest; Peele in

picturesque touch and pastoral sweetness; and Lyly in bright and sparkling dialogue. And having distanced the utmost efforts of his predecessors and contemporaries he took his own higher way, and reigned to the end without a rival in the new world of supreme dramatic art he had created. It is a new world, because Shakespeare's work alone can be said to possess the organic strength and infinite variety, the throbbing fulness, vital complexity, and breathing truth, of nature herself. In points of artistic resource and technical ability—such as copious and expressive diction, freshness and pregnancy of verbal combination, richly modulated verse, and structural skill in the handling of incident and action—Shakespeare's supremacy is indeed sufficiently assured. But, after all, it is of course in the spirit and substance of his work his power of piercing to the hidden centres of character, of touching the deepest springs of impulse and passion, out of which are the issues of life, and of evolving those issues dramatically with a flawless strength, subtlety and truth, which raises him so immensely above and beyond not only the best of the playwrights who went before him, but the whole line of illustrious dramatists that came after him. It is Shakespeare's unique distinction that he has an absolute command over all the complexities of thought and feeling that prompt to action and bring out the dividing lines of character. He sweeps with the hand of a master the whole gamut of human experience, from the lowest note to the very top of its compass, from the sportive childish treble of Mamilius and the pleading boyish tones of Prince Arthur, up to the spectre-haunted terrors of Macbeth, the tropical passion of Othello, the agonized sense and tortured spirit of Hamlet, the sustained elemental grandeur, the Titanic force and utterly tragical pathos of Lear.

Shakespeare's dramatic career—first period.

Shakespeare's active dramatic career in London lasted about twenty years, and may be divided into three tolerably symmetrical periods. The first extends from the year 1587 to about 1593–94; the second from this date to the end of the century; and the third from 1600 to about 1608, soon after which time Shakespeare ceased to write regularly for the stage, was less in London and more and more at Stratford. Some modern critics add to these a fourth period, including the few plays which from internal as well as external evidence must have been among the poet's latest productions. As the exact dates of these plays are unknown, this period may be taken to extend from 1608 to about 1612. The three dramas produced during these years are, however, hardly entitled to be ranked as a separate period. They may rather be regarded as supplementary to the grand series of dramas belonging to the third and greatest epoch of Shakespeare's productive power. To the first period belong Shakespeare's early tentative efforts in revising and partially rewriting plays produced by others that already had possession of the stage. These efforts are illustrated in the three parts of *Henry VI.*, especially the second and third parts, which bear decisive marks of Shakespeare's hand, and were to a great extent recast and rewritten by him. It is clear from the internal evidence thus supplied that Shakespeare was at first powerfully affected by "Marlowe's mighty line." This influence is so marked in the revised second and third parts of *Henry VI.* as to induce some critics to believe Marlowe must have had a hand in the revision. These passages are, however, sufficiently explained by the fact of Marlowe's influence during the first period of Shakespeare's career. To the same period also belong the earliest tragedy, that of *Titus Andronicus*, and the three comedies—*Love's Labor's Lost*, *The Comedy of Errors*, and the *Two Gentlemen of Verona*. These dramas are all marked by the dominant literary influences of the time. They present features obviously due to the revived and widespread knowledge of classical literature, as well as to the active interest in the literature of Italy and the South. *Titus Andronicus*, in many of its characteristic features, reflects the form of Roman tragedy almost universally accepted and followed in the earlier period of the drama. This form was supplied by the Latin plays of Seneca, their darker colors being deepened by the moral effect of the judicial tragedies and military conflicts of the time. The execution of the Scottish queen and the Catholic conspirators who had acted in her name, and the destruction of the Spanish Armada, had given an impulse to tragic representations of an extreme type. This was undoubtedly rather fostered than otherwise by the favorite exemplars of Roman tragedy. The *Medea* and *Thyestes* of Seneca are crowded with pagan horrors of the most revolting kind. It is true these horrors are usually related, not represented, although in the *Medea* the maddened heroine kills her children on the stage. But from these tragedies the conception of the physically horrible as an element of tragedy was imported into the early English drama, and intensified by the realistic tendency which the events of the time and the taste of their ruder audiences had impressed upon the common stages. This tendency is exemplified in *Titus Andronicus*, obviously a very early work, the signs of youthful effort being apparent not only in the acceptance of so coarse a type of tragedy but in the crude handling of character and motive, and the want of harmony in working out the details of the dramatic conception. Kyd was the most popular contemporary representative of the bloody school, and in the leading motives of treachery, concealment, and revenge there are points of likeness between *Titus Andronicus* and the *Spanish Tragedy*. But how promptly and completely Shakespeare's nobler nature turned from this lower type is apparent from the fact that he not only never reverted to it but indirectly ridicules the piled-up horrors and extravagant language of Kyd's plays.

The early comedies in the same way are marked by the dominant literary influences of the time, partly classic partly Italian. In the *Comedy of Errors*, for example, Shakespeare attempted a humorous play of the old classical type, the general plan and many details being derived directly from Plautus. In *Love's Labor's Lost* many characteristic features of Italian comedy are freely introduced: the pedant Holofernes, the curate Sir Nathaniel, the fantastic braggadocio soldier Armado, are all well-known characters of the contemporary Italian drama. Of this comedy, indeed, Gervinus says, "the tone of the Italian school prevails here more than in any other play. The redundance of wit is only to be compared with a similar redundance of conceit in Shakespeare's narrative poems, and with the Italian style which he had early adopted." These comedies display another sign of early work in the mechanical exactness of the plan and a studied symmetry in the grouping of the chief personages of the drama. In the *Two Gentlemen of Verona*, as Prof. Dowden points out, "Proteus the fickle is set against Valentine the faithful, Silvia the light and intellectual against Julia the ardent and tender, Launce the humorist against Speed the wit." So in *Love's Labor's Lost*, the king and his three fellow-students balance the princess and her three ladies, and there is a symmetrical play of incident between the two groups. The arrangement is obviously more artificial than spontaneous, more mechanical than vital and organic. But towards the close of the first period Shakespeare had fully realized his own power and was able to dispense with these artificial supports. Indeed, having rapidly gained knowledge and experience, he had before the close written plays of a far higher character than any which even the ablest of his contemporaries had produced. He had firmly laid the foundation of his future fame in the direction both of comedy and tragedy, for, besides the comedies already referred to, the first sketches of *Hamlet* and *Romeo and Juliet*, and the tragedy of *Richard III.*, may probably be referred to this period.

Another mark of early work belonging to these dramas is the lyrical and elegiac tone and treatment associated with the use of rhyme, of rhyming couplets and stanzas. Spenser's musical verse had for the time elevated the character of rhyming metres by identifying them with the highest kinds of poetry, and Shakespeare was evidently at first affected by this powerful impulse. He rhymed with great facility, and delighted in the gratification of his lyrical fancy and feeling which the more musical rhyming metres afforded. Rhyme accordingly has a considerable and not inappropriate place in the earlier romantic comedies. The *Comedy of Errors* has indeed been described as a kind of lyrical farce in which the opposite qualities of elegiac beauty and comic effect are happily blended. Rhyme, however, at this period of the poet's work is not restricted to the comedies. It is largely used in the tragedies and histories as well, and plays even an important part in historical drama so late as *Richard II.* Shakespeare appears, however, to have worked out this favorite vein, and very much taken leave of it, by the publication of his descriptive and narrative poems, the *Venus and Adonis* and the *Lucrece;* although the enormous popularity of these poems might almost have tempted him to return again to the abandoned metrical form. The only considerable exception to the disuse of rhyming metres and lyrical treatment is supplied by the *Sonnets*, which though not published till 1609, were probably begun early, soon after the poems, and written at intervals during eight or ten of the intervening years. Into the many vexed questions connected with the history and meaning of these poems it is impossible to enter. The attempts recently made by the Rev. W. A. Harrison and Mr. T. Tyler to identify the "dark lady" of the later sonnets, while of some historical interest, cannot be regarded as successful. And the identification, even if rendered more probable by the discovery of fresh evidence, would not clear up the difficulties, biographical, literary, and historical, connected with these exquisite poems. It is perhaps enough to say with Prof. Dowden that in Shakespeare's case the most natural interpretation is the best, and that, so far as they throw light on his personal character, the sonnets show that "he was capable of measureless personal devotion; that he was tenderly sensitive, sensitive above all to every diminution or alteration of that love his heart so eagerly craved; and that, when wronged, although he suffered anguish, he transcended his private injury and learned to forgive."

Second period.

Whatever question may be raised with regard to the superiority of some of the plays belonging to the first period of Shakespeare's dramatic career, there can be no question at all as to any of the pieces belonging to the second period, which extends to the end of the century. During these years Shakespeare works as a master, having complete command over the materials and resources of the most mature and flexible dramatic art. "To this stage," says Mr. Swinburne, "belongs the special faculty of faultless, joyous, facile command upon each faculty required of the presiding genius for service or for sport. It is in the middle period of his work that the language of Shakespeare is most limpid in its fulness, the style most pure, the thought most transparent through the close and luminous raiment of perfect expression." This period includes the magnificent series of historical plays—*Richard II.*, the two parts of *Henry IV.*, and *Henry V.*—and a double series of brilliant comedies. The *Midsummer Night's Dream*, *All's Well that ends Well*, and the *Merchant of Venice* were produced before 1598, and during the next three years there appeared a still more complete and characteristic group including *Much ado about Nothing*, *As you Like it*, and *Twelfth Night*. These comedies and historical plays are all marked by a rare harmony of reflective and imaginative insight, perfection of creative art, and completeness of dramatic effect. Before the close of this period, in 1598, Francis Meres paid his celebrated tribute to Shakespeare's superiority in lyrical, descriptive, and dramatic poetry, emphasizing his unrivalled distinction in the three main departments of the drama,—comedy, tragedy, and historical play. And from this time onwards the contemporary recognitions of Shakespeare's eminence as a poet and dramatist rapidly multiply, the critics and eulogists being in most cases well entitled to speak with authority on the subject.

Third period.

In the third period of Shakespeare's dramatic career years had evidently brought enlarged vision, wider thoughts, and deeper experiences. While the old mastery of art remains, the works belonging to this period seem to bear traces of more intense moral struggles, larger and less joyous views of human life, more troubled, complex, and profound conceptions and emotions. Comparatively few marks of the lightness and animation of the earlier works remain, but at the same time the dramas of this period display an unrivalled power of piercing the deepest mysteries and sounding the most tremendous and perplexing problems of human life and human destiny. To this period belong the four great tragedies—*Hamlet*, *Macbeth*, *Othello*, *Lear;* the three Roman plays—*Coriolanus*, *Julius Cæsar*, *Anthony and Cleopatra;* the two singular plays whose scene and personages are Greek but whose action and meaning are wider and deeper than either Greek or Roman life—*Troilus and Cressida* and *Timon of Athens;* and one comedy—*Measure for Measure*, which is almost tragic in the depth and intensity of its characters and incidents. The four great tragedies represent the highest reach of Shakespeare's dramatic power, and they sufficiently illustrate the range and complexity of the deeper problems that now occupied his mind. *Timon* and *Measure for Measure*, however, exemplify the same tendency to brood with meditative intensity over the wrongs and miseries that afflict humanity. These works sufficiently prove that during this period Shakespeare gained a disturbing insight into the deeper evils of the world, arising from the darker passions, such as treachery and revenge. But it is also clear that, with the larger vision of a noble, well-poised nature, he at the same time gained a fuller perception of the deeper springs of goodness in human nature, of the great virtues of invincible fidelity and unwearied love, and he evidently received not only consolation and calm but new stimulus and power from the fuller realization of these virtues. The typical plays of this period thus embody Shakespeare's ripest experience of the great issues of life. In the four grand tragedies the central problem is a profoundly moral one. It is the supreme internal conflict of good and evil amongst the central forces and higher elements of human nature, as appealed to and developed by sudden and powerful temptation, smitten by accumulated wrongs, or plunged in overwhelming calamities. As the result, we learn that there is something infinitely more precious in life than social ease or worldly success—nobleness of soul, fidelity to truth and honor, human love and loyalty, strength and tenderness, and trust to the very end. In the most tragic experiences this fidelity to all that is best in life is only possible through the loss of life itself. But when Desdemona expires with a sigh and Cordelia's loving eyes are closed, when Hamlet no more draws his breath in pain and the tempest-tossed Lear is at last liberated from the rack of this tough world, we feel that, death having set his sacred seal on their great sorrows and greater love, they remain with us as possessions forever. In the three dramas belonging to Shakespeare's last period, or rather which may be said to close his dramatic career, the same feeling of severe but consolatory calm is still more apparent. If the deeper discords of life are not finally resolved, the virtues which soothe their perplexities and give us courage and endurance to wait, as well as confidence to trust the final issues,—the virtues of forgiveness and generosity, of forbearance and

self-control,—are largely illustrated. This is a characteristic feature in each of these closing dramas, in the *Winter's Tale*, *Cymbeline*, and the *Tempest*. The *Tempest* is supposed, on tolerably good grounds, to be Shakespeare's last work, and in it we see the great magician, having gained by the wonderful experience of life, and the no less wonderful practice of his art, serene wisdom, clear and enlarged vision, and beneficent self-control, break his magical wand and retire from the scene of his triumphs to the home he had chosen amidst the woods and meadows of the Avon, and surrounded by the family and friends he loved.

Later personal history.

We must now briefly summarize the few remaining facts of the poet's personal history. The year 1596 was marked by considerable family losses. In August Shakespeare's only son Hamnet died in the twelfth year of his age. With his strong domestic affections and cherished hopes of founding a family, the early death of his only boy must have been for his father a severe blow. It was followed in December by the death of Shakespeare's uncle Henry, the friend of his childhood and youth, the protector and encourager of his boyish sports and enterprises at Bearley, Snitterfield, and Fulbroke. A few months later the Shakespeare household at Snitterfield, so intimately associated for more than half a century with the family in Henley Street, was finally broken up by the death of the poet's aunt Margaret, his uncle Henry's widow. Although the death of his son and heir had diminished the poet's hope of founding a family, he did not in any way relax his efforts to secure a permanent and comfortable home for his wife and daughters at Stratford. As early as 1597, when he had pursued his London career for little more than ten years, he had saved enough to purchase the considerable dwelling-house in New Place, Stratford, to which he afterwards retired. This house, originally built by Sir Hugh Clopton and called the "Great House," was one of the largest mansions in the town, and the fact of Shakespeare having acquired such a place as his family residence would at once increase his local importance. From time to time he made additional purchases of land about the house and in the neighborhood. In 1602 he largely increased the property by acquiring 107 acres of arable land, and later on he added to this 20 acres of pasture land, with a convenient cottage and garden in Chapel Lane, opposite the lower grounds of the house. Within a few years his property thus comprised a substantial dwelling-house with large garden and extensive outbuildings, a cottage fronting the lower road, and about 137 acres of arable and pasture land. During these years Shakespeare made another important purchase that added considerably to his income. From the letter of a Stratford burgess to a friend in London, it appears that as early as 1597 Shakespeare had been making inquiry about the purchase of tithes in the town and neighborhood. And in 1605 he bought the unexpired lease of tithes, great and small, in Stratford and two adjoining hamlets, the lease having still thirty years to run. This purchase yielded him an annual income of £38 a year, equal to upwards of £350 [$1700] a year of our present money. The last purchase of property made by Shakespeare of which we have any definite record is at once so interesting and so perplexing as to have stimulated various conjectures on the part of his biographers. This purchase carries us away from Stratford back to London, to the immediate neighborhood of Shakespeare's dramatic labors and triumphs. It seems that in March, 1613, he bought a house with a piece of ground attached to it a little to the southwest of St. Paul's cathedral, and not far from the Blackfriars theatre. The purchase of this house in London after he had been for some years settled at Stratford has led some critics to suppose that Shakespeare had not given up all thought of returning to the metropolis, or at least of spending part of the year there with his family in the neighborhood he best knew and where he was best known. The ground of this supposition is, however, a good deal destroyed by the fact that soon after acquiring this town house Shakespeare let it for a lease of ten years. He may possibly have bought the property as a convenience to some of his old friends who were associated with him in the purchase. In view of future contingencies it would obviously be an advantage to have a substantial dwelling so near the theatre in the hands of a friend. It was indeed by means of a similar purchase that James Burbage had originally started and established the Blackfriars theatre.

The year 1607–8 would be noted in Shakespeare's family calendar as one of vivid and chequered domestic experiences. On the 5th of June his eldest daughter Susanna, who seems to have inherited something of her father's genius, was married to Dr. John Hall, a medical man of more than average knowledge and ability, who had a considerable practice in the neighborhood of Stratford, and who was deservedly held in high repute. The newly married couple settled in one of the picturesque houses of the wooded suburb between the town and the church known as Old Stratford. But before the end of the year the midsummer marriage bells had changed to sadder music. In December Shakespeare lost his youngest brother, Edmund, at the early age of twenty-seven. He had become an actor, most probably through his brother's help and influence, and was, at the time of his death, living in London. He was buried at Southwark on the last day of the year. Two months later there was family rejoicing in Dr. Hall's house at the birth of a daughter, christened Elizabeth, the only offspring of the union, and the only grandchild Shakespeare lived to see. The rejoicing at this event would be fully shared by the household in New Place, and especially by Shakespeare himself, whose cherished family hopes would thus be strengthened and renewed. Six months later in this eventful year, fortune again turned her wheel. Early in September Shakespeare's mother, Mary Arden of the Asbies, died, having lived long enough to see and welcome her great-grandchild as a fresh bond of family life. She was buried at Stratford on the 9th of September, having survived her husband, who was buried on the 8th of September, 1601, exactly seven years. Mary Shakespeare died full of years and honor and coveted rewards. For more than a decade she had witnessed and shared the growing prosperity of her eldest son, and felt the mother's thrill of joy and pride in the success that had crowned his brilliant career. The loss of his mother would be deeply felt by her favorite son, but there was no bitterness in the bereavement, and it even seems to have exerted a tranquillizing, elevating effect on the poet's mind and character. As he laid her in the grave he would recall and realize afresh the early years during which her loving presence and influence were the light and guide of his boyish life. With these vivid and varied family experiences a strong wave of home-yearning seems to have set in, which gradually drew the poet wholly back to Stratford. During the autumn visit connected with his mother's death Shakespeare must have remained several weeks at the New Place, for on the 16th of October he acted as godfather to the infant son of an old personal friend, Henry Walker, who was an alderman of the borough. The child was called William after his godfather, and the poet must have taken a special interest in the boy, as he remembered him in his will.

Retires to Stratford.

It seems most probable that soon after the chequered domestic events of this year, as soon as he could conveniently terminate his London engagements, Shakespeare decided on retiring to his native place. He had gained all he cared for in the way of wealth and fame, and his strongest interests, personal and relative, were now centred in Stratford. But on retiring to settle in his native town he had nothing of the dreamer, the sentimentalist, or the recluse about him. His healthy natural feeling

was far too strong, his character too manly and well-balanced, to admit of any of the so-called eccentricities of genius. He retired as a successful professional man who had gained a competence by his own exertions and wished to enjoy it at leisure in a simple, social, rational way. He knew that the competence he had gained, the lands and wealth he possessed, could only be preserved, like other valuable possessions, by good management and careful husbandry. And, taught by the sad experience of his earlier years, he evidently guided the business details of his property with a firm and skilful hand, was vigilant and scrupulously just in his dealings, respecting the rights of others, and, if need be, enforcing his own. He sued his careless and negligent debtors in the local court of record, had various commercial transactions with the corporation, and took an active interest in the affairs of the borough. And he went now and then to London, partly on business connected with the town, partly no doubt to look after the administration and ultimate disposal of his own theatrical property, and partly it may be assumed for the pleasure of seeing his old friends and fellow dramatists. Even at Stratford, however, Shakespeare was not entirely cut off from his old associates in arts and letters, his hospitable board being brightened at intervals by the presence, and animated by the wit, humor, and kindly gossip, of one or more of his chosen friends. Two amongst the most cherished of his companions and fellow poets, Drayton and Ben Jonson, had paid a visit of this kind to Stratford, and been entertained by Shakespeare only a few days before his death, which occurred almost suddenly on the 23d of April, 1616. After three days' illness the great poet was carried off by a sharp attack of fever, at that time one of the commonest scourges, even of country towns, and often arising then as now, only more frequently then than now, from the neglect of proper sanitary precautions. According to tradition the 23d of April was Shakespeare's birthday, so that he died on the completion of the 52d year of his age. Three days later he was laid in the chancel of Stratford church, on the north wall of which his monument, containing his bust and epitaph, was soon afterwards placed, most probably by the poet's son-in-law, Dr. John Hall. Shakespeare's widow, the Anne Hathaway of his youth, died in 1623, having survived the poet seven years, exactly the same length of time that his mother Mary Arden had outlived her husband. Elizabeth Hall, the poet's grandchild, was married twice, first to Mr. Thos. Nash of Stratford, and in 1649, when she had been two years a widow, to Mr. afterwards Sir John Barnard of Abington in Northamptonshire. Lady Barnard had no family by either husband, and the three children of the poet's second daughter Judith (who had married Richard Quincy of Stratford, two months before her father's death) all died comparatively young. At Lady Barnard's death in 1670 the family of the poet thus became extinct. By his will made a few weeks before his death Shakespeare left his landed property, the whole of his real estate indeed, to his eldest daughter Mrs. Susanna Hall, under strict entail to her heirs. He left also a substantial legacy to his second daughter and only remaining child Mrs. Judith Quiney, and a remembrance to several of his friends, including his old associates at the Blackfriars theatre, Burbage, Heminge, and Condell,—the two latter of whom edited the first collection of his dramas published in 1623. The will also included a bequest to the poor of Stratford.

Summary of life and character

From this short sketch it will be seen that all the best known facts of Shakespeare's personal history bring into vivid relief the simplicity and naturalness of his tastes, his love of the country, the strength of his domestic affections, and the singularly firm hold which the conception of family life had upon his imagination, his sympathies, and his schemes of active labor. He had loved the country with ardent enthusiasm in his youth, when all nature was lighted with the dawn of rising passion and kindled imagination; and after his varied London experience we may well believe that he loved it still more with a deeper and calmer love of one who had looked through and through the brilliant forms of wealthy display, public magnificence, and courtly ceremonial, who had scanned the heights and sounded the depths of existence, and who felt that for the king and beggar alike this little life of feverish joys and sorrows is soothed by natural influences, cheered by sunlight and green shadows, softened by the perennial charm of hill and dale and rippling stream, and when the spring returns no more is rounded with a sleep. In the more intimate circle of human relationships he seems clearly to have realized that the sovereign elixir against the ills of life, the one antidote of its struggles and difficulties, its emptiness and unrest, is vigilant charity, faithful love in all its forms, love of home, love of kindred, love of friends, love of everything simple, just, and true. The larger and more sacred group of those serene and abiding influences flowing from well-centred affections was naturally identified with family ties, and it is clear that the unity and continuity of family life possessed Shakespeare's imagination with the strength of a dominant passion and largely determined the scope and direction of his practical activities. As we have seen, he displayed from the first the utmost prudence and foresight in securing a comfortable home for his family, and providing for the future welfare of his children. The desire of his heart evidently was to take a good position and found a family in his native place. And if this was a weakness he shares it with other eminent names in the republic of letters. In Shakespeare's case the desire may have been inherited, not only from his father, who had pride, energy, and ambition, but especially from his gently descended mother, Mary Arden of the Asbies. But, whatever its source, the evidence in favor of this cherished desire is unusually full, clear, and decisive. While the poet had no doubt previously assisted his father to retrieve his position in the world, the first important step in building up the family name was the grant of arms or armorial bearings to John Shakespeare in the year 1596. The father, it may be assumed, had applied to the heralds' college for the grant at the instance and by the help of his son. In this document, the draft of which is still preserved, the grounds on which the arms are given are stated as two: (1) because John Shakespeare's ancestors had rendered valuable services to Henry VII.; and (2) that he had married Mary, daughter and one of the heirs of Robert Arden of Wilmcote, in the said county, gentleman. In the legal conveyances of property to Shakespeare himself after the grant of arms he is uniformly described as "William Shakespeare of Stratford-upon-Avon, gentleman." He is so described in the midst of his London career, and this sufficiently indicates that Stratford was even then regarded as his permanent residence or home. In the following year another important step was taken towards establishing the position of the family. This was an application by John and Mary Shakespeare to the Court of Chancery for the recovery of the estate of the Asbies, which, under the pressure of family difficulties, had been mortgaged in 1578 to Edward Lambert. The issue of the suit is not known, but, as we have seen, the pleadings on either side occupy a considerable space and show how resolutely John Shakespeare was bent on recovering his wife's family estate.

Turning to the poet himself, we have the significant fact that during the next ten years he continued, with steady persistency, to build up the family fortunes by investing all his savings in real property,—in houses and land at Stratford. While many of his associates and partners in the Blackfriars company remained on in London living and dying there, Shakespeare seems to have early realized his theatrical property for the sake of increasing the acreage of his arable and pasture

land in the neighborhood of Stratford. In 1598, the year after the purchase of New Place, his family are not only settled there, but he is publicly ranked among the most prosperous and well-to-do citizens of Stratford. In that year there being some anticipation of a scarcity of corn, an official statement was drawn up as to the amount of wheat in the town. From the list contained in this document of the chief householders in Chapel Ward, where New Place was situated, we find that out of twenty holders of corn enumerated only two have more in stock than William Shakespeare. Other facts belonging to the same year, such as the successful appeal of a fellow-townsman for important pecuniary help, and the suggestion from an alderman of the borough that, for the sake of securing certain private and public benefits, he should be encouraged to complete a contemplated purchase of land at Shottery, show that Shakespeare was now recognized as a local proprietor of wealth and influence, and that he had so far realized his early desire of taking a good position in the town and neighborhood. It will be noted, too, that all the leading provisions of Shakespeare's will embody the same cherished family purpose. Instead of dividing his property between his two daughters, he left, as we have seen, the whole of his estate, the whole of his real property indeed, to his eldest daughter Mrs. Susanna Hall, with a strict entail to the heirs of her body. This indicates in the strongest manner the fixed desire of his heart to take a permanent position in the locality, and, if possible, strike the family roots deeply into their native soil. That this purpose was realized in his own case seems clear from the special respect paid to his memory. He was buried, as we have seen, in the chancel of the parish church, where as a rule only persons of family and position could be interred. His monument, one of the most considerable in the church, holds a place of honor on the north wall of the chancel, just above the altar railing. While this tribute of marked official respect may be due in part, as the epitaph intimates, to his eminence as a poet, it was no doubt, in a country district like Stratford, due still more to his local importance as a landed proprietor of wealth and position. Indeed, as a holder of the great tithes he was by custom and courtesy entitled to burial in the chancel.

If there is truth in the early tradition that Shakespeare originally left Stratford in consequence of the sharp prosecution of Sir Thomas Lucy, who resented with narrow bitterness and pride the presumption and audacity of the high-spirited youth found trespassing on his grounds, the victim of his petty wrath was in the end amply avenged. After a career of unexampled success in London, Shakespeare returned to his native town crowned with wealth and honors, and, having spent the last years of his life in cordial intercourse with his old friends and fellow townsmen, was followed to the grave with the affectionate respect and regret of the whole Stratford community. This feeling was indeed, we may justly assume, fully shared by all who had ever known the great poet. His contemporaries and associates unanimously bear witness to Shakespeare's frank, honorable, loving nature. Perhaps the most striking expression of this common feeling comes from one who in character, disposition and culture was so different from Shakespeare as his friend and fellow-dramatist Ben Jonson. Even his rough and cynical temper could not resist the charm of Shakespeare's genial character and gracious ways. "I loved the man," he says, "and do honor his memory on this side idolatry as much as any. He was indeed honest, and of an open and free nature, had an excellent phantasy, brave notions, and gentle expressions." As the genius of Shakespeare united the most opposite gifts, so amongst his friends are found the widest diversity of character, endowment, and disposition. This is only another way of indicating the breadth of his sympathies, the variety of his interests, the largeness and exuberant vitality of his whole nature. He touched life at so many points, and responded so instinctively to every movement in the complex web of its throbbing activities, that nothing affecting humanity was alien either to his heart or brain. To one so gifted with the power of looking below the surface of custom and convention, and perceiving not only the deeper elements of rapture and anguish to which ordinary eyes are blind, but the picturesque, humorous, or pathetic varieties of the common lot, every form of human experience, every type of character, would have an attraction of its own. In the view of such a mind nothing would be common or unclean. To Shakespeare all aspects of life, even the humblest, had points of contact with his own. He could talk simply and naturally without a touch of patronage or condescension to a hodman on his ladder, a costermonger at his stall, the tailor on his board, the cobbler in his combe, the hen-wife in her poultry-yard, the plowman in his furrow, or the base mechanicals at the wayside country inn. He could watch with full and humorous appreciation the various forms of brief authority and petty officialism, the bovine stolidity and empty consequence of the local Dogberries and Shallows, the strange oaths and martial swagger of a Pistol, a Bardolph, or a Parolles, the pedantic talk of a Holofernes, the pragmatical saws of a Polonius, or the solemn absurdities of a self-conceited Malvolio. On the other hand he could seize from the inner side by links of vital affinity every form of higher character, passionate, reflective, or executive,—lover and prince, duke and captain, legislator and judge, counsellor and king,—and portray with almost equal ease and with vivid truthfulness men and women of distant ages, of different races, and widely sundered nationalities.

As in his dramatic world he embraces the widest variety of human experience, so in his personal character he may be said to have combined in harmonious union the widest range of qualities, including some apparently the most opposed. He was a vigilant and acute man of business, of great executive ability, with a power of looking into affairs which included a thorough mastery of tedious legal details. But with all his worldly prudence and foresight he was at the same time the most generous and affectionate of men, honored and loved by all who knew him, with the irresistible charm that belongs to simplicity and directness of character combined with thoughtful sympathy and real kindness of heart. And while displaying unrivalled skill, sagacity, and firmness in business transactions and practical affairs, he could promptly throw the whole burden aside, and in the exercise of his noble art pierce with an eagle's wing the very highest heaven of invention. That indeed was his native air, his true home, his permanent sphere, where he still rules with undisputed sway. He occupies a throne apart in the ideal and immortal kingdom of supreme creative art, poetical genius, and dramatic truth. (T. S. B.)

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[1] This is an attempt to supply the want of a select classified bibliography of the literature connected with Shakespeare. Great compression has been necessary. Articles in periodicals not issued separately, and modern critical editions of single plays, are not included; and only those of the plays usually contained in the collective editions are noticed. The name, in its various spellings (Shakespeare, Shakspeare, Shakespear, Shakspere, etc.), is usually represented by the initial *S*.

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Eccles, *Illustrations and Variorum Comments on Lear, Cymbeline, and Merchant of Venice*, 1792–1805, 3 vols. 12 mo; E. Malone, *Letter to R. Farmer*, 1792, 8vo; J. Ritson, *Cursory Criticism on Malone's Edition*, 1792, 8vo; E. Malone, *Prospectus of an Edition in 15 vols. roy. 8vo*, 1792, 4to; Bishop Percy, *Origin of the English Stage*, 1793, 8vo; E. Malone, *Proposals for an Intended Edition in 20 vols. roy. 8vo*, 1795, folio; W. Richardson, *Essays on some of S.'s Dramatic Characters*, 1797, 1812, 8vo, reprint of separate pieces; Lord Chedworth, *Notes on some Obscure Passages*, 1805, 8vo, privately printed; E. H. Seymour, *Remarks on the Plays of S.*, 1805, 2 vols. 8vo; F. Douce, *Illustrations of S. and Ancient Manners*, 1807, 2 vols. 8vo, new edition 1839, 8vo; H. J. Pye, *Comments on the Commentators*, 1807, 8vo; J. M. Mason, *Comments on the several Editions*, 1807, 8vo; C. (and M.) Lamb, *Tales from S.*, 1807, 2 vols. 12mo, plates, frequently translated and reprinted; A. 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Halliwell Phillips, *Notes and Memoranda* [on 4 Plays], 1868–80, 4 pts., 8vo, and *Memoranda* [on 12 Plays], 1879–80, 7 pts. 8vo; A. C. Swinburne, *A Study of S.*, 1880, 8vo; D. J. Snider, *System of S.'s Dramas*, new edition, 1880, 8vo; F. A. Kemble, *Notes on some of S.'s Plays*, 1882, 8vo; H. Giles, *Human Life in S.*, Boston, 1882, 12mo; B. G. Kinnear, *Cruces Shakespearianæ*, 1883, sm. 8vo; C. C. Hense, *S. Studien*, Halle

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ALL'S WELL THAT ENDS WELL (1st ed. in F.1, 1623): H. v. Hagen, *Ueb. die altfranzös. Vorstufe des Lustspieles*, Halle, 1879, 8vo. ANTONY AND CLEOPATRA (1st ed. in F.1). AS YOU LIKE IT (1st ed. in F.1): W. Whiter, *Specimen of a Commentary*, 1794, 8vo ; A. O. Kellogg, *Jacques*, Utica, 1865, 8vo ; C. Sheldon, *Notes*, 1877, 8vo ; T. Stothard, *S.'s Seven Ages Illustrated*, 1799, folio ; J. Evans, *S.'s Seven Ages*, 3d ed. 1834, 12mo ; J. W. Jones, *Origin of the Division of Man's Life into Stages*, 1861, 4to. COMEDY OF ERRORS (1st ed. in F.1). CORIOLANUS (1st ed, in F.1) ; F. A. Leo, *Die Delius'sche Ausgabe kritisch beleuchtet*, Berlin, 1861, 8vo. CYMBELINE (1st ed. in F.1). HAMLET (Q.1, 1603 ; Q.2, 1604 ; Q.3, 1605 ; Q.4, 1608 ; Q.5, 1611 ; Q.6. n. d.; Q.7, 1637): L. Theobald, *S. Restored*, 1726, 4to, devoted to Hamlet ; Sir T. Hanmer, *Some Remarks on Hamlet*, 1736, 8vo, reprinted 1863, sm. 8vo ; J. Plumptre, *Observations on Hamlet, and Appendix*, 1796–7, 2 pts. 8vo ; F. L. 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Pt. ii. 1st ed. in F.1. *Contention, etc.* : Q.1, 1594 ; Q.2, 1600 ; Q.3, 1619. Pt. iii. 1st ed. in F.1. *Richard of Yorke:* Q.1, 1595 ; Q.2, 1600) : E. Malone, *Dissertation on Henry VI.*, 1792, 8vo ; G. L. Rives, *Authorship of Henry VI.*, 1874, 8vo. HENRY VIII. (1st ed, in F.1). JULIUS CÆSAR (1st ed. in F.1) : G. L. Craik, *The English of S. Illustrated*, 3d ed. 1866. sm. 8vo; H. Gomont, *Le César de S.*, 1874, 8vo ; W. G. Moberly, *Hints for S. Study exemplified in Julius Cæsar*, 1881, 8vo. KING JOHN (1st authentic ed. in F.1. *Troublesome Raigne*, spurious : Q.1, 1591 ; Q.2, 1611 ; Q.3, 1622). KING LEAR (Q.1, Q.2, Q.3, 1608 ; Q.4, 1655) : [C. Jennens], *King Lear Vindicated*, 1772, 8vo ; H. Neumann, *Ueber Lear u. Ophelia*, Breslau, 1866, 8vo; J. R. Seeley, W. Young, and E. A. Hart, *Three Essays on Lear*, 1851, 8vo, Beaufoy prize essays. LOVE'S LABOR'S LOST (Q.1, 1598 ; Q.2, 1631). MACBETH (1st ed. in F.1) : [Dr. S. 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V. LANGUAGE, INCLUDING GRAMMARS AND GLOSSARIES.

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VI. QUOTATIONS.

C. Gildon, *Shakespeariana*, in his *Complete Art of Poetry*, 1718, 12mo, the first of the class ; Dr. W. Dodd, *The Beauties of S.*, 1752, 2 vols. 12mo., reprinted (in various forms) more frequently than any similar work ; C. Lofft, *Aphorisms from S.*, 1812, 12mo ; T. Dolby, *The Shakespearian Dictionary*, 1832, 8vo, and *A Thousand Shakespearian Mottoes*, 1856, 32mo ; Mrs. M. C. Clarke, *S. Proverbs*, 1847, sm. 8vo, reprinted ; J. B. Marsh, *Familiar, Proverbial, and Select Sayings from S.*, 1864, 8vo ; E. Routledge, *Quotations from S.*, 1867, 8vo ; C. W. Stearns. *The S. Treasury*, N. Y., 1869, 12mo ; Capt. A. F. P. Harcourt, *The S. Argosy*, 1874, sm. 8vo ; G. S. Bellamy, *New Shakespearian Dictionary*, 1877, 8vo ; A. A. Morgan, *The Mind of S.*, 1880, 8vo, quotations in alphabetical order ; C. Arnold, *Index to Shakespearian Thought*, 1880, 8vo.

VII. CONCORDANCES.

A. Becket, *Concordance*, 1787, 8vo, the earliest ; S. Ayscough, *Index*, 1790, large 8vo, 2d ed. enlarged, 1827, useful : F. Twiss, *Complete Verbal Index*, 1805, 2 vols. 8vo ; M. Cowden Clarke, *Complete Concordance*, 1844, 8vo, deals only with the plays (no complete one exists) ; Mrs. H. H. Furness, *Concordance to Poems*, Philadelphia, 1874, 8vo, completing Mrs. C. Clarke's ; A. Schmidt, *S. Lexikon*, Berlin, 1874–5, 2 vols. large 8vo, in English, both concordance and

dictionary; C. and M. C. Clarke, *The S. Key*, 1879, 8vo, companion to the *Concordance;* J. Bartlett. *The S. Phrase Book*, 1881, 8vo; W. H. D. Adams, *Concordance to Plays*, 1886, 8vo.

VIII. Probable Sources.

Mrs. C. Lennox, *S. Illustrated*, 1753–4, 3 vols. 12mo, dedication by Johnson, many of the observations also said to be by him; T. Hawkins, *The Origin of the English Drama*, 1773, 3 vols. 8vo; J. Nichols, *The Six Old Plays on which S. founded Measure for Measure, etc.*, 1779, 2 vols. 12mo; T. Echtermeyer, L. Henschel, and K. Simrock, *Quellen des S.*, Berlin, 1831, 3 vols. 16mo; L. Tieck, *S.'s Vorschule*, Leipsic, 1823-9, 2 vols. 8vo; J. P. Collier, *S.'s Library* [1843], 2 vols. 8vo, 2d ed. [by W. C. Hazlitt] 1875, 6 vols. 8vo; W. C. Hazlitt, *S.'s Jest Books*, 1864, 3 vols. 8vo; W. W. Skeat, *S.'s Plutarch*, 1875, 8vo; F. A. Leo, *Four Chapters of North's Plutarch*, 1878, folio; R. Simpson, *The School of S.*, 1878, 2 vols. 8vo.

IX. Special Knowledge.

Angling: H. N. Ellacombe, *S. as an Angler*, 1883, 8vo. Bible: T. R. Eaton, *S. and the Bible*, 1858, 8vo; J. Brown, *Bible Truths with Shakespearian Parallels*, 3d ed. 1872, 8vo: J. Rees, *S. and the Bible*, Phil., 1876, sm. 8vo; Bp. C. Wordsworth, *S.'s Knowledge and Use of the Bible*, 1864, 8vo; C. Bullock, *S.'s Debt to the Bible*, 1879, 8vo. Botany: J. E. Giraud, *Flowers of S.*, 1847, 4to, plates; S. Beisly, *S.'s Garden*, 1864, 8vo; H. N. Ellacombe, *Plant-lore and Garden-craft of S.*, 2d ed. 1884, sm. 8vo; L. H. Grindon, *S.'s Flora*, 1883, 8vo. Emblems: H. Green, *S. and the Emblem Writers*, 1870, 4to. Folk-lore: W. Bell, *S.'s Puck and his Folks-lore*, 1852-64, 3 vols. sm. 8vo; W. J. Thoms, "The Folk-lore of Shakespeare," in *Three Notelets*, 1865, 8vo, reprinted from *Athenæum*, 1847; B. Tschischwitz, *Nachklänge Germanischer Mythe in S.*, Halle, 1868 8vo [W. C. Hazlitt, editor], *Fairy Tales, Legends and Romances, illustrating S., etc.*, 1875, 8vo; T. F. T. Dyer, *Folk-lore of S.*, 1884, 8vo. Learning: P. Whalley, *Enquiry into the Learning of S.*, 1748, 8vo; R. Farmer, *Essay on the Learning of S.*, 1767, 8vo., reprinted in the variorum (1821) and other editions, criticised by W. Maginn, see *S. Papers annotated by S. Mackenzie*, N. Y., 1856, sm. 8vo; [K. Prescot], *Essay on the Learning of S.*, 1774, 4to; E. Capell, *The School of S.*, 1780, 4to (vol. iii. of his *Notes and Various Readings to S.*, 1779–83, 3 vols. 4to); P. Stapfer, *S., et l'antiquité*, Paris, 1879, 8vo, translated, 1880, 8vo. Legal: W. L. Rushton, *S. a Lawyer*, 1858, 8vo, *S.'s Legal Maxims*, 1859, 8vo, *S.'s Testamentary Language*, 1869, 8vo, and *S. illustrated by the Lex Scripta*, 1870, 8vo; Lord Campbell, *S.'s Legal Acquirements*, 1859, 8vo; H. T., *Was S. a Lawyer?* 1871, 8vo; J. Kohler, *S. vor dem Forum der Jurisprudenz, und Nachwort*, 1883–4, 2 pts. 8vo; F. F. Heard, *S. as a Lawyer*, Boston, 1884, 16mo; C. K. Davis, *The Law in S.*, St. Paul, U. S., 1884, 8vo. Medicine: G. Farren, *Essays on Mania exhibited in Hamlet, Ophelia, etc.*, 1833, 8vo; J. C. Bucknill, *The Medical Knowledge of S.*, 1860, 8vo, and *The Mad Folk of S.*, 1867, sm. 8vo; C. W. Stearns, *S.'s Medical Knowledge*, N. Y., 1865, sm. 8vo; G. Cless, *Medicinische Blumenlese aus S.*, Stuttgart, 1865, 8vo; A. O. Kellogg, *S.'s Delineations of Insanity, etc.*, N. Y., 1866, 16mo; H. R. Aubert, *S. als Mediciner*, Rostock, 1873, 8vo; J. P. Chesney, *S. as a Physician*, St. Louis, 1884, 8vo: B. R. Field, *Medical Thoughts of S.*, 2d ed., Easton, U. S., 1885, 8vo. Military: W. J. Thoms, "Was S. ever a Soldier?" in his *Three Notelets*, 1865, 8vo. Natural History: R. Patterson, *Insects mentioned in S.'s Plays*, 1838, 8vo; J. H. Fennell, *S. Cyclopædia*, 1862, 8vo, pt. i. Zoology, Man (all published); J. E. Harting, *Ornithology of S.*, 1871, 8vo; C. R. Smith, *The Rural Life of S.*, 1874, 8vo; J. Walter, *S.'s Home and Rural Life*, 1874, 4to, illustrated; B. Mayou, *Natural History of S.*, 1877, 8vo, quotations; E. Phipson, *Animal Lore of S.'s Time*, 1883, sm. 8vo. Philosophy: W. J. Birch, *Philosophy and Religion of S.*, 1848, sm. 8vo; V. Knauer, *W. S., der Philosoph*, Innsbruck, 1879, 8vo. Printing: W. Blades, *S. and Typography*, 1872, 8vo. Psychology: J. C. Bucknill, *The Psychology of S.*, 1859, 8vo; E. Onimus, *La Psychologie dans les Drames de S.*, 1876, 8vo. Sea: J. Schuemann, *See u. Seefahrt in S.'s Dramen*, 1876, 4to.

X. Periodicals.

S. Museum, edited by M. L. Moltke, Leipsic, 23d April, 1870, to 23d February, 1874, 20 Nos. (all published); *Shakespeariana*, 1883, sm. 8vo, in progress. From the commencement of *Notes and Queries* in 1856, a special Shakespeare department (see Indexes) has been carried on. See also W. F. Poole's *Index to Periodical Literature*, Boston, 1882, and supplements.

XI. Shakespeare Societies and their Publications.

Proceedings of the Sheffield S. Club (1819–29), 1829, 8vo; Shakespeare Society, various publications, 1841–53, 48 vols. 8vo; New Shakspere Society, *Transactions* and other publications, reprints of quartos, etc., 1874, etc., 8vo, in progress; Deutsche S. Gesellschaft, *Jahrbuch*, Weimar, 1865, etc., in progress. The S. Societies of New York and Philadelphia publish transactions.

XII. Music.

W. Linley, *S.'s Dramatic Songs*, n. d., 2 vols. folio; the *S. Album, or Warwickshire Garland* (C. Lonsdale), 1862, folio; G. G. Gervinus, *Händel u. S.*, Leipsic, 1868, 8vo; H. Lavoix, *Les Traducteurs de S. en Musique*, 1869, 8vo; A. Rolfe, *Handbook of S. Music*, 1878, 4to; *List of Songs and Passages set to Music* (N. S. Soc.), 1884, 8vo. See also the musical works of J. Addison, T. A. Arne, C. H. Berlioz, Sir H. R. Bishop, C. Dibdin, W. Linley, M. Locke, G. A. Macfarren, F. Mendelssohn-Bartholdy, H. Purcell, G. Verdi, etc.

XIII. Pictorial Illustrations.

C. Taylor, *Picturesque Beauties of S.*, after Smirke, Stothard, etc., 1783–7, 2 vols. 4to; W. H. Bunbury, *Series of Prints Illustrative of S.*, 1792–6, oblong folio; S. Harding, *S. Illustrated*, 1793, 4to; S. Ireland, *Picturesque Scenes upon the Avon*, 1795, 8vo; J. and J. Boydell, *Collection of Prints from Pictures Illustrating the Dramatic Works of S.*, 1802–3, 2 vols. atlas folio, 100 plates, forms supplement to Boydell's edition; reproduced by photography, 1864, 4to, reduced and edited by J. P. Norris, Philadelphia, 1874, 4to; *S. Portfolio*, 1821–9, roy. 8vo; Stothard, *Illustrations of S.*, 1826, 8vo; F. A. M. Retzsch, *Gallerie zu S.'s dramat. Werken in Umrissen*, Leipsic, 1828–46, 8vols. obl. 4to; J. Thurston, *Illustrations of S.*, 1830, 8vo; F. Howard, *The Spirit of the Plays of S.*, 1833, 5 vols. 8vo; L. S. Ruhl, *Skizzen zu S.'s dram. Werken*, Frankfort, 1827–31, Cassel, 1838–40, 6 vols. oblong folio; G. F. Sargent, *S. Illustrated in a Series of Landscape and Architectural Designs*, 1842, 8vo, reproduced as *The Book of S. Gems*, 1846, 8vo; W. v. Kaulbach, *S. Gallerie*, Berlin, 1857–8, 3 pts. folio; P. Konewka, *Ein Sommernachtstraum*, Heidelb., 1868, 4to, and *Falstaff u. seine Gesellen*, Strasburg, 1872, 8vo; E. Dowden, *S. Scenes and Characters*, 1876, 4to, illustrations from A. F. Pecht's *S. Gallerie*, Leipsic, 1876, 4to; J. O. Halliwell Phillipps, *Hand List of Drawings and Engravings Illustrative of the Life of S.*, 1884, 8vo.

XIV. Biography.

A.—*General Works.*

N. Rowe, *The Life of Mr. W. S.*, 1743, 8vo, the first separate life; N. Drake, *S. and his Times*, 1817, 2 vols. 4to; J. Britton, *Remarks on the Life and Writings of S.*, revised edition, 1818, sm. 8vo; A. Skottowe, *Life of S.*, 1824, 2 vols., 8vo.; J. P. Collier, *New Facts*, 1835, 8vo, *New Particulars*, 1836, 8vo, *Further Particulars*, 1839, 8vo, and *Traditionary Anecdotes of S., collected in* 1673, 1838, 8vo; T. Campbell, *Life and Writings of W. S.*, 1838, 8vo; C. Knight, *S., a Biography*, 1843, 8vo; reprinted in *Studies*, 1850, 2 vols. 8vo; J. O. Halliwell Phillipps, *The Life of W. S.*, 1848, 8vo, *S. Facsimiles*, 1863, folio, *Illustrations of the Life of S.*, 1874, folio, and *Outlines of the Life of S.*, 1881, 8vo, 6th ed. 1886, 2 vols. 8vo; F. P. G. Guizot, *S. et son temps*, 1852, 8vo, translated into English, 1852, 8vo; G. M. Tweddell, *S., his Times and Contemporaries*, 1852, 12mo, 2d ed. 1861–3, unfinished; W. W. Lloyd, *Essays on Life and Plays of S.*, 1858, 8vo; S. Neil, *S., a Critical Biography*, 1861, 8vo; T. De Quincey, *S., a Biography*, 1864, 8vo; T. Kenny, *Life and Genius of S.*, 1864, 8vo; W. Bekk, *W. S., eine biogr. Studie*, Munich, 1864, sm. 8vo; S. W. Fullom, *The History of W. S.*, 2d ed. 1864, 8vo; Victor M. Hugo, *W. S.*, 1864, 8vo,—translated into Dutch, German, and English; H. G. Bohn, *Biography and Bibliography of S.* (Philobiblon Soc., 1863), 8vo, illustrations; J. Jordan, *Original Collections on S. and Stratford*, 1780, edited by J. O. Halliwell Phillipps, 1864, 4to; J. A. Heraud, *S.'s Inner Life as intimated in his Works*, 1865, 8vo; R. G. White, *Memoirs of the Life of W. S.*, Boston, 1865, 8vo; S. A. Allibone, Biography of S. (in *Dictionary*, vol. 2, 1870); H. N. Hudson, *S.—his Life, Art, and Characters*, Boston, 1872, 4th ed. 1883, 2 vols. 12mo; R. Genée, *S. sein, Leben u. s. Werke*, Hildburghausen, 1872, 8vo; F. K. Elze, *W. S.*, Halle, 1876, large 8vo; G. H. Calvert, *S.—a Biographic, Æsthetic Study*, Boston, 1879, 16mo; W. Tegg, *S. and his Contemporaries*, 1879, 8vo; W. Henty, *S., with some Notes on his early Biography*, 1882, sm. 8vo; E. Hermann, *Ergänzungen u. Berichtigungen der hergebrachten S. Biograph.*, Erl., 1884, 2 vols. 8vo; F. G. Fleay, *Chronicle History of the Life and Work of W. S.*, 1886, 8vo.

B.—*Special Works.*

Autograph: Sir F. Madden, *Autograph and Orthography of S.*, 1837, 4to; *S.'s Autograph*, copied and enlarged by J. Harris, etc. (Rodd), 1843; J. O. Halliwell Phillipps, *S.'s Will*, 1851, 4to; H. Staunton, *Memorials of S. photographed*, 1864, folio; J. H. Friswell, *Photogr. Reprod. of S.'s Will*, 1864, 4to. Birthday: B. Corney, *Argument on the Assumed Birthday*, 1864, 8vo. Bones: C. M. Ingleby, *S.'s Bones*, 1883, sm. 4to; W. Hall, *S.'s Grave, Notes of Traditions*, 1884, 8vo. Crab Tree: C. F. Green, *Legend of S.'s Crab Tree*, 1857, 4to, illustrated. Deer Stealing: C. H. Bracebridge, *S. no Deer Stealer*, 1862, 8vo, illustrated. Genealogy: J. Jordan, *Pedigree of the Family of S.*, 1796, in vol. iii. of R. Ryan's *Dramatic Table Talk*, 1825–30, 3 vols. 8vo; *Memoirs of the Families of S. and Hart*, 1790, ed. Halliwell, 1865, 4to; G. R. French, *Shakspearcana Genealogica*, 1869, 8vo; J. O. Halliwell Phillipps, *Entries respecting S., his Family and Connections*, 1864, 4to. Ghost-Belief: A. Rolfe, *The Ghost Belief of S.*, 1851, 8vo; T. A. Spalding, *Elizabethan Demonology*, 1880, 8vo. Name: J. O. Halliwell Phillipps, *New Lamps or Old?* 1880, 8vo, advocates "Shakespeare." Occupation: see *Special Knowledge*, above. Religion: F. Fritzart, *War S. ein Christ?* Heidelberg, 1832, 8vo; W. J. Birch, *Philosophy and Religion of S.*, 1848, sm. 8vo, thinks him a skeptic; E. Vehse, *S. als Protestant, Politiker, Psycholog, u. Dichter*, Hamburg, 1851, 2 vols. sm. 8vo; J. J. Rietmann. *Ueber S.'s religiöse u. ethische Bedeutung*, St. Gallen, 1853, 12mo; A. F. Rio, *S.*, 1864, 8vo (S. Roman Catholic); W. Kœnig, *S. als Dichter, Weltweiser, u. Christ*, Leipsic, 1873, 8vo; A. Gilman, *S.'s Morals*, N. Y., 1880, 8vo; J. M. Raich, *S.'s Stellung zur Kathol. Religion*, 1884, 8vo. Stratford-upon-Avon: R. B. Wheler, *History and Antiquities of Stratford*, 1806, 8vo, *Account of the Birthplace*, new edition, 1863, 8vo, and *Collectanea*, 1865, 4to; F. W. Fairholt, *The Home of S.*, 1847, 8vo, engravings reproduced in S. Neil's *Home of S.*, 1871, 8vo; J. O. Halliwell Phillipps, *New Boke about S. and Stratford*, 1850, 4to, *Brief Hand List of the Borough Records*, 1862, 8vo, *Descriptive Calendar*, 1863, folio, *Brief Guide to the Gardens*, 1863, 8vo, *Historical Account of the New Place*, 1864, folio illustrated, and *Stratford in the Times of the S.'s*, 1864, folio; E. Lees, *Stratford as connected with S.*, 1854. 8vo; J. R. Wise, *S., his Birthplace and its Neighborhood*, 1861, 8vo; J. C. M. Bellew, *S.'s Home at New Place*, 1863, sm. 8vo, illustrated, with pedigrees; R. E. Hunter, *S. and Stratford*, 1864, 8vo; J. M. Jephson, *S., his Birthplace, Home, and Grave*, 1864, 4to, illustrated; J. Walter, *S.'s Home and Rural Life*, 1874, 4to, illustrative of localities; C. M. Ingleby, *S. and the Welcombe Enclosures*, 1883, folio. S. L. Lee, *Stratford-on-Avon*, 1884, folio, illustrated.

XV. Portraits.

G. Steevens, *Proposals for Publishing the Felton Portrait*, 1794, 8vo; J. Britton, *On the Monumental Bust*, 1816, 8vo; J. Boaden, *Authenticity of Various Pictures and Prints offered as Portraits of S.*, 1824, 4to; A. Wivell, *The Monumental Bust*, 1827, 8vo, and *Inquiry into the S. Portraits*, 1840, 8vo; H. Rodd, *The Chandos Portrait* [1849], 8vo; R. H. Forster, *Remarks on the Chandos Portrait* 1849, 8vo; J. P. Collier, *Dissertation upon the Imputed Portraits*, 1851, 8vo; J. H. Friswell, *Life Portraits of W. S.*, 1864, 8vo; G. Scharf, *On the Principal Portraits of S.*, 1864, 12mo; E. T. Craig, *S. and his Portraits, Bust, and Monument*, 2d ed. 1864, 8vo, and *S.'s portraits phrenologically considered*, Philadelphia, 1875, 8vo; G. Harrison, *The Stratford Bust*, Brooklyn, 1865, 4to; W. Page, *Study of S.'s Portraits*, 1876, sm. 4to; J. P. Norris, *Bibliography of Works on the Portraits of S.*, Philadelphia, 1879, 8vo, 44 titles, *The Death Mask of S.*, 1884, and *The Portraits of S.*, Phil., 1885, 4to, with bibliography of 111 references, and illustrations. An elaborate account by A. M. Knapp of the portraits in the Barton collection, Boston Public Library, may be found in the *S. Catalogue*, 1880, large 8vo.

XVI. Literary and Dramatic History.

E. Malone, *Historical account of the English Stage*, 1790, enlarged in Boswell's edition, 1821; J. P. Collier, *History of English Dramatic Poetry*, 1831, new ed. 1879, 3 vols. 8vo, *Memoirs of Edw. Alleyne* (Shakespeare Society), 1841, 8vo, *The Alleyne Papers* (Shakespeare Society), 1843, 8vo [see G. F. Warner's catalogue of the Dulwich MSS., 1881, 8vo], and *Memoirs of the Principal Actors in the Plays of S.* (Shakespeare Society), 1846, 8vo; N. J. Halpin, *The Dramatic Unities of S.*, 1849, 8vo, ed. by C. M. Ingleby (N. S. Soc., series i., 1875–6); N. Delius, *Ueber das Englische Theaterwesen zu S.'s Zeit*, Bremen, 1853, 8vo; A. Mezières, *Prédécesseurs et Contemporains de S.*, 1863, 3d ed. 1881, 8vo, and *Contemporains et successeurs de S.*, 3d ed. 1881; Rev. W. R. Arrowsmith, *S.'s Editors and Commentators*, 1865, 8vo; W. Kelly, *Notices of the Drama and Popular Amusements of the 16th and 17th Centuries*, 1865, 8vo; C. M. Ingleby, *Traces of the Authorship of the Works attributed to S.*, 1868, 8vo, *S.'s Centurie of Prayse, culled from Writers of the First Century after his Rise*, 1874, 4to (enlarged by Miss Toulmin Smith for N. S. Soc., 1879), and *S. Allusion Books* (N. S. Soc.), 1874; H. I. Ruggles, *The Method of S. as an Artist*, N. Y., 1870, 8vo; A. H. Paget, *S.'s Plays, a Chapter of Stage History*, 1875, 8vo; H. Ulrici, *S.'s Dramatic Art*, translated by L. D. Schmitz, 1876, 2 vols. 8vo; H. P. Stokes, *The Chronological Order of S.'s Plays*, 1878, 8vo; C. Knortz, *S. in Amerika*, Berlin, 1882, 8vo; C. Muerer, *Synchronist. Zusammenstellung der wichtigsten Notizen üb. S.'s Leben u. Werke*, 1882, 4to; J. A. Symonds, *S.'s Predecessors in the English Drama*, 1884, 8vo; A. R. Frey, *S. and the alleged Spanish Prototypes*, N. Y., 1886, sm. 4to.

Germany: *S.'s Schauspiele erläutert von F. Horn*, Leipsic, 1823–31, 5 vols. 8vo; E. A. Hagen, *S.'s erstes Erscheinen auf den Bühnen Deutschlands*, Königs.. 1832, 8vo; K. Assman, *S. und seine deutschen Uebersetzer*, Liegnitz, 1843, 4to; N. Delius, *Die Schlegel-Tieckschc S. Uebersetz.*, Bonn, 1846, 12mo; F. K. Elze, *Die Englische Sprache in Deutschland*, Dresden, 1864, 12mo; F. A. T. Kreyssig, *S. Cultus*, Elbing, 1864, 8vo; L. G. Lemcke, *S. in seinem Verhältnisse zu Deutschland*, Leipsic, 1864, 8vo; W. J. Thoms, "S. in Germany," in *Three Notelets*, 1865, 8vo; A. Cohn, *S. in Germany in the 16th and 17th Centuries*, 1865, 4to; C. Humbert, *Molière, S., und d. deutsche Kritik*, Leipsic, 1869, 8vo; W. Oechelhäuser, *Die Würdigung S.'s in Engl. u. Deutschland*, 1869, 8vo; R. Genée, *Geschichte d. S.'schen Dramen in Deutschland*, Leipsic, 1870, 8vo; M. Bernays, *Zur Entstehungsgeschichte des Schlegelschen S.*, Leipsic, 1872, 8vo; R. J. Benedix, *Die S. omanie*, Stuttgart, 1873, 8vo; W. Wagner, *S. une die neueste Kritik*, Hamburg, 1874, 8vo; J. Meissner, *Die englischen Comödianten in Oesterreich*, Vienna, 1884, 8vo.

France: J. B. M. A. Lacroix, *Histoire de l'influence de S. sur le théâtre français*, Brussels, 1856, 8vo; W. Reymond, *Corneille, S., et Goethe*, Berlin, 1864, 8vo; A. Schmidt, *Voltaire's Verdienste um die Einführung S.*, 1864, 4to.

XVII. Shakespeare Jubilees.

Essay on the Jubilee at Stratford, 1769, 8vo; *S.'s Garland*, 1769, 8vo, second edition, 1826, 8vo; *Concise Account of Garrick's Jubilee*, 1769, *and the Festivals of* 1827 *and* 1830, 1830, 8vo; *Descriptive Account of the Second Gala*, 1830, 8vo; K. F. Gutzkow, *Eine S. Feier an der Ilm*, Leipsic, 1864, 8vo; P. H. A. Möbius, *Die Deutsche S. Feier*, Leipsic, 1864, 8vo; *Tercentenary Celebration by the New England Historic-Geneabogical Society at Boston*, 1864, 8vo; *Official Programme at the Tercentenary Festival at Stratford, with Life, Guide, etc.*, 1864, 8vo.

XVIII. Ireland Controversy.

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XIX. Payne Collier Controversy.

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SHALLOT. See Horticulture, vol. xii. p. 300.

SHAMANISM is the name commonly given to the type of religion which once prevailed among all the Ural-Altaic peoples,—Tungus, Mongol, and Turkish,—and which still lives in various parts of northern Asia[1] in spite of the progress of Mohammedanism, Buddhism, and Christianity. The shaman himself (in Turkish, *kam*) is a wizard-priest, closely akin to the medicine-men of savage tribes in other parts of the world. Outsiders often describe Shamanism as pure devil-worship, but in reality the shaman or *kam* deals with good as well as with evil spirits, especially with the good spirits of ancestors (*cf.* Religion, vol. xx. p. 376). Among the Altaians, for example, the practices of the sorcerers rest on an elaborate cosmogony and a developed doctrine of good and evil powers, the friends and enemies of man. The *kam* has the power of influencing these by magic ritual, and his gift is hereditary,—his own ancestors, now good spirits, being the great assistants of his work. His two chief functions are to perform sacrifice, with which is conjoined the procuring of oracles, and to purify houses after a death, preventing the dead man from continuing his injurious presence among the living; see the full accounts of Radloff, *Aus Siberien*, 1884, vol. ii. In his magical apparatus a drum (*tüngür*) holds the chief

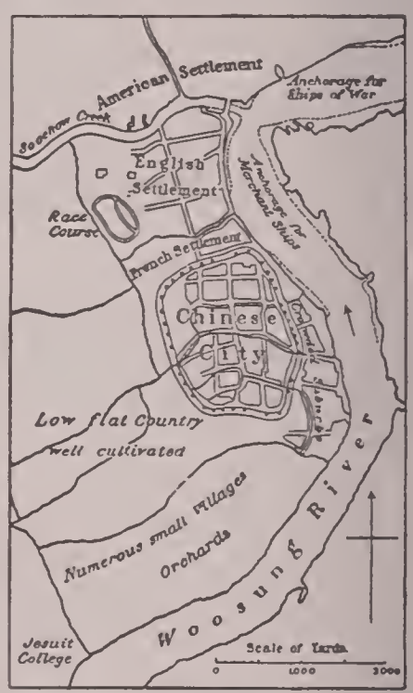
[1] [A form of Shamanism exists amongst the tribes of the north-west coast of North America.—Am. Ed.]

place. The ceremonies have a dramatic character, the wizard acting an ascent to the heavens or a descent to the under-world, and holding colloquy with their denizens in scenes of great excitement ending in ecstasy and physical collapse. The epithet of devil-worship as applied to the Altaian Shamanism is so far justified that the great enemy of man, Erlik, the king of the lower world, from whom death and all evils come, is much courted, addressed as father and guide, and propitiated with offerings. He is not, however, a power coördinate with the highest good god Kaira Kan, but is the creature of the latter, who banished him underground for his evil deeds.

SHAMMAI, a Jewish rabbi, sometimes called הַזָּקֵן, "the elder," was the contemporary of HILLEL (*q.v.*) and the head of a rival school. The pair are twelfth in order in the *Pirke Aboth*, where we are informed that Shammai enjoined his disciples to make a special business of the study of the law, to promise little and perform much, and to receive every one in a friendly spirit. Of his personal history nothing is known. The tendency of Shammai and his school is represented as having been towards a more scrupulously and burdensomely literal construction of the law than was thought necessary by Hillel; but their differences so far as known turned upon very trifling minutiæ. One example of his rigor will suffice. It is related of him in the *Mishnah* that a grandson having been born to him during the feast of tabernacles he caused the ceiling to be removed and the bed to be canopied with branches, in order that the child also might observe the solemnity according to the law.

SHAMOKIN, a post borough of the United States, in Northumberland county, Pennsylvania, 20 miles southeast of Sunbury, is a great centre of the coal-trade, and had a population in 1881 of 8184.

SHANGHAI, a city of China. The native city of Shanghai is situated in 31° 15′ N. lat. and 121° 27′ E. long., and stands on the left or western bank of the Hwang-p'u[1] river, about twelve miles from the point where that river empties itself into the estuary of the Yang-tsze-kiang. The walls which surround it are about 3½ miles in circumference, and are pierced by seven gates. The streets and thoroughfares may be said to illustrate all the worse features of Chinese cities—dirt, closeness, and absence of all sanitary arrangements; while the want of any building of architectural or antiquarian interest robs the city of any redeeming traits. On the eastern face of the city, between the walls and the river, stands the principal suburb, off which the native shipping lies anchored. The native town has thus nothing to recommend it except its geographical position. Situated in the extreme eastern portion of the province of Kiang-soo, and possessing a good and commodious anchorage, as well as an easy access to the ocean, it forms the principal port of central China. From the western wall of the city there stretches away a rich alluvial plain extending over 45,000 square miles, which is intersected by numerous waterways and great chains of lakes. The products of this fertile district, as well as the teas and silks of more distant regions, find their natural outlet at Shanghai. The looms of Soochow and the tea plantations of Gan-hwuy, together with the rice of this "garden of China," have for many years before treaty days supplied the Shanghai junks with their richest freight. But though thus favorably situated as an emporium of trade Shanghai did not attract the attention of foreign diplomatists until the outbreak of the war of 1841, when the inhabitants purchased protection from the bombarding propensities of Admiral Parker by the payment of a ransom of one million taels. In the Nanking treaty, which was signed in the following year, Shanghai was included among the four new ports which were thrown open to trade by the terms of that document. In 1843 Sir George Balfour, then Captain Balfour, was appointed British consul, and it was on his motion that the site of the present English settlement, which is bounded on the north by the Soochow creek, on the south by the Yang-king canal, and on the east by the river, was chosen. The site, thus defined on its three sides (on the west no boundary was marked out) is three-fifths of a mile in length, and was separated from the native city by a narrow strip of land which was subsequently selected as the site of the French settlement. Later again the Americans established themselves on the other side of the Soochow creek, on a piece of land fronting on the river, which there makes a sharp turn in an easterly direction. At first merchants appeared disinclined to take advantage of the opportunities offered them at Shanghai. "At the end of the first year of its history as an open port Shanghai could count only 23 foreign residents and families, 1 consular flag, 11 merchants' houses, and 2 Protestant missionaries. Only forty-four foreign vessels had arrived during the same period."[2] By degrees, however, the manifold advantages as a port of trade possessed by Shanghai attracted merchants of all nationalities; and from the banks of the Hwang-p'u



Shanghai.

arose lines of hongs and handsome dwelling-houses, which have converted a reed-covered swamp into one of the finest cities in the East.

The number of foreigners, other than English, who took up their abode in the English settlement at Shanghai made it soon necessary to adopt some more catholic form of government than that supplied by an English consul who had control only over British subjects, and by common agreement a committee of residents, consisting of a chairman and six members, was elected by the renters of land for the purposes of general municipal administration. It was expected when the council was formed that the three settlements—the British, French, and Americans—would have been incorporated into one municipality, but international jealousy prevented the fulfilment of the scheme, and it was not until 1863 that the Americans threw in their lot with the British. In 1853 the prosperity of the settlements received a severe check in consequence of the capture of the native city by a band of insurgents, who held possession of the walls from September in that year to February, 1855. This incident, though in many ways disastrous, was the exciting cause of the establishment of the foreign customs service, which

[1] [Also called the Woosung river. See plan.—AM. ED.]

[2] *The Treaty Ports of China and Japan*, by W. F. Mayer.

has proved of such inestimable advantage to the Chinese Government. The confusion into which the customs system was thrown by the occupation of the city by the rebels induced the Chinese authorities to request the consuls of Great Britain, France, and the United States to nominate three officers to superintend the collection of the revenue. This arrangement was found to work so well that on the reoccupation of the city the native authorities proposed that it should be made permanent, and Mr. H. N. Lay, of H. M.'s consular service, was in consequence appointed inspector of the Shanghai customs. The results of Mr. Lay's administration proved so successful that when arranging the terms of the treaty of 1858 the Chinese willingly assented to the application of the same system to all the treaty ports, and Mr. Lay was thereupon appointed inspector-general of maritime customs. On the retirement of Mr. Lay in 1862 Sir Robert Hart was appointed to the post, which he still (1886) occupies.

During the period from 1856 to 1864 the trade of Shanghai increased by leaps and by bounds, and its prosperity culminated between 1860 and 1864, when, in addition to the ordinary commerce, the influx of Chinese into the foreign settlement in consequence of the advance eastward of the T'ai-p'ing rebels added enormously to the value of land and to the profits of the leaseholders. Both in 1860 and again in 1861 the rebels advanced to the walls of Shanghai, and on both occasions were driven back in confusion by the British troops and volunteers, aided by the naval forces of England and France. It was in connection with this resistance to the rebels at Shanghai that General Gordon assumed the command of the Chinese force, which under his direction gave a meaning and reality to the hitherto somewhat boastful title of "ever-victorious army" it had assumed under the generalship of the two American adventurers Ward and Burgevine. To Shanghai the successful operations of Gordon against the rebels brought temporarily disastrous consequences. With the disappearance of the T'ai-p'ings the refugees who had sought safety in the foreign settlements returned to their homes, leaving whole streets and quarters deserted and empty. The loss thus inflicted on the municipality was very considerable, and was intensified by a commercial crisis in the markets of cotton and tea, in both of which articles there had been a great deal of over-speculation. But, though the abnormal prosperity produced by extraordinary circumstances was thus suddenly brought to an end, the genuine trade of the port has steadily advanced, subject of course to occasional fluctuations. For example, between the years 1878 and 1881 the gross value of the trade increased from 110,956,274 taels [$154,229,220.86] to 141,291,357 taels [$196,394,986.23]. In 1883, however, this amount fell to 110,433,531 taels [$153,502,608.09], while in 1884 it rose again to 113,215,520 taels [$157,369,572.80], although at this time, as will be remembered, hostilities were being carried on between France and China. In the same year 53,562 bales of silk were exported, as against 47,807 bales in 1883, and 27,084,675 lb of green tea, as against 25,336,041 lb in 1883. In black tea there was a falling off, the respective figures being 43,813,058 and 48,251,637 lb. The total burden of foreign steamers which entered and cleared at Shanghai during 1884 was 3,145,242 tons. Of this amount 2,238,433 tons were British, 500,222 were American, 188,484 were Japanese, 93,226 were German, 88,983 were French, 24,572 were Russian, and 11,322 were Danish.

According to the latest estimate the native population of the city and suburbs of Shanghai amounts to 156,000. When to this number the boat population, amounting to 11,000, and the mixed inhabitants of the foreign settlements, numbering 145,500, are added, a total is reached of 312,500 souls.

The vastness of English interests in China and the large British population at Shanghai gave rise in 1865 to the establishment of a British supreme court for China and Japan, —Sir Edmund Hornby, who was then the judge of the British court at Constantinople, being the first judge appointed to the new office. The court thus constituted not only exercises jurisdiction over the British subjects at Shanghai but acts as a court of appeal from all British consular courts in China and Japan. All charges against Chinamen within the settlement are tried before a mixed court, which sits daily, presided over by a Chinese official and an officer of the consular service. During the year 1884 2304 criminal cases were tried before this tribunal, and 99 civil cases,—in 85 of which cases no less a sum than £60,000 [$291,600] was involved.

A handsome bund runs along the river frontage of the three foreign settlements, and the public buildings, especially in the British settlement, are large and fine. The cathedral, which is built in the Gothic style, is a notable example of Sir Gilbert Scott's skill as an architect, and the municipal offices, club-house, and hospitals are all admirable in their way. Shanghai is now connected with Peking by a telegraph, which will doubtless before long be supplemented by a railway. Some years ago a short railway was laid down between Shanghai and Woosung by some foreigners who wished to force the pace at which China was progressing. But the time had not come when such a step would be adopted by the Chinese, and after a few weeks' existence the plant was bought by the native authorities and shipped to Formosa, where it has since been allowed to rust and rot. The climate of Shanghai is essentially unhealthy. It lies low, and, though the early winter is enjoyable, snow and ice being occasionally seen, the summer months are sweltering hot. Fever, dysentery, and cholera are unfortunately common complaints, and it is only by frequent trips to Japan and Chefoo that the residents are able to preserve health and strength. But, notwithstanding every disadvantage, the position occupied by Shanghai as a centre of trade, situated as it is at the mouth of the Yang-tsze-kiang, in the immediate neighborhood of the richest silk and tea districts, and in proximity to Japan and the newly-opened ports of Corea, insures for it an increasing volume of commerce and a widening prosperity in the future. (R. K. D.)

SHANNON. See IRELAND, vol. xiii. p. 222.

SHANS. This name is applied to a number of for the most part semi-independent communities occupying a region bounded on the W. by Burmah and Assam, N. and N.E. by the Chinese province of Yun-nan, E. by Tongking, and S. by Siam (see Plate IX.). Ethnologically the race has a much wider extension, including the Siamese (see SIAM), and also, according to Garnier and Colquhoun, the hill tribes around the Tong-king delta and various tribes of Kwang-tung and Kwang-se, and extending across the north of Burmah into Assam. It is also widely diffused through southwestern Yun-nan. Terrien de Lacouperie considers it allied to the Mon, the Mung, and the Pa, and places its early home in the mountains north of Sze-chuen, whence, not having amalgamated with the growing Chinese empire, it was gradually forced southwards. Although the level of civilization and the purity of their Buddhism vary considerably among the different branches of the race, there is everywhere a remarkable resemblance in appearance, manners, customs, and polity. The traditions current of their origin, too, though localized by each in its own habitat, are closely similar. This great homogeneity seems the more remarkable in that the race is found not only living under many different political systems,—*i.e.*, either independent, or subject to Burmah, China, or Siam,—but often in communities isolated by mountain ranges, inhabited by tribes of different race and character. All this seems to point to a political unity in earlier times.

The Shans probably appeared on the upper Irawadi nearly two thousand years ago, but Burmese and Shan traditions agree that they were established some centuries earlier on the upper waters of the Shweli and on the Salwín and adjacent valleys on the southwest frontiers of Yun-nan. Here at all events, in the 7th and 8th centuries, we hear of the growth of that power which, temporarily broken by Burmah in the 11th century, reached its highest development in the 13th. This Shan empire, known by the classical Indian name of Kausambi,—corrupted after the punning Chinese fashion into Koshan-pyi, *i.e.*, nine Shan states,—was a confederacy of about ten states, known among themselves by the name of the most powerful member, Mau, or Muang Mau. A great leader, Sam Lung Pha, brother of the king of Mau, overran and conquered Upper Assam from the Satiyas in 1229, the dynasty lasting until the British annexation. These Ahoms still inhabit the Assam districts of Sibsagar and south and east Lakhimpur, though pressed on from the southwest by the Bengalis, whom they despise as a black and inferior race, preferring to associate with the

Chinese, whom they regard as congeners, and as the greatest race in the world.

This 13th and the following century also saw Tali to the east and Arakan to the west invaded, Burmah being then weakened by the Mongol invasion; Chieng Mai and other southern Shan states were also annexed, and "Ayuthia" (*i.e.*, Siam), Cambodia, and Tavoy are claimed by the Shan historians as among their conquests, the Shan influence being felt even in Java. From the 14th to the 16th century wars with both Burmah and China were frequent, and Shan dynasties ruled at times in Burmah; but in 1556–62 the Burmese conquered Mogaung, the chief province of Mau, when Buddhism is recorded to have been introduced: probably only a reform of religion is meant. In 1604 the districts now known as the Chinese Shan States, *i.e.*, the heart of the Mau empire, lying chiefly in the Ta-peng basin, east of Bamo,—a town whose population also is mainly Shan,—were finally conquered by China, Mogaung remaining independent on sufferance till absorbed by Burmah in 1796.

Zimmé or Chieng Mai (including Kiang Hai, Kiang Sen, Lagong and Lapong), whose capital is now an important and well-built town, and Vien Chang on the east of the Me-kong, were both great Shan centres, warring, with various fortunes, with Burmah and Cambodia, and with each other, till subjected by the growing power of Siam late in the last century.

The Burmese Shan States, especially those more remote from Mandalay, have latterly become practically independent; and, the tyranny which led to extensive southward migration having thus ceased, the stream is partly returning northwards. Descendants, too, of the population deported by Siam from Kiang Sen about a hundred years ago are now by the king's permission returning to people that fertile territory. The Burmese plan with the Shans was to govern by fostering internal dissensions, and they are bitterly hated, while the Chinese are in an equal degree liked and respected. The great Shan state of Kiang Hung has now accepted the dictation of China, to whom in fact, like some of its lesser neighbors, it has always paid certain taxes, while acknowledging the supremacy of Burmah. Kiang Tung to the south, which has been Burmese for over a century, has lately made overtures to Siam, though not forgetting the injuries inflicted by that power in 1854. The numerous ruins of great cities over the whole region from Chieng Mai to Kiang Tung testify to former wealth and prosperity, though they may not have all existed contemporaneously. In Luang Prabang in the northeast, on the other hand, tribes of a partly Chinese race are pressing southwards. It is remarkable how many of the conquering irruptions of southeast Asia were due mainly to the eviction of such conquerors by some stronger power. Incessant wars and vast deportations have tended to assimilate the various populations of all this region.

Each Shan state is governed by a *tsobwa* (*chao p'hya*) or supreme chief, aided by a council, and often by a coadjutor. Where the Shans are in immediate contact with one of their great neighbors their habits and customs are necessarily modified; otherwise, speaking generally, civilization increases southwards. Religion is nominally Buddhist, and the priests, though their lives are usually far from correct, have great influence; temples, caves, and other localities sacred to Buddha, are thronged with worshippers liberal with their offerings; but the practical exercise of religion consists chiefly in efforts to propitiate or avert the evil influence of the *nats* or *p'hees*, demons and spirits everywhere present, to whom all accidents and illnesses are attributed. Along with the Buddha, various images, among which the horse is not uncommon, are adored (though there are temples in which these are not found); and fetishes—natural objects of special form, *e.g.*, of some part of the body—are kept in the house to avert disease. Medical treatment consists largely in magical practices, and individuals denounced by the sick as the cause of their illness frequently have their houses burned and are themselves deported to a distance. Thus, too, ordeals have a prominent place in legal practice. The Shans have no Buddhist prejudices against killing poultry or cattle for food, but like other Indo-Chinese and the Malays do not use milk. Slavery is general; the supply is recruited partly by raids on neighboring hill-tribes; the Indo-Chinese practice of slavery for debt also prevails. The slaves are not ill treated, and are chiefly employed in field labor by the chaos, who own great numbers. In appearance the North Shans are sallow, but hardly darker than South Europeans, and are characterized by a short broad flat face more elongated and nearer the Tartar type in the upper classes; they have red cheeks, brown eyes hardly oblique, black hair, nose almost aquiline, and are of medium height. The Chinese Shans are much smaller, with squat figures, prominent cheek-bones and oblique eyes.

The practice of tattooing prevails in some districts, down to the upper waters of the Me-uam, and it occurs also among the Laos in the southeast, the tattooed being known as the black-bellied, the non-tattooed as the white-bellied. The Shans are all hardier and more manly than their congeners the Siamese, and they are also more sedate and more self-possessed than the Burmese. Most travellers speak of them as brave, friendly, social, and hospitable, but a good deal of the oppression and cruelty natural to a semi-barbarous condition prevails. They are cleanly and fond of bathing, the town and villages being supplied with bamboo aqueducts. Drunkenness, except at festivals, is rare. Gambling is common, whole families being sold into slavery to pay debts thus contracted. Public gaming and the sale of spirits and opium are monopolies. They show much artistic taste in the beautiful colors of their textile fabrics, the needlework and embroidery of the women, and the designing and execution of the silver ornaments which are worn in profusion. They show great aptitude for trade, and are said by Mr. Holt Hallett to welcome the prospect of the railway intended to connect their country with Maulmein, crossing thence to Raheng or some neighboring point on the Me-nam, and on through the fertile valleys and plateaus on its upper tributaries to the Chinese frontier.

Tea is found, both wild and cultivated, from Zimmé to Kiang Tung. Opium is exported to Mandalay and to China. Indian corn, sugar, and tobacco are grown in the low grounds, and excellent cotton and indigo (which also grows wild in the hills). Teak has long been worked by Anglo-Burmese in the eastern affluents of the Toong-yen and neighboring valleys, and has become comparatively scarce west of the Me-ping; but it grows freely in the hills and valleys around Kiang Sen and Lagong, and in the hill region of eastern Siam, where, however, it is of inferior quality. Silk is produced, and iron, copper, and silver-lead (galena) ores are worked.

The Shan languages are classified by Dr. Cushing as follows: Ahom (Assam), extinct; Khamti, on the upper Irawadi and other valleys on the extreme north of Burmah; the Chinese (Mau) Shans, east from Bamo; Shans proper, between the mountains which bound the Burmese plains in the east and the Me-kong, and between 23° and 19° N. lat.; Laos to the south of this, from 19° north to the frontiers of Siam; and lastly Siamese. The last two, as spoken, differ but little, and the three others may be grouped together. All have separate alphabets (related, however, in form), except the Siamese; and the spelling being phonetic, the orthography is tolerably fixed. But it is a tonal language, and the vowel signs are few, so that some have two or three values assigned them. There are a good many Pali words due to Buddhism, many Burmese words in the districts under Burmese influence, and a large foreign element in the Chinese Shan state of Ho-tha, where the race is perhaps not fundamentally Shan.

See Ney Elias, *Introductory Sketch of the History of the Shans in Upper Burmah and West Yun-nan*, Calcutta, 1876; Yule, *Glossary of Anglo-Indian Words and Phrases* (1886), and *Narrative of the Mission to Ava* (1858); Anderson, *From Mandalay to Momien;* Colquhoun, *Among the Shans;* Cushing, *Shan Dictionary* (Introduction); Bock, *Temples and Elephants;* Sir A. Phayre, *History of Burmah.* (C. T.)

SHARK. The systematic position of the group of Sharks or *Selachoidei* in the class of Fishes, their classification, and their general external and anatomical characteristics have been already sufficiently noticed under ICHTHYOLOGY (vol. xii. pp. 723–4 *sq.*), and we have here to supplement that article only by a fuller reference to the natural history of the more common and more important types of the group.

Sharks are almost exclusively inhabitants of the sea, but some species freely enter the mouths of large rivers and one species (*Carcharias gangeticus*) occurs frequently high up in the large rivers of India, and in the Tigris about Baghdad, at a distance of 350 miles from the Persian Gulf in a straight line, and has

even been reported from a lake in Viti Levu (Fiji Islands) which is shut off from the sea by a cataract.[1] Sharks are found in all seas; most numerous between the tropics, they become scarcer beyond, a few only reaching the Arctic circle; it is not known how far they advance southwards in the Antarctic region. Altogether some hundred and fifty different species have been described.

With regard to their habits many are littoral species, the majority pelagic, and a few are known to belong to the bathybial fauna, having hitherto been obtained down to a depth of 500 fathoms.

Littoral Sharks.—The littoral forms are of small size, and generally known under the name of "dogfishes," "hounds," etc. Some pelagic sharks of larger size also live near the shore on certain parts of a coast, but they are attracted to it by the abundance of food, and are as frequently found in the open sea, which is their birthplace; therefore we shall refer to them when we speak of the pelagic kinds.

The majority of the littoral species live on the bottom, sometimes close inshore, and feed on small marine animals or any animal substance. The following are deserving of special notice:

The Tope (*Galeus*) is common on the coasts not only of England, Ireland, and of the more southern parts of Europe, but also of South Africa, California, Tasmania, and New Zealand. Its teeth are equal in both jaws, of rather small size, flat, triangular, with the point directed towards the one side, and with a notch and denticulations on the shorter side (Fig. 1). It is of a uniform slaty-gray color, and attains to a length of 6 feet. The female brings forth some thirty living young at one birth in May. It cannot be regarded as a very destructive fish, but becomes troublesome at times to fishermen by taking their bait and driving away other fish they desire to catch.

FIG. 1.—Teeth of Tope. *u*, upper; *l*, lower. (×2).

The Hounds proper (*Mustelus*) possess a very different dentition, the teeth being small, obtuse, numerous, arranged in several rows like pavement (Fig. 2). Five or six species are known from the shores of the various temperate and subtropical seas, one (*M. vulgaris*), being common on the coasts of Great Britain and the United States on the Pacific as well as the Atlantic side. It is of a uniform gray color or sparingly spotted with white, and attains to a length of 3 or 4 feet. The young, about twelve in number, are brought forth alive in November. It is a comparatively harmless fish, which feeds on shells, crustaceans, and decomposing animal substances.

FIG. 2. Teeth of *Mustelus*.

Of the Dog-Fishes proper (*Scyllium*, *Chiloscyllium*, etc.), some twenty species are known, which are spread over nearly all the temperate and tropical seas. Their teeth are small, in several series, with a longer pointed cusp in the middle, and generally one or two smaller ones on each side (Figs. 3 and 5). They are all oviparous, their oblong egg-shells being produced at each corner into a long thread by which the egg is fastened to some fixed object. Some of the tropical species are ornamented with a pretty pattern of coloration. The two British species, the Lesser and the Larger Spotted Dog-Fish (*Sc. canicula* and *Sc. catulus*), belong to the most common fishes of the coast, and are often confounded with each other. But the former is finely dotted with brown above, the latter having the same parts covered with larger rounded brown spots, some of which are nearly as large as the eye. As regards size,

FIG. 3.—Teeth of *Scyllium canicula*.

the latter exceeds somewhat the other species, attaining to a length of 4 feet. Dogfishes may become extremely troublesome by the large numbers in which they con-

FIG. 4.—*Chiloscyllium trispeculare*.

gregate at fishing stations; nor do they compensate for the injury they cause to fishermen, being but rarely used as food, except at certain seasons by the poorer

FIG. 5.—Confluent Nasal and Buccal Cavities of the same fish.

classes of the Mediterranean countries, in China and Japan, and in the Orkneys, where they are dried for home consumption. The Black-mouthed Dog-Fish (*Pristiurus melanostomus*) is another European species which is rarely caught on the British coasts, and is recognized by a series of small, flat spines, with which each side of the upper edge of the caudal fin is armed.

The Tiger-Shark (*Stegostoma tigrinum*) is one of the commonest and handsomest sharks in the Indian Ocean. The ground color is a brownish-yellow, and the whole fish is ornamented with black or brown transverse bands or rounded spots. It is a littoral species, but adult specimens, which are from 10 to 15 feet long, are not rarely met far from land. It is easily recognized by its enormously long bladelike tail, which is half as long as the whole fish. The teeth are small, trilobed, in many series. The fourth and fifth gill-openings are close together.

The genus *Crossorhinus*, of which three species are known from the coasts of Australia and Japan, is remarkable as the only instance in this group of fishes in which the integuments give these inactive ground-sharks, whilst they lie concealed watching for their prey, what may be called a "celative" rather than a "protective" resemblance to their surroundings. Skinny frond-like appendages are developed near the angle of the mouth, or form a wreath round the side of the head, and the irregular and varied coloration of the whole body closely assimilates that of a rock cov-

[1] [Dr. J. F. Bransford, in *Reports for the Location of a Ship Canal through Nicaragua* (Washington, 1874), said that sharks were found in the lake of that name. Theodore Gill in Johnson's Cyclopædia (1878), vol. iv. p. 1596, says it is of the genus *Eulamia*, and adds, "another species of the same or allied genus occurs in a fresh-water lake of Manila.—AM. ED.]

ered with short vegetable and coralline growth. This peculiar development reminds us of the similar condi-

FIG. 6.—*Cestracion galeatus.*

tion in the sea-devil (*Lophius*), where it serves also to conceal the fish from its prey, rather than to protect it from its enemies. The species of *Crossorhinus* grow to a length of 10 feet.

The so-called Port Jackson Shark (*Cestracion*) is likewise a littoral form. Besides the common species

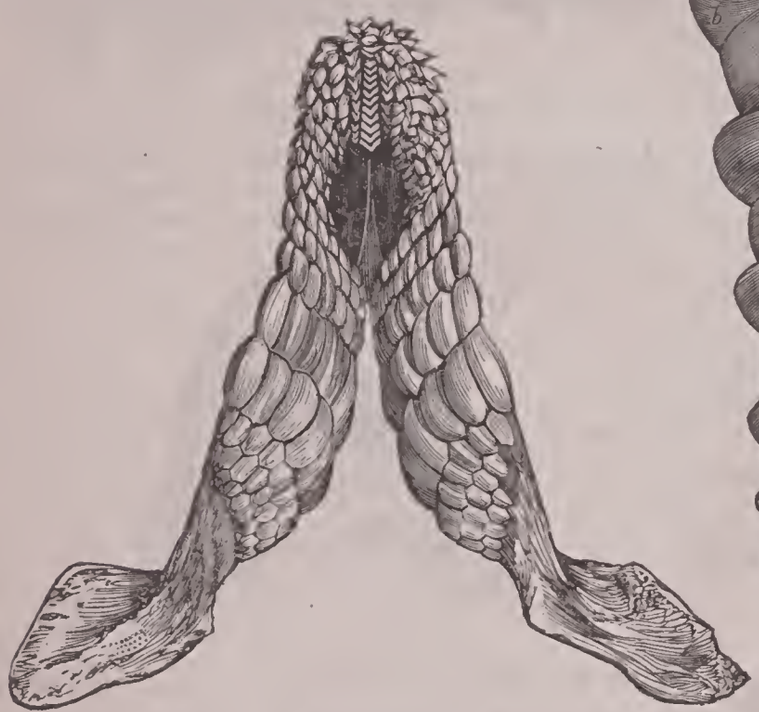


FIG. 7.—Upper Jaw of Port Jackson Shark (*Cestracion philippi*). ×½.

(*C. philippi*), three other closely allied kinds from the Indo-Pacific are known. This genus, which is the only existing type of a separate family, is one of special interest, as similar forms occur in Primary and Secondary strata. The jaws are armed with small obtuse teeth in front, which in young individuals are pointed, and provided with from three to five cusps. The lateral teeth are larger, pad-like, twice as broad as long and arranged in oblique series (Fig. 7),—an arrangement admirably adapted for the prehension and mastication of crustaceans and hard-shelled animals. The fossil forms far exceeded in size the living, which scarcely attain to a length of 5 feet. The shells of their eggs are not rare in collections, being found thrown ashore like those of our dog-fishes. The shell is pyriform, with two broad lamellar ridges each wound edgewise five times round it (Fig. 8).

The Spiny or Piked Dog-Fish (*Acanthias*) inhabits, like the majority of littoral genera of sharks, the temperate seas of both the northern and southern hemispheres. For some part of the year it lives in deeper water than the sharks already noticed, but at uncertain irregular times it appears at the surface and close inshore in almost incredible numbers. Couch says that he has heard of 20,000 having been taken in a seine at one time; and in March, 1858, the newspapers reported a prodigious shoal reaching westward to Uig, whence it extended from 20 to 30 miles seaward, and in an unbroken phalanx eastward to Moray, Banff, and Aberdeen. In the deep fjords of Norway, and indeed at every station of which a shoal of these fishes has taken temporary possession, line-fishing has to be suspended during the time of their visit, as they cut the lines with their scissors-like teeth. As expressed by the name, these fishes are distinguished from the other British littoral sharks by each of the two dorsal fins being armed in front by an acute spine. They do not possess an anal fin. Their teeth are rather small, placed in a single series, with the point so much turned aside that the inner margin of the tooth forms the cutting edge (Fig. 9). The spiny dog-fish are of a grayish color with some whitish spots in young specimens, and attain to a length of 2 or 3 feet. They are viviparous, the young being produced

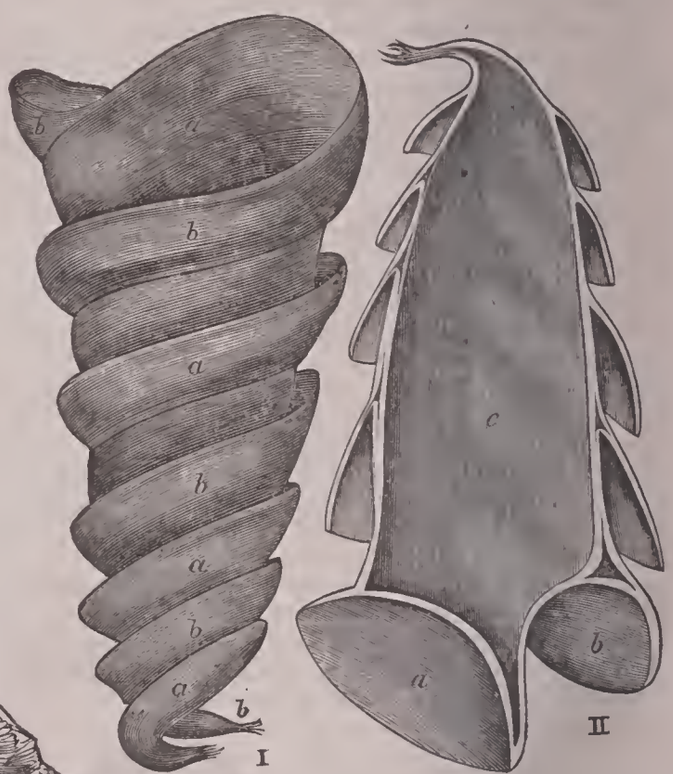


FIG. 8.—Egg-shell of same fish (× ½). I., external view; II., section; *a* and *b*, the two spiral ridges; *c*, cavity for the ovum.

throughout the summer months. It is stated that in the northern islands of Great Britain they are dried for food, and that their livers yield a large quantity of oil.

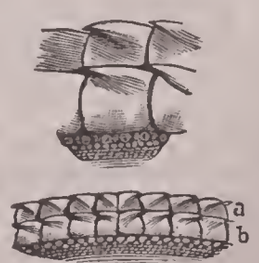


FIG. 9.—Teeth of *Acanthias vulgaris.*

Finally, we have to notice among the littoral sharks the "Angel-Fish" or "Monk-Fish" (*Rhina squatina*), which, by its broad flat head and expanded pectoral fins, approaches in general appearance the rays. It occurs in the temperate seas of the southern as well as the northern hemisphere, and is not uncommon on sandy parts of the coast of England and Ireland. It does not seem to exceed a length of 5 feet, is not used as food, and is too rare to do any perceptible injury to other fish. It is said to produce about twenty young at a birth.

Pelagic Sharks.—All these are of large size, and some are surpassed in bulk and length only by the larger kinds of cetaceans. Those armed with powerful cutting teeth are the most formidable tyrants of the ocean and dangerous to man, whilst others, which are provided with numerous but very small teeth, feed on small fishes only or marine invertebrates, and are other-

wise almost harmless and of a timid disposition, which causes them to retire into the solitudes of the open sea. On this account we know very little of their life; indeed, some are known from a few individuals only which have accidentally come ashore. All pelagic sharks have a wide geographical range, and many are found in all seas within the limits of the equatorial zone,—some being almost cosmopolitan. All seem to be viviparous.

Of the more remarkable forms which we propose to notice here the genus most abundantly represented in species and individuals is *Carcharias*. Perhaps nine-tenths of the sharks of which we read in books of travel belong to this genus. Between thirty and forty species have been distinguished, all of which are found in tropical seas. They are the sharks which so readily attach themselves to sailing vessels, following them for weeks, and thus exhibiting an endurance of muscular power scarcely found in any other class of animals. Others affect more the neighborhood of land, congregating at localities where nature or the vicinity of man provides them with an abundant supply of food. One of the most common species, and one of those which extends far into the temperate zones, is the Blue Shark (*Carcharias glaucus*), of which small specimens (4 to 6 feet long) are frequently caught on the south coasts of England and Ireland. Other species of *Carcharias* attain a length of 25 feet. The mouth of all is armed with a series of large flat triangular teeth, which have a sharp, smooth, or serrated edge (Fig. 10).

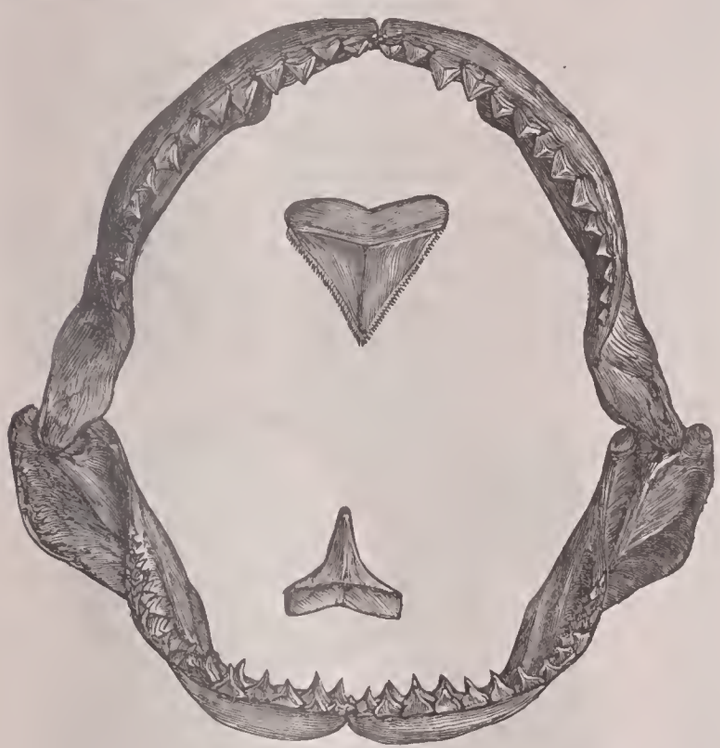


FIG. 10.—Dentition of the Blue Shark (*Carcharias glaucus*). The single teeth are of the natural size.

Galeocerdo is likewise a large shark very dangerous to man, differing from the preceding chiefly by having the outer side of its teeth deeply notched. It has long been known to occur in the North Atlantic, close to the Arctic Ocean (*G. arcticus*), but its existence in other parts has been ascertained within a recent period; in fact it seems to be one of the most common and dangerous sharks of the Indo-Pacific, the British Museum having obtained specimens from Mauritius, Kurrachee, Madras, and the west coast of Australia.

Hammerheaded Sharks (*Zygæna*) are sharks in which the anterior portion of the head is produced into a lobe on each side, the extremity of which is occupied by the eye. The relation of this unique configuration of the head to the economy of the fish is unknown. Otherwise these sharks resemble *Carcharias*, and are equally formidable, but seem to be more stationary in their habits. They occur in all tropical and subtropical seas, even in the Mediterranean, where *Z. malleus* is by no means rare. In the Indian Ocean it is common, and Cantor states that specimens of this species may be often seen ascending from the clear blue depths of the ocean like a great cloud.

The Porbeagles (*Lamna*) differ from the preceding sharks in their dentition (Fig. 11), the teeth being large, lanceolate in shape, not adapted for cutting, but rather for seizing and holding the prey, which consists chiefly in fish. These sharks are therefore not dangerous to man; at least there is no instance known of a person having been attacked by the species common on the British coast (*L. cornubica*). It grows to a length of 10 feet, and ranges to New Zealand and Japan. See vol. xix. p. 532.

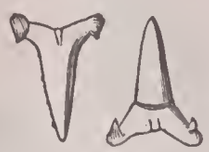


FIG. 11.—Teeth of *Lamna*.

To the genus *Carcharodon* particular interest is attached; because the single still existing species is the most formidable of all sharks, as were those which preceded it in Tertiary times. The existing species (*C. rondeletii*) occurs in almost all tropical and subtropical seas, but seems to be verging towards extinction. It is known to attain to a length of 40 feet. The tooth figured here of the natural size (Fig. 12) is

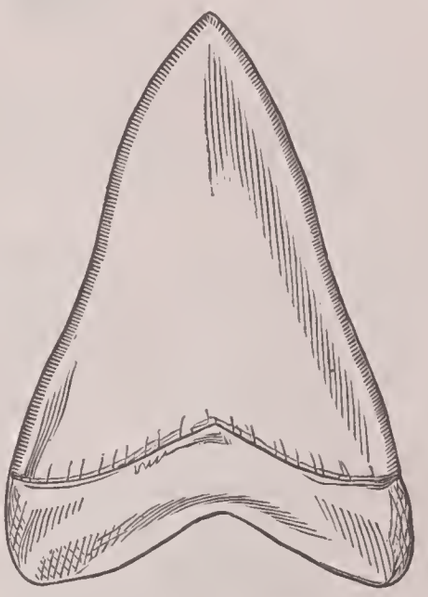


FIG. 12.—Tooth of *Carcharodon rondeletii*.

taken from a jaw much shrunk in drying, but still 20 inches wide in its transverse diameter, and taken from a specimen 36½ feet long. The extinct species must have been still more gigantic in bulk, as we may judge from teeth which are found in the crag or which have been dredged up from the bottom of the Pacific Ocean by the naturalists of the "Challenger" expedition, and which are 4 inches wide at the base and 5 inches long measured along their lateral margin. In some Tertiary strata these teeth are extremely abundant, so much so that—for instance, in Charleston—the strata in which they occur are quarried to obtain the fossil remains for export to England, where they are converted into artificial manure.

The Fox-Shark or Thresher (*Alopecias vulpes*), of which every year specimens are captured on the British coast, but which is common in all the temperate seas of the northern and southern hemispheres, is readily recognized by its extremely slender tail, the length of which exceeds that of the remainder of the body. Its teeth are small, flat, triangular, and without serrature (Fig. 13; the single tooth is of the natural size). It follows the shoals of herrings, pilchards, and sprats in their migrations, destroying incredible numbers and frequently injuring the nets by getting entangled in them. When feeding it uses the long tail in splashing the surface of the water, whilst it swims in gradually

decreasing circles round a shoal of fishes which are thus kept crowded together, falling an easy prey to their enemy. Sometimes two threshers may be seen working together. Statements that it has been seen to attack whales and other large cetaceans rest upon erroneous observations; its dentition is much too weak to bite through their skin, although, as Couch says, by one splash

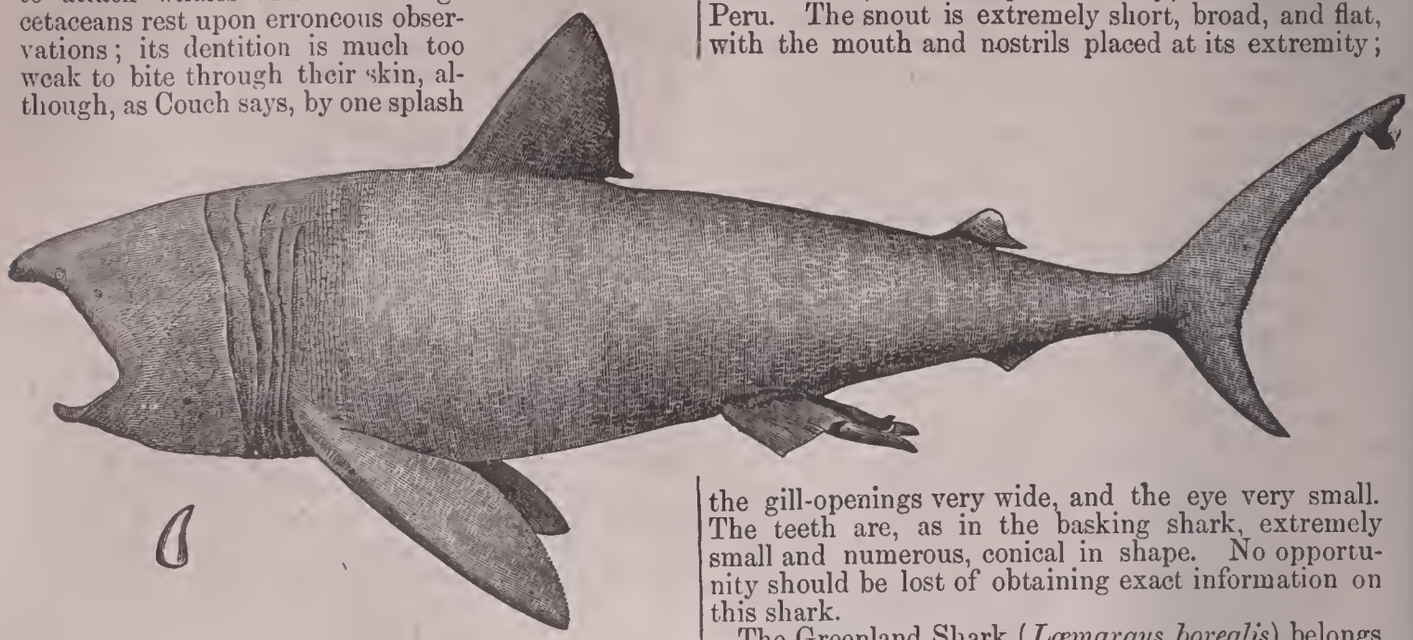


Fig. 13.—Basking Shark.

of its tail on the water it may put a herd of dolphins or porpoises to flight like so many hares. The same effect may be produced by the splash of an oar. The thresher attains to a length of 15 feet, the tail included.

The Basking Shark (*Selache maxima*), sometimes erroneously called "Sun-Fish," is the largest fish of the North Atlantic, growing to a length of more than 30 feet. It is one of the few types of sharks which up to a very recent time were considered to be peculiar to the North Atlantic fauna; but Prof. F. M'Coy has just recorded its occurrence on the Australian coast, a specimen 30 feet long having been captured in November, 1883, at Portland, on the west coast of Victoria. The mouth is of an extraordinary width, and, like the gill-cavity, capable of great expansion, so as to enable the fish to take at one gulp an enormous quantity of the small fish and other marine creatures on which it subsists. Also the gill-openings are of great width. The teeth are very small, numerous, arranged in several series, conical, and probably without use in feeding. This shark is therefore quite harmless if not attacked. On the west coast of Ireland, where it is frequently seen during the summer months, generally in companies, at a distance of from three to a hundred miles off the shore, it is chased by the more courageous of the fishermen for the sake of the oil which is extracted from the liver, one fish yielding from a ton to a ton and a half. Its capture is not unattended with danger, as one blow from the enormously strong tail is sufficient to stave in the sides of a large boat. The simple method used at present of harpooning the fish entails much patience and loss of time upon the captors, as the fish generally sinks to the bottom and sulks for many hours before it rises again in a more or less exhausted condition; and the use of more modern appliances could not fail of securing more speedy and better success. The basking shark is gregarious, and many individuals may be seen in calm weather lying together motionless, with the upper part of the back raised above the surface of the water, a habit which it has in common with the true sun-fish (*Orthagoriscus*), and from which it has derived its name.

A shark similar in many points to the basking shark (which it exceeds in size), and an inhabitant of the Indo-Pacific Ocean, is *Rhinodon typicus*. In fact, so far as our present knowledge goes, it is the largest of all sharks, as it is known to exceed a length of 50 feet, but it is stated to attain that of 70. The captures of only a few specimens are on record, viz., one at the Cape of Good Hope, one or two near the Seychelles, where it is known as the "chagrin," one on the coast of California, and one (quite recently) on the coast of Peru. The snout is extremely short, broad, and flat, with the mouth and nostrils placed at its extremity; the gill-openings very wide, and the eye very small. The teeth are, as in the basking shark, extremely small and numerous, conical in shape. No opportunity should be lost of obtaining exact information on this shark.

The Greenland Shark (*Læmargus borealis*) belongs to the same family as the spiked dog-fish, but grows to a much larger size, specimens 15 feet long being

Fig. 14.—Greenland Shark (*Læmargus borealis*).

frequently met with. The two dorsal fins are small and destitute of spines. The teeth (Fig. 11) in the upper jaw are small, narrow, conical in shape; those of the lower flat, arranged in several series, one on the top of the other, so that only the uppermost forms the sharp dental edge of the jaw. The points of these

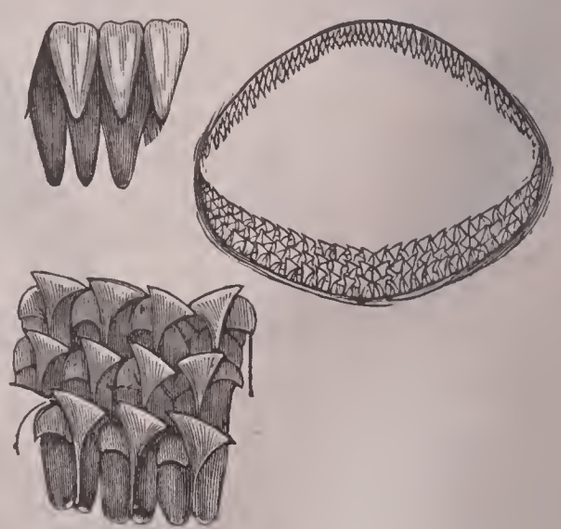


Fig. 15.—Dentition of Greenland Shark.

lower teeth are so much turned aside that the inner margin only enters the dental edge. The Greenland shark is an inhabitant of the Arctic regions, sometimes straying to the latitudes of Great Britain and of Cape Cod in the western Atlantic; it is one of the greatest enemies of the whale, which is often found with large pieces bitten out of the tail by this shark. Its voracity is so great that, as Scoresby tells us, it is absolutely fearless in the presence of man whilst engaged in feeding on the carcass of a whale, and that it will allow itself to be stabbed with a lance or knife without being driven away.

The Spinous Shark (*Echinorhinus spinosus*) is readily recognized by the short bulky form of its body, its short tail, and the large round bony tubercles which are scattered all over its body, each of which is raised in the middle into a pointed conical spine. More frequent in the Mediterranean, it has been found also not very rarely on the English coasts and near the Cape of Good Hope. It is always living on the ground, and probably descends to some depth. It does not seem to exceed a length of 10 feet.

Bathybial Sharks.—Sharks do not appear to have yet reached the greatest depths of the ocean; and so far as we know at present we have to fix the limit of their vertical distribution at 500 fathoms. Those

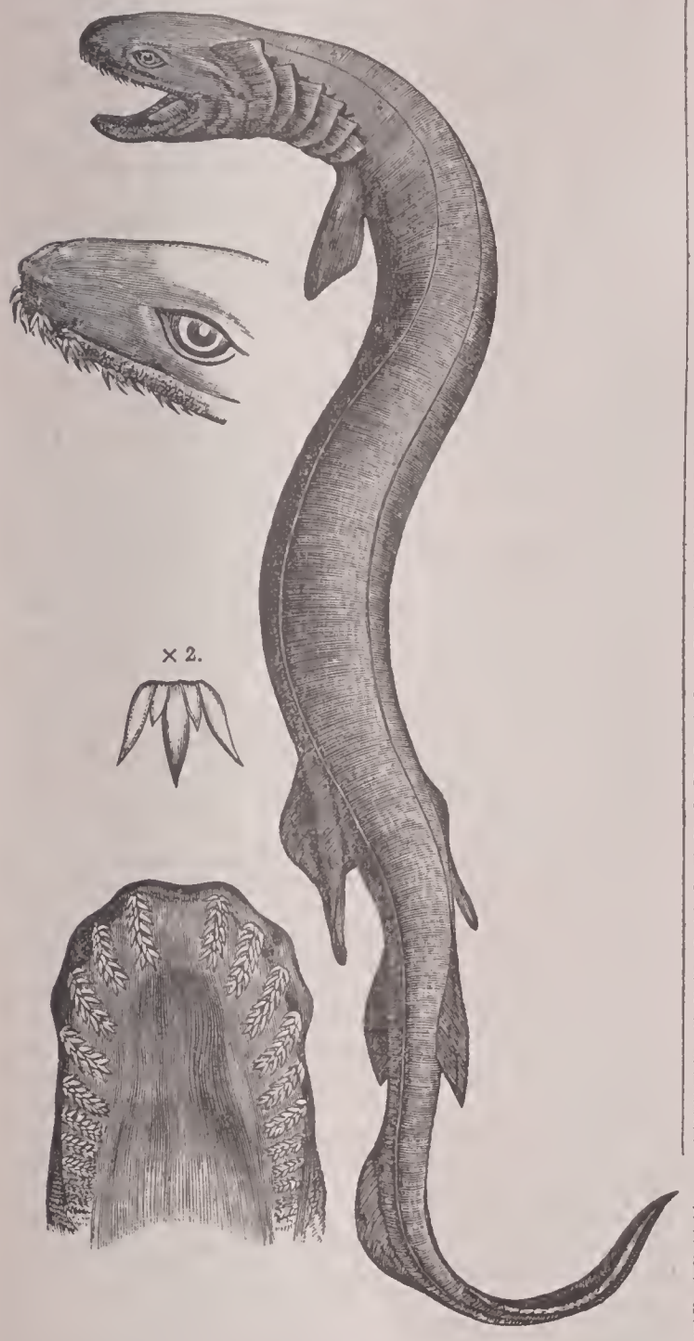


FIG. 16.—*Chlamydoselachus anguineus.*

which we find to have reached or to pass the 100 fathoms line belong to generic types which, if they include littoral species, are ground-sharks,—as we generally find the bottom-feeders of our littoral fauna much more strongly represented in the deep sea than the surface swimmers. All belong to two families only, the *Scylliidæ* and *Spinacidæ*, the littoral members of which live for the greater part habitually on the bottom and probably frequently reach to the 100 fathoms line. Distinctly bathybial species are two small dog-fishes,—*Spinax granulatus* from 120 fathoms, and *Scyllium canescens* from 400 fathoms, both on the southwest coast of South America; also *Centroscyllium granulatum* from 245 fathoms in the Antarctic Ocean, whose congener from the coast of Greenland probably descends to a similar depth. The sharks which reach the greatest depth recorded hitherto belong to the genus *Centrophorus*, of which some ten species are known, all from deep water in the North Atlantic, Mediterranean, the Molucca and Japanese seas. The Japanese species were discovered by the naturalists of the "Challenger" on the Hyalonema ground off Inosima in 345 fathoms. Dr. E. P. Wright found *C. cœlolepis* at a still greater depth on the coast of Portugal. The fishermen of Sétubal fish for these sharks in 400 or 500 fathoms, with a line of some 600 fathoms in length. "The sharks caught were from 3 to 4 feet long, and when they were hauled into the boat fell down into it like so many dead pigs;" in fact, on being rapidly withdrawn from the great pressure under which they lived they were killed, like other deep-sea fishes under similar circumstances. It is noteworthy that the organization of none of these deep-sea sharks has undergone such a modification as would lead us to infer that they are inhabitants of great depths.

One of the most interesting types of the division of sharks is the small family of *Notidanidæ*, which is externally distinguished by the presence of a single dorsal fin only, without spine and opposite to the anal, and by having six or seven wide branchial openings. They represent an ancient type, the presence of which in Jurassic formations is shown by teeth extremely similar to those of the living species. Their skeleton is notochordal. Only four species are known, of which one (*Notidanus griseus*) has now and then strayed northwards to the English coast. A member of this family has been recently discovered in Japan, and is so scarce that only two specimens are known—one in the museum at Cambridge, U. S., and the other in the British Museum. It was named by its first describer, S. Garman, *Chlamydoselachus anguineus* (Fig. 16). It resembles somewhat in shape a conger, and differs from the *Notidani* proper by its elongate body, wide lateral and terminal mouth, extremely wide gill-openings, and peculiarly formed teeth. The teeth are similar in both jaws, each composed of three slender curved cusps separated by a pair of rudimentary points, and with a broad base directed backwards. These teeth resemble some fossils of the Middle Devonian, described as *Cladodus*, and North-American naturalists regard, therefore, this fish as "the oldest living type of vertebrate." The *Notidani* are very probably ground-sharks, perhaps descending into deep water; and, although nothing positive is known at present of the habits of *Chlamydoselachus*, the fact that this singular type has escaped so long the observation of the numerous collectors in Japan renders it probable that it inhabits depths the exploration of which has been initiated only recently.

A few words have to be added with reference to the economic uses of this group of fishes. Their utility to man is insignificant in comparison with the havoc they commit among food-fishes and at fisheries, and with the loss of life which is caused by the larger kinds. As mentioned above, some of the smaller dog-fishes are eaten at certain seasons by the captors, and by the poorer classes of the population. An inferior kind of oil, chiefly used for the adulteration of cod-liver oil is extracted on some of the northern fishing-stations from the liver of the spiked dog-fishes, and occasionally of the larger sharks. Cabinetmakers make extensive use of shark's-skin under the name of "shagreen" for smoothing or polishing wood. This shagreen is obtained from species (such as our dog-fishes) whose skin is covered with small, pointed, closely-set, calcified papillæ, whilst very rough skins, in which the papillæ are large or blunt, are useless for this purpose. The dried fins of sharks (and of rays) form in India and China an important article of trade, the Chinese preparing gelatin from them, and using the better sort for culinary purposes. They are assorted in two kinds, viz., "white" and "black." The former consists exclusively of the dorsal fins, which are on both sides of the same light color, and reputed to yield more gelatin than the other fins. The pectoral,

ventral and anal fins constitute the "black" sort; the caudal are not used. One of the principal places where shark fishing is practiced as a profession is Kurrachee, and the principal kinds of sharks caught there are species of *Carcharias*, *Galeocerdo*, and *Zygæna*. Dr. Buist, writing in 1850, states that there are thirteen large boats, with crews of twelve men each, constantly employed in this pursuit, that the value of the fins sent to the market varies from 15,000 to 18,000 rupees ($7290 to $8748), that a boat will capture sometimes at a draught as many as a hundred sharks of various sizes, and that the number of sharks captured annually amounts probably to not less than 40,000. Large quantities are imported from the African coast and the Arabian Gulf, and various ports on the coast of India. In the year 1845–46 8770 cwt. of sharks' fins were exported from Bombay to China. (A. C. G.)

SHARON, a borough of the United States, in Mercer County, Pennsylvania, 14 miles west of Mercer, is the seat of considerable iron manufacture, with blast furnaces, rolling mills, foundries, and nail factories, and had in 1880 a population of 5684.

SHARP, James (1618–1679), archbishop of St. Andrews, was the son of William Sharp, sheriff-clerk of Banffshire and of Isabel Leslie, daughter of Leslie of Kininvie, of the family of Halyburtons of Pitcur in Angus, and was born in Castle Banff on May 4, 1618. He was a clever boy and his early disposition for the church led to his being called in jest "the young minister." In 1633 he went to King's College, Aberdeen, and graduated in 1637. He there studied divinity for one or two years, and probably derived his Episcopal tendencies from the "Aberdeen doctors," Aberdeen being at that time the home of Episcopal sentiment. On the outbreak of the Covenanting war he went to England (1639) and visited Oxford and perhaps Cambridge, becoming acquainted with the principal English divines. Upon his return he was chosen in 1643 through the influence of Lord Rothes to be one of the "regents" of philosophy in St. Leonard's College, St. Andrews. He appears to have continually risen in reputation until in December, 1647, he went through his ordinary trials for the ministerial office before the Presbytery of St. Andrews, and was appointed minister of Crail, in Fifeshire, on the presentation of the Earl of Crawford, on January 27, 1648. In the great schism of Resolutioners and Protestors, he, with the large majority of educated men, took active part with the former; he was the friend of Baillie, Douglas, Dickson, Wood, Blair and others, and as early as March, 1651, was recognized as one of the leading men of the party. His first public employment was in 1656 when he went to London on their behalf to endeavor to counteract with the Protector the influence of Warriston, who was acting for the Protestors. Here he became acquainted with Calamy, Ash, and other leading London Presbyterian ministers, and letters passed between him and Lauderdale, then prisoner in the Tower. He displayed all his undoubted talents for petty diplomacy and considerable subtlety in argument while on this service, and his mission was decidedly successful. He returned to Scotland in 1659, but upon Monk's march to London was again, in February, 1660, sent by the Resolutioners to watch over their interests in London, where he arrived on February 13. He was most favorably received by Monk, to whom it was of great importance to remain on good terms with the dominant party in Scotland. His letters to Douglas and others during this period, if they may be trusted, are useful towards following the intrigues of the time day by day. It must not be forgotten, however, that there is good reason for thinking that Sharp had already made up his mind not to throw away the chances he might have of prominent employment under the Restoration. In the beginning of May he was despatched by Monk to the king at Breda "to deal that he may be sent with a letter to the London Presbyterian ministers, showing his resolution to own the godly sober party." His letters on this occasion to Douglas show that he regarded himself equally as the emissary of the Scottish kirk. It is to be noticed that he was also the bearer of a secret letter from Lauderdale to the King. He was in fact playing a game admirably suited to his peculiar capacity for dark and crooked ways of dealing. There can be little doubt that while on this mission he was finally corrupted by Charles and Clarendon, not indeed so far as to make up his mind to betray the kirk, but at any rate to decide in no way to imperil his own chances by too firm an integrity. The first thing that aroused the jealousy of his brethren, who, as Baillie says, had trusted him as their own souls, was his writing from Holland in commendation of Clarendon. This jealousy was increased on his return to London (May 26) by his plausible endeavors to stop all coming of Presbyterian commissioners from Scotland and Ireland, though he professed to desire the presence of Douglas and Dickson, by his urgent advice that the Scots should not interfere in the restoration of Episcopacy in England, and by his endeavors to frustrate the proposed union of Resolutioners and Protestors. He informed them that Presbyterianism was a lost cause in England, but as late as August 11 he intimated that, though there had been great danger for the Scottish kirk as well, this danger had been constantly and successfully warded off by his efforts. He returned to Scotland in this month and busied himself in endeavoring to remove all suspicions of his loyalty to the kirk; but at the same time he sucessfully stopped all petitions from Scottish ministers to king, parliament, or council. His letters to Drummond, a Presbyterian minister in London, and to Lauderdale, without absolutely committing him, show clearly that he was certain that Episcopacy was about to be set up. How far he was actively a traitor in the matter has always been fairly disputed until the question was at last set at rest by the discovery of his letter, dated May 21, from London, whither he went in April, 1661, to Middleton, the High Commissioner, whose chaplain he now was, from which it is proved that he was in confidential communication with Clarendon and the English bishops, that he was earnestly and eagerly coöperating in the restoration of Episcopacy in Scotland, that he had before leaving Scotland held frequent conferences with Middleton on the subject (a fact which he had explicitly and vehemently denied) and was aware that Middleton had all along intended it, and that he drew up and was directly responsible for the quibbling proclamation of June 10, the sole purpose of which was "the disposing of minds to acquiesce in the king's pleasure." The original of this letter (which is printed in the *Lauderdale Papers* and in the *Scottish Review*) is preserved in the Museum of the Society of Antiquaries, Edinburgh. It should be noticed that as late as the end of April, on the eve of starting on his mission to court with Rothes and Glencairne, he declared to Baillie that no change in the kirk was intended. The mask was at length dropped in August, when Episcopacy was restored and Sharp was appointed Archbishop of St. Andrews. He and Leighton, Fairfoul and Hamilton "were dubbed, first preaching deacons, then presbyters, and then consecrated bishops in one day, by Dr. Sheldon and a few others." On April 8th the new prelates entered Scotland, and on the forenoon of April 20, 1662, Sharp preached his first sermon at St. Andrews.

Sharp had carefully kept on good terms with Lauderdale, and when the Billeting Plot was concocted in September, 1662, against the latter by Middleton, he managed to avoid acting against him; indeed it is probable that, after being appointed under an oath of secrecy to be one of the scrutineers of the billets, he, in violation of the oath, was the cause of Lauderdale receiving timely information of the decision against him; and yet he shortly went up to London to explain the whole affair in Middleton's interest. When Lauderdale's supremacy was established he readily coöperated in passing the National Synod Act in 1663, the first step in the intended subjection of the church

to the crown. In 1664 he was again in London, returning in April, having secured the grant of a new church commission. His vanity also had been gratified by his being allowed to take precedence of the chancellor at the council. He harassed the ministers who were with his old friend James Wood when he signed his well-known deathbed confession; he cited and fined others, as well as laymen, for withdrawing from the churches; he urged the thorough prosecution of the arbitrary powers granted to the commission, and complained of the slackness of his fellow commissioners. So oppressive was his conduct and that of others of the bishops that it called forth a written protest from Gilbert Burnet. Sharp at once summoned him before the bishops and endeavored to obtain a sentence of deprivation and excommunication against him, but was overruled by his brethren. On the death of Glencairne, the chancellor's greatest efforts were made to secure the vacant office for Sharp, and he was not inactive in his own interest; the place was not, however, filled up until 1667, and then by the appointment of Rothes. He was in strict alliance with Rothes, Hamilton, and Dalyell, and the other leaders of oppression, and now placed himself in opposition to the influence of Lauderdale, attacking his friends, and especially the earl of Kincardine. In 1665 he was again in London, where, through his own folly and mendacity, he suffered a complete humiliation at the hands of Lauderdale, well described by the historian Burnet. With Rothes he now in great part governed Scotland, and the result of their system of violence and extortion was the rising of the Covenanters, during which, being in temporary charge during Rothes's absence, he showed, according to Bellenden, the utmost fear, equalled only by his cruelty to the prisoners after the rout of Pentland. When the convention of estates met in January, 1667, he received his first rebuff, Hamilton being substituted for him as president. He now tried to curry favor with Lauderdale, to whom he wrote letters of the most whining contrition, and who extended him a careless reconciliation. The expressions of contempt for him which occur at this time, as previously, in the letters of Robert Moray, Argyll, and others of Lauderdale's correspondents, are frequent and very amusing. For a time he made himself actively useful, and was instrumental in restraining his brethren from writing to London to complain of the conciliation policy which for a while Lauderdale carried out, a transaction in which he displayed the utmost effrontery of lying; and, with slight attempts to free himself, he continued faithful in his new service. On July 10, 1668, an attempt was made upon his life by Robert Mitchell, who fired a pistol at him while driving through the streets of Edinburgh. The shot, however, missed Sharp, though his companion the bishop of Orkney was wounded by it, and Mitchell for the time escaped. In August Sharp went up to London, returning in December, and with his assistance, nominally indeed at his suggestion, Tweeddale's tolerant proposals for filling the vacant parishes with some of the "outed" ministers were carried out. In the debates on the Supremacy Act, by which Lauderdale destroyed the autonomy of the church, he at first showed reluctance to put in motion the desired policy, but gave way upon the first pressure. When, however, Leighton, as archbishop of Glasgow, endeavored to carry out a comprehension scheme, Sharp actively opposed him, and expressed his joy at the failure of the attempt. From this time he was completely subservient to Lauderdale, who had now finally determined upon a career of oppression, and in 1674 he was again in London to support this policy. In this year also Mitchell, who had shot at him six years before, was arrested, Sharp himself having recognized him, and, upon Sharp's promise to obtain a pardon, privately made a full confession. When brought into the justiciary court, however, he refused to repeat the confession, whereupon the promise of pardon was recalled; the prisoner was sent to the Bass, and was not brought to trial for four years. In 1678, however, the country being again in great disorder, he was tried on his own confession, which, not having been made before judges, could not legally be brought against him. This plea being overruled, he claimed the promise of pardon. Sharp, however, basely denied that any such promise had been given. His falsehood was proved by the entry of the act in the records of the court. Mitchell was finally condemned, but the condemnation was so evidently unfair and contrary to solemn promise that a reprieve would have been granted had not Sharp himself insisted on his death. This, perhaps the basest action of his base life, was speedily avenged. On May 3, 1679, as he was driving with his daughter Isabel to St. Andrews, he was set upon by nine men, who were looking for one of the instruments of his cruelty, and, in spite of unmanly beseechings and of the appeals of his daughter, was cruelly murdered. The place of the murder, on Magus Muir, now covered with fir trees, is marked by a monument erected by Dean Stanley, with a Latin inscription recording the deed. It is only right, while recording a career of cold-blooded cruelty and almost unexampled political baseness, to remember that no charge that can be seriously maintained has ever been brought against the morality of Sharp's private life.

Unless otherwise mentioned, the proofs of the statements in this article will be found in vols. i. and ii. of the *Lauderdale Papers* (Camden Society) and in two articles in the *Scottish Review*, July, 1884, and January, 1885. (O. A.)

SHARP, William (1749–1824), an eminent line-engraver, was born at London on the 29th of January, 1749. He was originally apprenticed to what is called a bright engraver, and practiced as a writing engraver, but, gradually becoming inspired by the higher branches of the engraver's art, he exercised his gifts with surprising success on works of the old masters. Among his earlier plates are some illustrations, after Stothard, for the *Novelists' Magazine*. He engraved the Doctors Disputing on the Immaculateness of the Virgin and the Ecce Homo of Guido Reni, the St. Cecilia of Domenichino, the Virgin and Child of Dolci, and the portrait of John Hunter of Sir Joshua Reynolds. His style of engraving is thoroughly masterly and original, excellent in its play of line and rendering of half-tints and of "color." He died at Chiswick on the 25th July, 1824. In his youth Sharp was a violent republican, and, owing to his hotly expressed adherence to the politics of Paine and Horne Tooke, he was examined by the privy council on a charge of treason. He was also one of the greatest visionaries in matters pertaining to religion. No imposture was too gross for him to accept, no deception too glaring for his eyes to admire. The dreams of Mesmer and the rhapsodies of Brothers found in Sharp a stanch believer; and for long he maintained Joanna Southcott at his own expense. As an engraver he achieved a European reputation, and at the time of his death he enjoyed the honor of being a member of the Imperial Academy of Vienna and of the Royal Academy of Munich.

SHAWL, a square or oblong article of dress worn in various ways dependent from the shoulders. The term is of Persian origin (*shál*), and the article itself is most characteristic and important in the dress of the natives of northwestern India and Central Asia; but in various forms, and under different names, essentially the same piece of clothing is found in most parts of the world. The shawls made in Kashmir occupy a preëminent place among textile products; and it is to them and their imitations from Western looms that specific importance attaches. The Kashmir shawl is characterized by the great elaboration and minute detail of its design, in which the "cone" pattern is a prominent feature, and by the glowing harmony, brilliance, depth, and enduring qualities of its colors. The basis of these excellences is found in the raw material of the shawl

manufacture, which consists of the very fine, soft, short, flossy under-wool, called pashm or pashmina, found on the shawl-goat, a variety of *Capra hircus* inhabiting the elevated regions of Tibet. There are several varieties of pashm, according to the districts in which it is produced, but the finest is a strict monopoly of the maharaja of Kashmir, through whose territory it comes. Inferior pashm and Kirman wool—a fine soft Persian sheep's wool—are used for shawl weaving at Amritsar and other places in the Punjab, where colonies of Kashmiri weavers are established; but just in proportion to the quality of the pashm used are the beauty and value of the resulting shawl. In Kashmir the shawl wool is sorted with patient care by hand, and spun into a fine thread, a work of so much delicacy, owing to the shortness of the fibre, that a pound of undyed thread may be worth £2, 10s. [$12.15]. The various colors, costly and permanent, are dyed in the yarn. The subsequent weaving or embroidering is a work of great labor, and a fine shawl will occupy the whole labor of three men not less than a year. Thus a first-rate shawl weighing about 7 lb may cost at the place of its production £300 [$1458], made up thus: material £30 [$145.80], labor £150 [$729], duty £70 [$340.20], miscellaneous expenses, £50 [$243]. In shawl cloth many varieties of dress articles are made; but of shawls themselves, apart from shape and pattern, there are only two principal classes: (1) loom-woven shawls called tiliwalla, talikár or káni kár,—sometimes woven in one piece, but more often in small segments which are sewn together with such precision and neatness that the sewing is quite imperceptible (such loom-woven shawls have borders of silk, the weight and stiffness of which serve to stretch the shawl and make it set properly); and (2) embroidered shawls —amlikár,—in which over a ground of plain pashmina is worked by needle a minute and elaborate pattern. A large proportion of the inhabitants of Srinagar, the capital of Kashmir, are engaged in the shawl industry; and there are numerous colonies of Kashmiri weavers settled at Amritsar, Ludianah, Nurpur, and other towns in the Punjab. Amritsar is now the principal entrepôt of the shawl trade between India and Europe. Imitation Kashmir shawls are made at Lyons, Nîmes, Norwich, and Paisley, and some of the products of these localities are little inferior in beauty and elaboration to Oriental shawls; but owing to the fluctuations of fashion there has been little demand for the finer products of European looms for many years. See also PERSIA, vol. xviii. p. 637.

SHEA BUTTER. See OILS, vol. xvii. p. 768.

SHEARWATER, the name of a bird first published in Willughby's *Ornithologia* (p. 252), as made known to him by Sir T. Browne, who sent a picture of it with an account that is given more fully in Ray's translation of that work (p. 334), stating that it is "a Sea-fowl, which fishermen observe to resort to their Vessels in some numbers, swimming[1] swiftly to and fro, backward, forward, and about them, and doth as it were *radere aquam*, shear the water, from whence perhaps it had its name."[2] Ray's mistaking young birds of this kind obtained in the Isle of Man for the young of the Coulterneb, now usually called PUFFIN, has already been mentioned under that heading (vol. xx. p. 107); and not only has his name *Puffinus anglorum* hence become attached to this species, commonly described in English books as the Manx Puffin or Manx Shearwater, but the barbarous and misapplied word *Puffinus* has come into regular use as the generic term for all birds thereto allied, forming a well-marked group of the Family *Procellariidæ* (*cf.* PETREL, vol. xviii. p. 725), distinguished chiefly by their elongated bill, and numbering some twenty species, if not more —the discrimination of which, owing partly to the general similarity of some of them, and partly to the change of plumage which others through age are believed to undergo, has taxed in no common degree the ingenuity of those ornithologists who have ventured on the difficult task of determining their characters. Shearwaters are found in nearly all the seas and oceans of the world,[3] generally within no great distance from the land, though rarely resorting thereto, except in the breeding-season. But they also penetrate to waters which may be termed inland, as the Bosphorus, where they have long attracted attention by their daily passage up and down the strait, in numerous flocks, hardly ever alighting on the surface, and from this restless habit they are known to the French-speaking part of the population as *âmes damnées*, it being held by the Turks that they are animated by condemned human souls. Four species of *Puffinus* are recorded as visiting the coasts of the United Kingdom; but the Manx Shearwater aforesaid is the only one that at all commonly occurs or breeds in the British Islands. It is a very plain-looking bird, black above and white beneath, and about the size of a Pigeon. Some other species are considerably larger, while some are smaller, and of the former several are almost whole-colored, being of a sooty or dark cinereous hue both above and below. All over the world Shearwaters seem to have precisely the same habits, laying their single purely white egg in a hole under ground. The young are thickly clothed with long down, and are extremely fat. In this condition they are thought to be good eating, and enormous numbers are caught for this purpose in some localities, especially of a species, the *P. brevicaudus* of Gould, which frequents the islands off the coast of Australia, where it is commonly known as the "Mutton-bird." For works treating of the Shearwaters, see those cited under PETREL (vol. xviii. p. 725). (A. N.)

SHEATHBILL, a bird so-called by Pennant in 1781 (*Gen. Birds*, ed. 2, p. 43) from the horny case[4] which ensheaths the basal part of its bill. It was first made known from having been met with on New-Year Island, off the coast of Staten Land, where Cook anchored on New Year's eve, 1774.[5] A few days later he discovered the islands that now bear the name of South Georgia, and there the bird was again found,—in both localities frequenting the rocky shores. On his third voyage, while seeking some land reported to have been found by Kerguelen, Cook in December, 1776, reached the cluster of desolate islands now generally known by the name of the French explorer, and here, among many other kinds of birds, was a Sheathbill, which for a long while no one suspected to be otherwise than specifically identical with that of the western Antarctic Ocean; but, as will be seen, its distinctness has been subsequently admitted.

The Sheathbill, so soon as it was brought to the notice of naturalists, was recognized as belonging to a genus hitherto unknown, and the elder Forster in 1788 (*Enchiridion*, p. 37) conferred upon it, from its snowy plumage, the name *Chionis*, which has most properly received general accept-

[1] By mistake, no doubt, for flying or "hovering," the latter the word used by Browne in his *Account of Birds found in Norfolk* (Mus. Brit. MS. Sloane, 1830, fol. 5, 22 and 31), written in or about 1662. Edwards (*Gleanings*, iii. p. 315) speaks of comparing his own drawing "with Browne's old draught of it, still preserved in the British Museum," and thus identifies the latter's "Shearwater" with the "Puffin of the Isle of Man."

[2] *Lyrie* appears to be the most common local name for this bird in Orkney and Shetland; but *Scraib* and *Scraber* are also used in Scotland. These are from the Scandinavian *Skraape* or *Skrofa*, and considering Prof. Skeat's remarks (*Etym. Dictionary*, p. 546) as to the alliance between the words *shear* and *scrape* it may be that Browne's hesitation as to the derivation of "Shearwater" had more ground than at first appears.

[3] The chief exception would seem to be the Bay of Bengal and thence throughout the western part of the Malay Archipelago, where, though they may occur, they are certainly uncommon.

[4] A strange fallacy arose early, and of course has been repeated late, that this case or sheath was movable. It is absolutely fixed.

[5] Doubtless some of the earlier voyagers had encountered it, as Forster suggests (*Descr. Animalium*, p. 330) and Lesson asserts (*Man. d'Ornithologie*, ii. p. 343); but for all practical purposes we certainly owe its discovery to the naturalists of Cook's second voyage. By some error, probably of transcription, New Zealand, instead of New-Year Island, appears in many works as the place of its discovery, while not a few writers have added thereto New Holland. Hitherto there is no real evidence of the occurrence of a Sheathbill in the waters of Australia or New Zealand.

ance, though in the same year the compiler Gmelin termed the genus *Vaginalis*, as a rendering of Pennant's English name, and the species *alba*. It has thus become the *Chionis alba* of ornithology. It is about the size of and has much the aspect of a Pigeon;[1] its plumage is pure white, its bill somewhat yellow at the base, passing into pale pink towards the tip. Round the eyes the skin is bare, and beset with cream-colored papillæ, while the legs are bluish-gray. The second or eastern species, first discriminated by Dr. Hartlaub (*Rev. Zoologique*, 1841, p. 5; 1842, p. 402, pl. 2)[2] as *C. minor*, is smaller in size, with plumage just as white, but having the bill and bare skin of the face black and the legs much darker. The form of the bill's "sheath" in the two species is also quite different, for in *C. alba* it is almost level throughout, while in *C. minor* it rises in front like the pommel of a saddle. Of the habits of the western and larger species not much has been recorded. It gathers its food, consisting chiefly, as Darwin and others have told us, of sea-weeds and shell-fish, on rocks at low water; but it is also known to eat birds' eggs. There is some curiously conflicting evidence as to the flavor of its flesh, some asserting that it is wholly uneatable, and others that it is palatable,—a difference which may possibly be due to the previous diet of the particular example tasted, to the skill of the cook, or the need of the taster. Though most abundant as a shore-bird, it is frequently met with far out at sea, and its most northern recorded limit is by Fleurieu (*Voy. de Marchand*, i. p. 19), in lat. 44° S., some 260 miles from the eastern coast of Patagonia. It is not uncommon on the Falkland Isles where it is said to breed (*Ibis*, 1861, p. 154), though confirmation of the report is as yet wanting, and from thence is found at both extremities of the Strait of Magellan, and southward to Louis-Philippe Land in lat. 60° S. On the other hand, thanks to the naturalists of the British and United States expeditions to Kerguelen Land for the observation of the transit of Venus in 1874, especially Mr. Eaton (*Philos. Transactions*, clxviii. pp. 103–105) and Dr. Kidder (*Bull. U. S. National Museum*, 1875, No. 2, p. 1–4), much more has been recorded of the eastern and smaller species, which had already been ascertained by Mr. Layard (*Proc. Zool. Society*, 1871, p. 57, pl. iv. fig. 7) to breed on the Crozet Islands,[3] and was found to do so still more numerously on Kerguelen, while it probably frequents Prince Edward's Islands for the same purpose. The eggs, of which a considerable number have now been obtained, though of peculiar appearance, bear an unmistakable likeness to those of some Plovers, while occasionally exhibiting a resemblance —of little significance, however—to those of the Tropic-birds.

The systematic position of the Sheathbills has been the subject of much hesitation—almost useless since 1836, when De Blainville (*Ann. Sc. Naturelles*, ser. 2, vi. p. 97) made known certain anatomical facts proving their affinity to the OYSTER-CATCHERS (vol. xviii. p. 114), though pointing also to a more distant relationship with the GULLS (vol. xi. p. 242). These he afterwards described more fully (*Voy. "Bonite," Zoologie*, i. pt. 3, pp. 107–132, pl. 9), so as to leave no doubt that *Chionis* was a form intermediate between those groups. Yet some writers continued to refer it to the *Gallinæ* and others to the *Columbæ*. The matter may now be regarded as settled forever. In 1876 Dr. Reichenow in Germany (*Jour. f. Orn.*, 1876, pp. 84–89) and in America Drs. Kidder and Coues (*Bull. U. S. Nat. Museum*, No. 3, pp. 85–116) published elaborate accounts of the anatomy of *C. minor*, the first wholly confirming the view of De Blainville, the last two[4] agreeing with him in the main, but concluding that the Sheathbills formed a distinct group *Chionomorphæ*, in rank equal to the *Cecomorphæ* and *Charadriomorphæ* of Prof. Huxley (which are, to speak roughly, the *Gaviæ* and *Limicolæ* of older systematists), and regarding this group as being "still nearer the common ancestral stock of both." These authors also wish to separate the two species generically; but their proposals are considered needless by Garrod (*P. Z. S.*, 1877, p. 417) and M. Alph. Milne-Edwards (*Ann. Sc. Naturelles*, ser. 6, xiii. art. 4, p. 24). The opinions of De Blainville and Dr. Reichenow are borne out by the observations of Mr. Eaton (*loc. cit.*), and no one knowing the habits of an Oyster-catcher can read his remarks without seeing how nearly related the two forms are. Their differences may perhaps justify the separation of each form into what is vaguely called a "Family," but the differences will be seen by the comparative anatomist to be of slight importance, and the intimate affinity of the *Gaviæ* and *Limicolæ*, already recognized by Prof. Parker and some of the best taxonomers (*cf.* ORNITHOLOGY, vol. xviii. p. 49) is placed beyond dispute.[5] (A. N.)

SHEBA. See YEMEN.

SHEBOYGAN, a city of the United States, capital of Sheboygan county, Wisconsin, stands on Lake Michigan, at the mouth of the river of the same name, 43 miles east of Fond du Lac and 52 miles north of Milwaukee. It possesses a good harbor, and, being surrounded by very productive agricultural land, exports annually a large quantity of grain. The manufactures include farming implements, enamelled hollow-ware, and stone-ware; there are a number of tanneries and breweries; and mineral water is exported. Settled in 1836, the city had in 1880 a population of 7314.

SHECHEM, now NÁBULUS, a city of Palestine. Eleven hours from Jerusalem on the great north road the traveller finds himself in the broad upland plain of Makhna (1500 feet above the sea[6]), with Mount Gerizim on his left, and, skirting the base of the mountain, reaches the traditional well of Jacob (John iv. 5, 6; *cf.* Gen. xxxiii. 19), a deep cistern with the ruins of an old church beside it. Here the road divides: the caravan route to Damascus continues northward by the village of 'Asker (Sychar of John iv. 5?), and so to Beisán (Beth-shan) and Tiberias; but the way to Samaria turns westward into a fertile and well-watered side valley between Gerizim (2849 feet) on the south and Ebal (3077 feet) on the north. This is the Vale of Shechem or Nábulus; it is in fact an easy pass between the Mediterranean and Jordan basins, and at the watershed (1870 feet), where the city stands, 1¼ miles from Jacob's Well, is not more than 100 yards wide. Thus Shechem commands both branches of the great north road, and several routes from the coast also converge here and connect with the ancient road from Shechem eastward to Ḳeráwá (Archelais) and Al-Salt, the capital of the Belḳá. The name of Shechem (shoulder, back) accords with the position of the town on the watershed, and the native name in Josephus's time (Mabortha, *B. J.*, iv. 8. 1; Pliny has Mamortha) means simply "the pass." The situation of Shechem at the crossing of so many great roads must have given it importance at a very early date, and it is still a busy town of 20,000 inhabitants, with soap manufactures and considerable trade. On the other hand, the position is equally favorable for brigandage, to which, under weak governments, the Shechemites were addicted of old (Judges ix. 25; Hosea vi. 9, where "for consent" read "to Shechem"), and the district is still a lawless one.

The ancient inhabitants of Shechem were the Bne Hamor, a Canaanite clan, who were not expelled on the first con-

[1] In the Falkland Isles it is called the "Kelp-Pigeon," and by some of the earlier French navigators the "Pigeon blanc antarctique." The cognate species of Kerguelen Land is named by the sealers "Sore-eyed Pigeon," from its prominent fleshy orbits, as well as "Paddy-bird"—the last doubtless from its white plumage calling to mind that of some of the smaller Egrets, so-called by the English in India and elsewhere.

[2] Lesson (*loc. cit.*) cites a brief but correct indication of this species as observed by Lesquin (*Lycée Armoricain*, x. p. 36) on Crozet Island, and, not suspecting it to be distinct, was at a loss to reconcile the discrepancies of the latter's description with that given of the other species by earlier authors.

[3] A previous announcement of the discovery of its egg (*Ibis*, 1867, p. 458) was premature, the specimen, now in the possession of the present writer, proving to be that of a Gull—a fact unknown to the American writer named above.

[4] In some details their memoir is unfortunately inaccurate.

[5] The little group of very curious birds, having no English name, of the genera *Thinocorys* and *Attagis*, which are peculiar to certain localities in South America and its islands, are by some systematists placed in the Family *Chionididæ* and by others in a distinct Family *Thinocoridæ* (more correctly *Thinocorythidæ*). They are undoubtedly Limicoline, though having much the aspect of Sand-Grouse, but their precise position and rank remain at present uncertain. *Cf.* Garrod (*ut supra*) and Prof. Parker (*Trans. Zool. Soc.*, x. pp. 301 *sq.*).

[6] [Vol. xviii., p. 176, PALESTINE gives 1600 to 1800 as the height of this plain.—AM. ED.]

quest of Canaan but remained in possession till the events recorded in Judges ix. From the narrative of Gen. xxxiv., which has been spoken of in the article LEVI, it would seem that they entered into friendly relations with the invaders, and that an attack made on them by Simeon and Levi was repudiated by Israel and led to the dispersion of these two tribes. In Judges ix. the "freemen of Shechem" (בעלי שכם) appear as a turbulent but cowardly race, who, in spite of their numbers and wealth, had become vassals of Gideon for the sake of protection against the Midianites, and would have continued to serve his sons but for the enterprise of Abimelech, whose mother was of their race. With the aid of mercenaries hired with the treasure of the sanctuary of Baal-Berith or El-Berith, the god of the town, Abimelech destroyed the sons of Gideon, was crowned king of Shechem, and for three years held sway also over the surrounding Israelites. A revolt was led by Gaal, an Israelite who scorned to be subject to the creature of the despised Canaanites,[1] and, the Shechemites having fallen out with Abimelech about their practice of brigandage, Gaal made a dash at the city in the absence of the king, and the fickle inhabitants received him with open arms. Abimelech, however, with his mercenaries proved too strong for his adversaries, and Canaanite Shechem was utterly destroyed. Its place was taken by a Hebrew city, and the Canaanite sanctuary of El-Berith was transformed into a Hebrew holy place of El the God of Israel, of which the foundation was afterwards referred to Jacob (Gen. xxxiii. 20) or even to Abraham (Gen. xii. 7). The great stone under the famous sacred tree at the sanctuary (the "tree of the revealer" or "tree of the soothsayers," E.V. "plain of Moreh" or "of Meonenim;" Gen. xii. 6, xxxv. 4;[2] Deut. xi. 30; Jud. ix. 6, 37) was said to have been set up by Joshua (Josh. xxiv. 26), and Joseph's grave was shown there.[3] All this indicates that Shechem was once the chief sanctuary of Joseph, and so we understand why Rehoboam went to Shechem to be crowned king of Northern Israel and why Jeroboam at first made it his residence (1 Kings xii. 25). Politically Shechem was soon supplanted by Tirzah and Samaria, but it appears to have been still a sanctuary in the time of Hosea. It survived the fall of Ephraim (Jer. xli. 5) and ultimately became the religious centre of the SAMARITANS (*q.v.*). The Greek name Neapolis, known to Josephus, indicates the building of a new town, which, according to Eusebius and Jerome, was a little way from the old Shechem, or at least did not include the traditional holy sites. The coins give the form Flavia Neapolis. Neapolis was the birthplace of Justin Martyr, and became the seat of a bishopric. Five Christian churches destroyed by the Samaritans in the time of Anastasius were rebuilt by Justinian (Procop., *De Æd.*, v. 7). Remains of one of these seem still to exist in the crusaders' church of the Passion and Resurrection (1167), now the great mosque. Neapolis had much to suffer in the crusades; it was finally lost to the Christians soon after Saladin's great victory at Ḥiṭṭín.

A map of the Shechem valley, with topographical details, etc., will be found in the *Memoirs* of Pal. Expl. Soc., vol. ii.

SHEE, SIR MARTIN ARCHER (1770–1850), portrait-painter, and president of the Royal Academy, was born in Dublin on the 23d of December, 1770. He was sprung from an old Irish family, and his father, while he exercised the trade of a merchant, regarded the profession of a painter as in no sense a fit occupation for a descendant of the Shees. Young Shee became, nevertheless, a student of art in the Dublin Society, and came early to London, where he was, in 1788, introduced by Burke to Reynolds, by whose advice he studied in the schools of the Royal Academy. In 1789 he exhibited his first two pictures, the Head of an Old Man and Portrait of a Gentleman. During the next ten years he steadily increased in practice, and gradually gained ground among the aristocracy, with whom his suavity and good manners were great recommendations. He was chosen an associate of the Royal Academy in 1798, shortly after the illustrious Flaxman, and in 1800 he was made a Royal Academician. In the former year he had married, removed to Romney's house in Cavendish Square, and set up as the legitimate successor of that artist. Shee continued to paint with great readiness of hand and fertility of invention, although his portraits were eclipsed by more than one of his contemporaries, and especially by Lawrence, Hoppner, Phillips, Jackson, and Raeburn. In addition to his portraits he executed various subjects and historical works, such as Lavinia, Belisarius, his diploma picture Prospero and Miranda, and the daughter of Jephthah. In 1805 he published a poem consisting of *Rhymes on Art*, and it was succeeded by a second part in 1809. Although Byron spoke well of it in his *English Bards and Scotch Reviewers*, and invoked a place for "Shee and genius" in the temple of fame, yet, as nature had not originally conjoined these two, it is to be feared that even a poet's invocation could not materially affect their relations. Shee published another small volume of verses in 1814, entitled *The Commemoration of Sir Joshua Reynolds, and other Poems*, but this effort did not greatly increase his fame. He now produced a tragedy called *Alasco*, of which the scene was laid in Poland. The play was accepted at Covent Garden, and in the fertile fancy of the poet the play had already gained for him a great dramatic fame, when Colman, the licenser, refused it his sanction, on the plea of its containing certain treasonable allusions, and Shee, in great wrath, resolved to make his appeal to the public. This violent threat he carried out in 1824, but unfortunately the public found other business to mind, and *Alasco* is still on the list of unacted dramas. On the death of Lawrence in 1830, Shee was chosen president of the Royal Academy, and shortly afterwards he received the honor of knighthood. He was excellently qualified by his gentlemanly manners, business habits, and fluent speech for the position; and in the dispute regarding the use of rooms to be provided by Government, and in his examination before the parliamentary committee of 1836, he ably defended the rights of the Academy. He continued to paint till 1845, and died on the 13th of August, 1850, in his eightieth year.

The earlier portraits of the artist are carefully finished, easy in action, with good drawing and excellent discrimination of character. They show an undue tendency to redness in the flesh painting,—a defect which is still more apparent in his later works, in which the handling is less "square," crisp, and forcible.

SHEEP. The animals commonly designated by this name constitute the genus *Ovis* of zoologists, a group belonging to the Artiodactyle or paired-toe section of the *Ungulata* or hoofed mammals (see MAMMALIA, vol. xv., p. 435). They are ruminants and belong to the hollow-horned section, *i.e.*, those having persistent horns composed of conical epidermic sheaths, encasing and supported by processes of the frontal bone. This section includes the various species of Oxen, Goats and Antelopes, as well as the Sheep, animals all so closely related structurally that it is by no means easy to define the differences between them.

In nearly all wild sheep the horns are present in both sexes, though smaller in the female. They are trigonal in section, having always three more or less distinctly marked surfaces, divided by edges running longitudinally to the axis of the horn, sometimes sharply prominent, and sometimes rounded off. They are also marked by numerous transverse ridges and constrictions and present a strong more or less spiral curve, which varies in direction in different species. The teeth resemble generally those of the other *Bovidæ*. The upper incisors and canines are entirely wanting, their place being taken by a callous pad against which the lower front teeth bite. These are eight in number, all much alike and in close contact; the outer pair represent

[1] In Judges ix. 28 for עברו read יעבידו (Wellhausen after MSS. of LXX.), and translate "Who is Abimelech or who are the Shechemites (his supporters) that we should be his slaves? By all means let the son of Jerubbaal and Zebul his officer enslave the men of Hamor father of Shechem; but why should we (Hebrews) be his slaves?" These words cannot have been spoken after the Shechemites had renounced Abimelech; vv. 29, 30 ought to stand immediately after ver. 22. See W. R. Smith, *Theol. Tijdschrift*, 1886, p. 195 *sq.*

[2] Eusebius gives the tree (terebinthus) of Gen. xxxv. 4 a place in his *Onomasticon*: and from it probably the bishop Terebinthius in Procop., *De Æd.*, v. 7, had his name.

[3] The Canaanite sanctuary was represented as a mere temporary usurpation by the tradition (in the Elohistic narrative) that Jacob had bought the site of his altar from the Hamorites and bequeathed it to Joseph (Gen. xxxiii. 19, Josh. xxiv. 32; in the latter passage read with LXX ויתנה for והיו).

the canines, the rest the incisors. On each side of the mouth above and below are six teeth close together, three of which are premolars (replacing milk teeth) and three true molars, all markedly selenodont (the grinding surfaces presenting crescent-like patterns) and hypsodont, or with long crowns and small roots. The dental formula is thus—incisors $\frac{0}{3}$, canines $\frac{0}{1}$, premolars $\frac{3}{3}$, molars $\frac{3}{3}$, $= \frac{6}{10}$; total of both sides 32. The vertebral formula is—cervical 7, dorsal 13, lumbar 6 or 7, sacral 4, caudal variable. In the feet the hoofs of the two middle toes (third and fourth) only reach the ground, and are equally developed. The outer toes (second and fifth) are very rudimentary, represented only by small hoofs, without bony phalanges, and by the proximal or upper ends of the slender splint-like metacarpal or metatarsal bones. Between the two middle toes, in most species, is lodged a deep sac, having the form of a retort and with a small external orifice, which secretes an unctuous and odorous substance. This, tainting the herbage or stones over which the animal walks, affords the means by which, through the powerfully developed sense of smell, the neighborhood of other individuals of the species is recognized. The crumen or suborbital gland, which is so largely developed and probably performs the same office in some antelopes

Moufflon (*Ovis musimon*). From a living animal in the London Zoological Gardens.

and deer, is present, but in a comparatively rudimentary form, though varying in different species. The tail, though long in many varieties of domestic sheep, is short in all the wild species, in which also the external covering of the body is in the main hairy,—the fine fleecy coats of wool, or hair so modified as to have the property of "felting" or adhering together under pressure, which give such value to many breeds, having been especially cultivated by selective breeding.

The sheep was a domestic animal in Asia and Europe before the dawn of history, though quite unknown as such in the New World until after the Spanish conquest. It has now been introduced by man into almost all parts of the world where settled agricultural operations are carried on, but flourishes especially in the temperate regions of both hemispheres. Whether our well-known and useful animal is derived from any one of the existing wild species, or from the crossing of several, or from some now extinct species, is quite a matter of conjecture. The variations of external characters seen in the different domestic breeds are very great. They are chiefly manifested in the form and number of the horns, which may be increased from the normal two to four or even eight, or may be altogether absent in the female alone or in both sexes; in the form and length of the ears, which often hang pendent by the side of the head; in the peculiar elevation or arching of the nasal bones in some Eastern races; in the length of the tail, and the development of the great masses of fat at each side of its root or in the tail itself; and in the color and quality of the fleece. See AGRICULTURE.

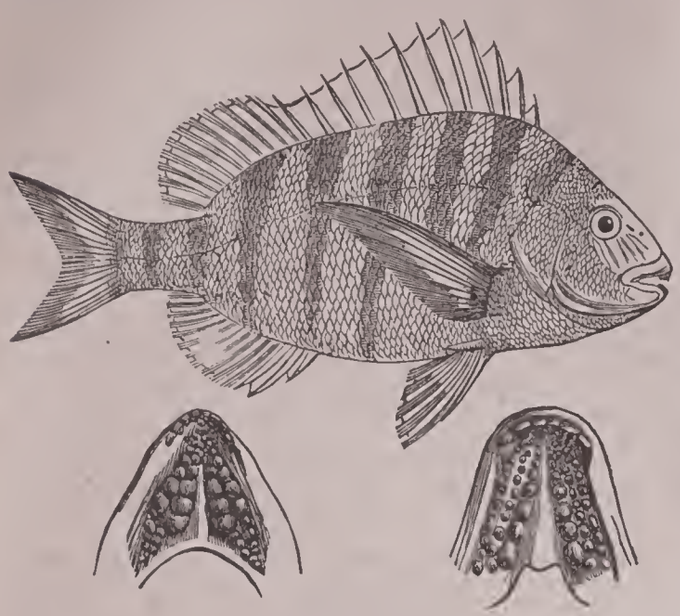
The distinction of the various permanent modifications under which wild sheep occur is a matter of considerable difficulty. Trivial characters, such as size, slight variations in color, and especially, the form and curvature of the horns, are relied upon by different zoologists who have given attention to the subject in the discrimination of species, but no complete accord has yet been established. The most generally recognized forms are enumerated below.

The geographical distribution of wild sheep is interesting. The immense mountain ranges of Central Asia, the Pamir and Thian Shan of Turkestan, may be looked upon as the centre of their habitat. Here, at an elevation of 16,000 feet above the sea-level, is the home of the magnificent *Ovis poli*, named after the celebrated Venetian traveller, Marco Polo, who met with it in his adventurous travels through this region in the 13th century. It is remarkable for the great size of the horns of the old rams and the wide open sweep of their curve, so that the points stand boldly out on each side, far away from the animal's head, instead of curling round nearly in the same plane, as in most of the allied species. A very similar if not identical species from the same origin, in which the horns retain their more normal development, has received the name of *O. karelini*. Eastward and northward is found the argali (*O. ammon*), with a wide and not very well determined range. Still further north, in the Stanovoi Mountains and Kamchatka, is *O. nivicola*, and away on the other side of Behring's Strait, in the Rocky Mountains and adjacent high lands of western North America, is the "bighorn" or mountain sheep (*O. montana*), the only one of the genus found in that continent and indeed—except the bison, the musk-ox (*Ovibos*), mountain goat (*Aploceras*), and the prongbuck (*Antilocapra*), —the only hollow-horned ruminant, being like the rest obviously a straggler from the cradle of its race. Turning southward from the point from which we started, and still a little to the east, in Nepal and Little Tibet, is *O. hodgsoni*, a species with large and strongly curved horns, and another with smaller and more spreading horns, the burrhel, *O. nahoor*. Passing in a southwesterly direction we find a series of smaller forms, *O. vignei*, of Ladak, *O. cycloceros* of northern India, Persia, and Baluchistan, *O. gmelini* of Asia Minor, *O. ophion*, confined to the elevated pine-clad Troödos Mountains of the island of Cyprus, and said at the time of the British occupation in 1878, to have been reduced to a flock of about twenty-five individuals, and *O. musimon*, the moufflon of Corsica and Sardinia (see figure), believed to have been formerly also a native of Spain. Lastly we have the somewhat aberrant, goat-like aoudad, *O. tragelaphus*, of the great mountain ranges of North Africa.

We thus find that sheep are essentially inhabitants of high mountainous parts of the world, for dwelling among which their wonderful powers of climbing and leaping give them special advantages. No species frequent by choice either level deserts, open plains, dense forests, or swamps. By far the greater number of species are inhabitants of the continent of Asia, one or perhaps two extending into North America, one into Southern Europe, and one into North Africa. No wild sheep occurs in any other part of the world, unless the so-called musk-ox (*Ovibos moschatus*) of the Arctic regions, the nearest existing ally to the true sheep, may be considered as one. Geologically speaking, sheep appear to be very modern animals, or perhaps it would be safer to say that no remains that can be with certainty referred to the genus have been met with in the hitherto explored true Tertiary beds, which have yielded such abundant modifications of antelopes and deer. They are apparently not indigenous in the British Isles, but were probably introduced by man from the East in prehistoric times. (W. H. F.)

SHEEPSHEAD is the name of one of the largest species of the genus *Sargus*, marine fishes known on the coasts of southern Europe as "Sargo" or "saragu." These fishes possess two kinds of teeth:—one, broad and flat, like incisors, occupying in a single series the front of the jaws; the other, semiglobular and molar-

like, arranged in several series on the sides of the jaws. For the systematic position of the genus, see vol. xii. p. 727. The sheepshead, *Sargus ovis*, occurs in abundance on the Atlantic coasts of the United States, from Cape Cod to Florida, and is one of the most valued



Sheepshead.

food-fishes of North America. It is said to attain to a length of 30 inches and a weight of 15 pounds. Its food consists of shellfish, which it detaches with its incisors from the base to which they are fixed, crushing them with its powerful molars. It may be distinguished from some other allied species occurring in the same seas by the presence of seven or eight dark cross-bands traversing the body, by a recumbent spine in front of the dorsal fin, by twelve spines and as many rays of the dorsal and ten rays of the anal fin, and by forty-six scales along the lateral line. The term "sheepshead" is also given in some parts of North America to a very different fish, a freshwater Sciænoid, *Corvina oscula*, which is much less esteemed for the table.

SHEERNESS-ON-SEA, a seaport, watering-place, naval establishment, and garrison town in the Isle of Sheppey, Kent, is situated on the Thames at the mouth of the Medway, on the Sittingbourne branch of the London, Chatham, and Dover Railway, 52 miles east of London, and 17 northeast of Maidstone. The older part of Sheerness, containing the dockyard, is called Blue Town, the later additions being known as Miletown, Bankstown, and Marinetown. Marinetown consists chiefly of houses occupied by summer visitors, but although there is a good beach for bathing the presence of the dockyard with its surroundings has militated against the success of the town as a watering-place. The dockyard, erected by the admiralty about 1830, was seriously damaged by fire in 1881. The naval establishment is only of the second-class, the basins being too small to admit vessels of the largest size. The dockyard is 60 acres in extent, and contains naval barracks with accommodation for 1000 men. A fort was built at Sheerness by Charles II., which on the 10th July, 1667, was taken by the Dutch fleet under De Ruyter. After this mishap it was strengthened and a dockyard was formed. The fortifications are now of great strength, £100,000 [$486,000] having been spent in adapting them to modern necessities. The town is in the parish of Minster, which possesses the most ancient abbey church in England. The population of the urban sanitary district (area 938 acres) in 1871 was 13,956, and in 1881 it was 14,286.

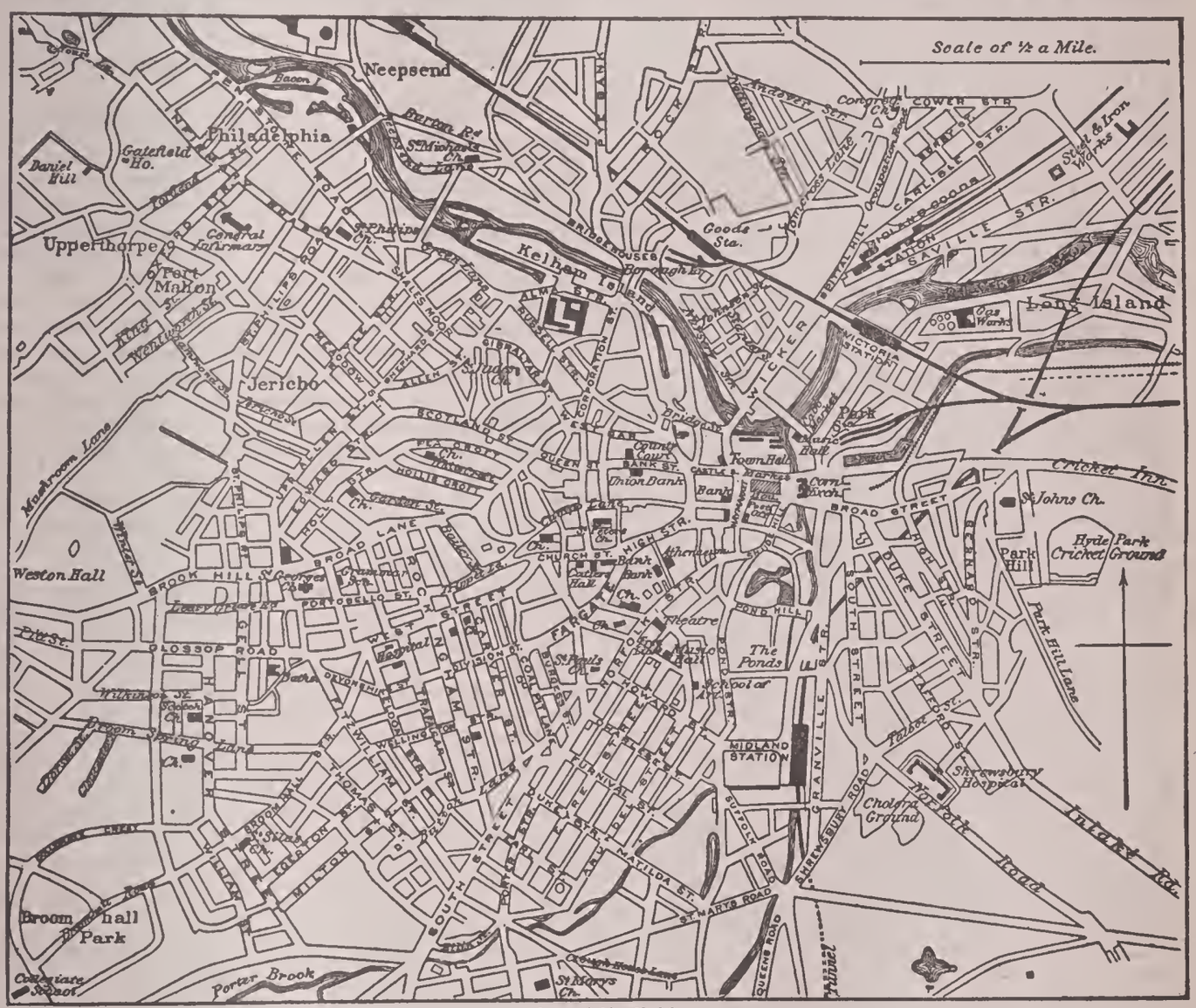
SHEFFIELD, a municipal and parliamentary borough in the West Riding of Yorkshire, next to Leeds the largest town in the county, and the chief seat of the cutlery trade in England, is situated on somewhat hilly ground in the neighborhood of the Pennine range, on several rivers and streams, the principal of which are the Don, the Sheaf, the Porter, the Rivelin, and the Loxley, and on the Midland, Great Northern, and various branch railway lines, 39 miles south of Leeds, 37 southeast of Manchester, 172 north of London by the Midland Railway, and 162 by the Great Northern. The borough of Sheffield is coëxtensive with the parish, and embraces a district 10 miles in length by 3 or 4 miles in breadth. It includes the townships of Sheffield, Brightside Bierlow, Attercliffe-cum-Darnall, Nether Hallam, Hecley, Ecclesall Bierlow, and Upper Hallam, the last two districts being in great part rural, but occupied also by the southern and western suburbs of the borough. The older portions of the town are somewhat irregularly built, and in some districts densely populated, but much has been done of late years to widen and otherwise improve the streets in the central districts by the operation of an Act passed in 1875, the expense amounting in all to about £1,000,000 [$4,860,000]. The suburbs contain a large number of beautiful terraces and mansions, picturesquely situated in the neighborhood of fine natural scenery. A considerable portion of them is occupied by workmen's cottages, many of which are surrounded by well-kept gardens.

Sheffield in 1845 was divided into twenty-five parochial districts, which have been gradually added to in successive years, and in 1855 it was constituted a deanery. The only ecclesiastical building of special interest is the old parish church of St. Peter, chiefly in the Perpendicular style, originally cruciform, but by various additions now rectangular. The old Norman building is supposed to have been burned down during the wars of Edward III. with the barons, and the most ancient part of the present structure is the tower, dating from the 14th century. The church has lately been restored at the cost of about £20,000 [$97,200]. It contains a large number of interesting mural monuments.

The free grammar school was founded in 1603 through a bequest of Thomas Smith, a native of Sheffield, practicing as an attorney at Crowland, Lincolnshire, and it received the sanction of King James I. in 1604, with the title "The Free Grammar School of King James of England." The grammar school building of stone in the Tudor style, erected in 1824, is now (1886) used as a technical school, the grammar school trustees having purchased the collegiate school at Broomhall Park. The other principal educational institutions are the free writing school (1715, rebuilt in 1827), the boys' charity school (founded 1706), the girls' charity school (1786), the Roman Catholic reformatory (1861), the Church of England educational institute, the Firth College, erected by Mark Firth at a cost of £20,000 [$97,200], for lectures and classes in connection with the extension of university education, the Wesley College, associated with London University, Ranmoor College, for training young men for the ministry in the Methodist New Connection, the mechanics' institute, the school of art, and the St. George's Museum, founded by Mr. Ruskin, and including a picture gallery, a library, and a mineral, a natural history, and a botanical collection, the special purpose of the institution being the training of art students. The school board was first elected in 1870, and carries on its operations with great energy and success.

The principal public buildings are the town-hall, including the police offices and rooms for the quarter sessions and other courts, erected in 1808, enlarged in 1833, and lately extensively remodelled at a cost of over £10,000 [$48,600]; the council hall and municipal buildings, originally used for the mechanics' institute, but purchased by the corporation in 1864; the cutlers' hall, built in 1832 at a cost of £6500 [$31,590], and enlarged in 1857 by the addition of a magnificent ban-

queting hall, erected at a cost of £9000 [$43,740]; the general post office, in the Doric style, opened in 1874; the fine new corn exchange, in the Tudor style, erected at a cost of £60,000 [$291,600]; the Albert Hall, opened in 1873 by a joint-stock company for concerts and public meetings; the music hall, erected in 1823; the freemasons' hall, opened in 1877; the temperance halls, 1856; the Norfolk market hall, opened in 1857 at a cost of £40,000 [$194,400]; the theatre royal, originally erected in 1793, rebuilt in 1880 at a cost of £8000 [$38,880]; the Alexandra theatre, erected 1836–7 at a cost of £8000 [$38,880]; the barracks, having accommodation for a cavalry and an infantry regiment and surrounded by grounds 25 acres in extent; and the volunteer artillery drill hall, erected at a cost of £9000 [$43,740]. The literary and social institutions include the Athenæum, established in 1847, with



Plan of Sheffield.

a newsroom and library; the literary and philosophical society, 1822; the Sheffield club, 1862; the Sheffield library, commenced in 1777, and containing 80,000 volumes; and the free library, founded in 1856, with various branches opened in subsequent years. Among the medical or benevolent institutions may be mentioned the general infirmary, opened in 1797, and successively enlarged and improved as requirements demanded; the public hospital, erected in 1858 (in connection with the Sheffield medical school established in 1792) and extended in 1869; the hospital for women, originally established in 1864, but transferred in 1878 to a new building erected at the expense of Thomas Jessop, and now called the Jessop hospital for women; the hospital for diseases of the skin, 1880; the ear and throat hospital, 1880; the fever hospital, erected by the Town Council at a cost of about £25,000 [$121,500]; the school and manufactory for the blind, 1879; the South Yorkshire lunatic asylum, 1872; the Shrewsbury hospital for twenty men and twenty women, originally founded by the seventh earl of Shrewsbury, who died in 1616, but since greatly enlarged by successive benefactions; the Hollis hospital, established in 1700 for widows of cutlers, etc.; the Firth almshouses, erected and endowed in 1869 by Mark Firth of Oakbrook at a cost of £30,000 [$145,800]; the licensed victuallers' asylum, 1878; the Deakin institution, 1849; Hanby's charity, 1766; and Hadfield's charity, 1860.

The public monuments are neither numerous nor important, the principal being the Montgomery statue, erected to James Montgomery the poet in 1861, chiefly by the Sunday school teachers of the town, the Ebenezer Elliot monument, erected in the market-place in 1854, and removed to Weston Park in 1875, the column to Godfrey Sykes the artist, erected in Weston Park in 1871, the cholera monument 1834–5, and the Crimean monument to the natives of Sheffield who died in the Crimean War.

The town is comparatively well supplied with parks and public gardens. In three of the more populous districts the duke of Norfolk, lord of the manor, presented plots of ground amounting in all to 26 acres, to be used as recreation grounds. In the western suburbs is the Weston Park and Museum, occupying the grounds and mansion house of Weston Hall, which the town council purchased in 1873. The grounds are about 13 acres in extent, and the museum includes—in addition to the Mappin Art Gallery, now (1886) being erected from the bequest of John Newton Mappin—a picture gallery, a natural history collection, and an extensive

collection of British antiquities. The Firth Park, on the northeast of the town, 36 acres in extent, was purchased by Mark Firth, and presented to the town, the opening ceremony by the prince and princess of Wales taking place 16th August, 1875. The Norfolk Park, 60 acres in extent, is granted by the duke of Norfolk for the use of the town, but remains his property. The botanical gardens, 18 acres in extent, situated in the western suburbs, are the property of a company, but on certain days they are open to the public at a small charge. The Bramall Lane cricket ground is the scene of most of the Yorkshire county cricket matches.

The prosperity of Sheffield is chiefly dependent on the manufacture of steel and the application of it to its various uses. The smelting of iron in the district is supposed to date from Roman times, and there is distinct proof carrying it back as far as the Norman Conquest. The town had become famed for its cutlery by the 14th century, as is shown by allusions in Chaucer. There was an important trade carried on in knives in the reign of Elizabeth, and the Cutlers' Company was incorporated in 1624. In early times cutlery was made of blister or bar steel; afterwards shear steel was introduced for the same purpose; but in 1740 Benjamin Huntsman of Handsworth introduced the manufacture of cast steel, and up to the present time Sheffield retains its supremacy in steel manufacture, notwithstanding foreign competition, especially that of Germany and the United States, its trade in heavy steel having kept pace with that in the other branches. It was with the aid of Sheffield capital that Henry Bessemer founded his pioneer works to develop the manufacture of his invention, and a large quantity of Bessemer steel is still made in Sheffield. The heavy branch of the steel manufacture includes armor plates, rails, tires, axles, large castings for engines, steel shot, and steel for rifles. The cutlery trade embraces almost every variety of instrument and tool,—spring and table knives, razors, scissors, surgical instruments, mathematical instruments, edge tools, saws, scythes, sickles, spades, shovels, engineering tools, hammers, vices, etc. The manufacture of engines and machinery is also largely carried on, as well as that of stoves and grates. The art of silver plating was introduced by Thomas Bolsover in 1742, and the manufacture is still of importance. Among the minor industries of the town are tanning, confectionery, cabinetmaking, bicycle making, iron and brass founding, silver refining, and the manufacture of brushes and combs and of optical instruments. On account of various outrages perpetrated by artisans in workshops against persons obnoxious to them, a Government commission was in 1867 appointed to make inquiries, the result being the exposure and suppression of confederacies in connection with various workmen's unions.

The town trust for the administration of property belonging to the town dates from the 14th century, and in 1681 the number and manner of election of the "town trustees" was definitely settled by a decree of the Court of Chancery. Additional powers were conferred on the trustees by an Act passed in 1874. The annual income of the trust property now amounts to about £5000. Sheffield obtained municipal government in 1843, and is divided into nine wards. The number of aldermen is sixteen. Since 1864 the town council have had control of the police, of the maintenance of the streets, and of the drainage and sanitary arrangements, but the supplies of water and gas are in the hands of private companies. The markets belong to the duke of Norfolk, lord of the manor. The town first returned members to parliament in 1832. In 1885 the representation was increased from two to five members, the parliamentary divisions being Attercliffe, Brightside, Central, Ecclesall, and Hallam. The area of the municipal and parliamentary borough is 19,651 acres. From 45,755 in 1801 the population had increased by 1841 to 110,891, by 1871 to 239,947, and by 1881 to 284,508 (141,298 males, 143,210 females).

Sheffield was the capital of Hallamshire from the Norman Conquest, and it is supposed that the "aula" of the Saxon Lord Waltheof mentioned in Domesday was on the Castle Hill. After the execution of Waltheof for a conspiracy against the Conqueror in 1075 the manor for some time remained in the hands of his countess, but in 1080 was possessed by Roger de Busli. Afterwards it passed to the De Lovetots, barons of Huntingdonshire, one of whom had a castle at Sheffield. A number of people, workers in iron, gathered round the castle and formed the nucleus of the town. Through an heiress of the De Lovetots it passed in the reign of Richard I. to the De Furnivals, one of whom, Thomas de Furnival, strengthened and completed the castle, and obtained from Edward I. a charter under the great seal for a market and annual fair. After the extinction of the male line of the Furnivals in 1406, the manor passed to the Talbots, of whom John, referred to in Shakespeare's *Henry VI.*, was created earl of Shrewsbury in 1442. Cardinal Wolsey, during his disgrace, was for some time placed in Sheffield Castle, under the charge of George, fourth earl of Shrewsbury; and Queen Mary remained a prisoner in it under the care of George, sixth earl, from the autumn of 1570 to the autumn of 1584. During the Civil Wars the castle was seized in 1642 by the Parliamentary party, who garrisoned it and threw up entrenchments round the town, but after the capture of Rotherham in April, 1643, they, on the approach of the earl of Newcastle, left it in panic and fled to Derbyshire. It was, however, recaptured by the party in the following year, and was subsequently demolished. In 1654 the estate passed by marriage to the Howards, dukes of Norfolk.

See Hunter's *Hallamshire*, 1819, new ed. by A. Gatty, 1869; Leader, *Sheffield Castle and Mary Queen of Scots*, 1869; Gatty, *Sheffield Past and Present*, 1873; W. de Gray Birch, *Original Documents relating to Sheffield*, 1874; Leader, *Reminiscences of Old Sheffield*, 1875; Taylor, *Pictorial Guide to Sheffield*, 1879.

SHEFFIELD, JOHN. See BUCKINGHAMSHIRE, DUKE OF.

SHEIL, RICHARD LALOR (1791–1851), Irish political orator, was the eldest son of Edward Sheil, an Irishman who had acquired considerable wealth in Spain, and after the passing of the Act permitting Catholics in Ireland to purchase and transmit property in fee had returned to Ireland, where he purchased the estate of Bellevue, Tipperary. The son was born 17th August, 1791, at Drumdowney, Tipperary. He received instruction in French and Latin from the Abbé de Grimeau, a French refugee, and afterwards at Kensington House school, London, presided over by a French nobleman, the Prince de Broglie. In October, 1804, he was removed to the college at Stoneyhurst, Lancashire, and in November, 1807, entered Trinity College, Dublin, where he specially distinguished himself in the debates of the Historical Society. He graduated B.A. in July, 1811, and on 13th November of the same year entered Lincoln's Inn, preparatory to being called to the Irish bar. He was admitted a member of the Irish bar at the Hilary term 1814, and meanwhile resolved to support himself by writing plays. His play of *Adelaide, or the Emigrants*, was played at the Crow Street theatre, Dublin, 19th February, 1814, with complete success, and on the 23d May, 1816, was performed at Covent Garden. The *Apostate*, produced at the latter theatre on 3d May, 1817, firmly established his reputation, and encouraged him to continue his dramatic efforts till his legal and political duties absorbed the greater part of his leisure. His principal other plays are *Bellamira* (written in 1818), *Evadne* (1819), *Huguenot* (1819), and *Montini* (1820). In 1822 he began, along with W. H. Curran, to contribute to the *New Monthly Magazine* a series of papers entitled *Sketches of the Irish Bar*, which attracted considerable attention by their raciness and graphic vigor. Those written by Sheil were published in 1855 in two volumes, with a sketch of his life. Sheil was one of the principal founders of the Catholic Association in 1823, and drew up the petition for inquiry into the mode of administering the laws in Ireland, which was presented in the same year to both Houses of Parliament. After the defeat of the Catholic Relief Bill in 1825 he suggested the formation of the New Catholic Association, and, along with O'Connell, was the principal leader of the agitation persistently carried on till Catholic emancipation was granted in 1829. In the same year he was returned to parliament for Melbourne Port, and in 1831 for Louth. He took a prominent part in all the debates relating to Ireland, and his brilliant eloquence gradually captivated the admiration of the House. In August, 1839, he became vice-president of the board of trade in Lord Melbourne's ministry. After the accession of Lord John Russell to power in 1846 he was appointed master of the mint. Being desirous, on account of his wife's health, to obtain diplomatic employment abroad, he

was in 1850 appointed minister at the court of Tuscany. He died somewhat suddenly of gout at Florence on May 23, 1851.

See *Memoirs of Richard Lalor Sheil*, by W. Torrens M'Cullagh (2 vols. 1855).

SHEKEL. In the system of Babylonian and Assyrian weights the talent (called in Heb. כִּכָּר, kikkar) consisted of 60 mana (Heb. מָנֶה, maneh), or minas, and the latter again of sixty shekels (Heb. שֶׁקֶל). For the values of these weights see NUMISMATICS, vol. xvii. p. 646, where it is also explained that the Phœnicians and Hebrews modified the system and reckoned only 50 shekels to the maneh, at all events in applying the names to money, *i.e.*, to the precious metals,[1] and that the weight of their silver shekel was also probably modified for convenience of interchange between the gold and silver standard. The silver shekels of the Maccabees (NUMISMATICS, p. 668) have a maximum weight of about 224 grains, and correspond to the Phœnician tetradrachm (four drams). Hence in Matt. xvii. 24 the temple tax of half a shekel is called the didrachm (2 drams). In 2 Sam. xiv. 26 we read of shekels "after the king's weight," *i.e.*, according to the Assyrian standard, which is called "royal" on weights found at Nineveh. The Hebrews divided the shekel into twenty parts, each of which was a gerah (גֵּרָה).

SHELBURNE, EARL OF. See LANSDOWNE, MARQUIS of.

SHELD-DRAKE, or, as commonly spelled in its contracted form, SHELDRAKE, a word whose derivation[2] has been much discussed, one of the most conspicuous birds of the Duck tribe, *Anatidæ*, called, however, in many parts of England the "Burrow-Duck" from its habits presently to be mentioned, and in some districts by the almost obsolete name of "Bergander" (Dutch, *Berg-eende*, Germ. *Berg-ente*), a word used by Turner in 1544.

The Sheldrake is the *Anas tadorna*[3] of Linnæus, and the *Tadorna cornuta* or *T. vulpanser* of modern ornithology, a bird somewhat larger and of more upright stature than an ordinary Duck, having its bill, with a basal fleshy protuberance (whence the specific term *cornuta*), pale red, the head and upper neck very dark glossy green, and beneath that a broad white collar, succeeded by a still broader belt of bright bay extending from the upper back across the upper breast. The outer scapulars, the primaries, a median abdominal stripe, which dilates at the vent, and a bar at the tip of the middle tail-quills are black; the inner secondaries and the lower tail-coverts are gray; and the *speculum* or wing-spot is a rich bronzed-green. The rest of the plumage is pure white, and the legs are flesh-colored. There is little external difference between the sexes, the female being only somewhat smaller and less brightly colored. The Sheldrake frequents the sandy coasts of nearly the whole of Europe and North Africa, extending across Asia to India, China and Japan, generally keeping in pairs and sometimes penetrating to favorable inland localities. The nest is always made under cover, usually in a rabbit-hole among sand hills, and in the Frisian Islands the people supply this bird with artificial burrows, taking large toll of it in eggs and down. Barbary, southeastern Europe, and Central Asia are inhabited by an allied species of more inland range and very different coloration, the *T. casarca* or *Casarca*[4] *rutila* of ornithologists, the Ruddy Sheldrake of English authors—for it has several times strayed to the British Islands,—and the "Brahminy Duck" of Anglo-Indians, who find it resorting in winter, whether by pairs or by thousands, to their inland waters. This species is of an almost uniform bay color all over, except the quill-feathers of the wings and tail, and (in the male) a ring round the neck, which are black, while the wing-coverts are white and the *speculum* shines with green and purple; the bill and legs are dark-colored.[5] A species closely resembling the last, but with a gray head, *T. cana*, inhabits South Africa, while in some of the islands of the Malay Archipelago, and in the northern parts of Australia, there is a fourth species, *T. radjah*, which almost equals the true Sheldrake in its brightly contrasted plumage, but yet wants some of the lively colors the latter displays—its head, for instance, being white instead of dark green. Further to the southward in Australia occurs another species of more sombre colors, the *T. tadornoides;* and New Zealand is the home of a sixth species, *T. variegata*, still less distinguished by bright hues. In the last two the plumage of the sexes differs not inconsiderably, but all are believed to have essentially the same habits as the *T. cornuta*.[6]

It is not without a purpose that these different species are here particularized. Sheldrakes will, if attention be paid to their wants, breed freely in captivity, crossing if opportunity be given them with other species, and an incident therewith connected possesses an importance hardly to be overrated by the philosophical naturalist, though it seems not to have met with the attention it deserves. In the Zoological Society's gardens in the spring of 1859 a male of *T. cornuta* mated with a female of *T. cana*, and, as will have been inferred from what has been before stated, these two species differ greatly in the coloring of their plumage. The young of their union, however, presented an appearance wholly unlike that of either parent, and an appearance which can hardly be said, as has been said (*P. Z. S.*, 1859, p. 442), to be "a curious combination of the colors of the two." Both sexes of this hybrid have been admirably portrayed by Mr. Wolf (*tom. cit.*, Aves, pl. 158); and, strange to say, when these figures are compared with equally faithful portraits by the same master (*op. cit.*, 1864, pls. 18, 19) of the Australian and New Zealand species, *T. tadornoides* and *T. variegata*, it will at once be seen that the hybrids present an appearance almost midway between the two species last named—species which certainly had nothing to do with their production. The only explanation of this astounding fact seems to be that afforded by the principle of "reversion," as set forth by Mr. Darwin, and illustrated by him from examples of certain breeds of Doves, domestic Fowls, and Ducks (*Anim. and Pl. under Domestication*, i. pp. 197–200, ii. p. 40), as well as, in the matter of domestic Fowls, by Mr. Cambridge Phillips (*Zoologist*, 1884, p. 331). It is a perfectly fair hypothesis that the existing animals of New Zealand and Australia retain more of their ancestral character than do those of countries in which we may suppose the struggle for life to have been fiercer and the action of natural selection stronger. Why it is so we cannot say, yet experiment proves that the most widely different breeds of Pigeons and other poultry, when crossed, produce offspring that more resembles the ancestral wild species from which the domesticated forms have sprung than it resembles either of the immediate parents. This mysterious agency is known as the principle of "reversion," and the example just cited proves that the same effect is produced in species as well as in "races,"—indicating the essential identity of both,—the only real difference being that "species" are more differentiated than are "races," or that the distinction between them, instead of being

[1] See Exod. xxxviii. 25, where there are 3000 shekels in the talent.

[2] Ray in 1674 (*Engl. Words*, p. 76) gave it from the local "sheld" (=particolored), which, applied to animals, as a horse or cat, still survives in East Anglia. This opinion is not only suitable but is confirmed by the bird's Old Norsk name *Skjöldungr*, from *Skjöldr*, primarily a patch, and now commonly bestowed on a piebald horse, just as *Skjalda* (Cleasby's *Icel. Dict.*, *sub voce*), from the same source, is a particolored cow. But some scholars interpret *Skjöldungr* by the secondary meaning of *Skjöldr*, a shield, asserting that it refers to "the shield-like band across the breast" of the bird. If they be right the proper spelling of the English word would be "Shield-drake," as some indeed have it. A third suggested meaning, from the Old Norsk *Skjól*, shelter, is philologically to be rejected, but, if true, would refer to the bird's habit, described in the text, of breeding under cover.

[3] This is the Latinized form of the French *Tadorne*, first published by Belon (1555), a word on which Littré throws no light except to state that it has a southern variant *Tardone*.

[4] Bonaparte was pleased in 1838 to separate this species from the genus *Tadorna*, but neither he nor any of his successors has shown any good reason for doing so.

[5] Jerdon (*B. India*, iii. p. 793) tells of a Hindu belief that once upon a time two lovers were transformed into birds of this species, and that they or their descendants are condemned to pass the night on the opposite banks of a river, whence they unceasingly call to one another; "Charkwa, shall I come?" "No, Charkwi." "Charkwi, shall I come?" "No, Charkwa." As to how, under these circumstances, the race is perpetuated the legend is silent.

[6] The *Anas scutellata* of the Indo-Malay countries is by several authorities considered to be a *Tadorna*, but this view is denied by others, among them by Mr. Hume (*Stray Feathers*, viii. p. 158).

(as many writers, some of the first repute, have maintained) qualitative, is merely quantitative, or one of degree.[1]

The genus *Tadorna*, as shown by its tracheal characters, seems to be most nearly related to *Chenalopex*, containing the bird so well known as the Egyptian Goose, *C. ægyptiaca*, and an allied species, *C. jubata*, from South America. For the same reason the genus *Plectropterus*, composed of the Spur-winged Geese of Africa, and perhaps the Australian *Anseranas* and the Indian and Ethiopian *Sarcidiornis*, also appear to belong to the same group, which should be reckoned rather to the Anatine than to the Anserine section of the *Anatidæ*. (A. N.)

SHELLEY, Mary Wollstonecraft (1797–1851), the second wife of the poet Shelley (*q.v.*), born in London, August 30, 1797 (see vol. x. p. 639), deserves some notice on her own account, as a writer of romance, chiefly imaginative. When she was in Switzerland with Shelley and Byron in 1816 (see below), a proposal was made that various members of the party should write a romance or tale dealing with the supernatural. The result of this project was that Mrs. Shelley wrote *Frankenstein*, Byron the beginning of a narrative about a vampyre, and Dr. Polidori, Byron's physician, a tale named *The Vampyre*, the authorship of which used frequently in past years to be attributed to Byron himself. *Frankenstein*, published in 1818, when Mrs. Shelley was at the utmost twenty-one years old, is a very remarkable performance for so young and inexperienced a writer; its main idea is that of the formation and vitalization, by a deep student of the secrets of nature, of an adult man, who, entering the world thus under unnatural conditions, becomes the terror of his species, a half-involuntary criminal, and finally an outcast whose sole resource is self-immolation. This romance was followed by others: *Valperga, or the Life and Adventures of Castruccio, Prince of Lucca* (1823), an historical tale written with a good deal of spirit, and readable enough even now; *The Last Man* (1826), a fiction of the final agonies of human society owing to the universal spread of a pestilence,—this is written in a very stilted style, but bears some traces of the imagination which fashioned *Frankenstein; The Fortunes of Perkin Warbeck* (1830); *Lodore* (1835); and *Falkner* (1837). Besides these novels there was the *Journal of a Six Weeks' Tour* (the tour of 1814 mentioned below), which is published in conjunction with Shelley's prose-writings; also *Rambles in Germany and Italy* in 1840–42–43 (which shows an observant spirit, capable of making some true forecasts of the future), and various miscellaneous writings. After the death of Shelley, for whom she had a deep and even enthusiastic affection, marred at times by defects of temper, Mrs. Shelley in the autumn of 1823 returned to London. At first the earnings of her pen were her only sustenance; but after a while Sir Timothy Shelley made her an allowance, which would have been withdrawn if she had persisted in a project of writing a full biography of her husband. She was a loving and careful mother, and shared the prosperous fortunes of her son, when, upon the death of Sir Timothy in 1844, he succeeded to the baronetcy. She died in February, 1851.

SHELLEY, Percy Bysshe (1792–1822), was born on 4th August, 1792, at Field Place, near Horsham, Sussex. He was the eldest child of Timothy Shelley, M.P. for Shoreham, by his wife Elizabeth, daughter of Charles Pilfold, of Effingham, Surrey. Mr. Timothy Shelley became in 1815 Sir Timothy Shelley, Bart., upon the decease of his father Bysshe, who was created a baronet in 1806. This Bysshe Shelley was born in Trinity Parish, Newark, North America, and married two heiresses, the former, the mother of Timothy, being Mary Catherine, heiress of the Rev. Theobald Michell, of Horsham. He was a handsome man of enterprising and remarkable character, accumulated a vast fortune, built Castle Goring, and lived in sullen and penurious retirement in his closing years. None of his talent seems to have descended to Timothy, who, except for being of a rather oddly self-assertive character, was undistinguishable from the ordinary run of commonplace country squires. The mother of the poet is described as beautiful, and a woman of good abilities, but not with any literary turn; she was an agreeable letter-writer. The branch of the Shelley family to which the poet Percy Bysshe belonged traces its pedigree to Henry Shelley, of Worminghurst, Sussex, who died in 1623. Beyond that point the genealogical record is not clear; yet no substantial doubt exists that these Worminghurst or Castle Goring Shelleys are of the same stock as the Michelgrove Shelleys, who trace up to Sir William Shelley, judge of the common pleas under Henry VII., thence to a member of parliament in 1415, and to the reign of Edward I., or even to the epoch of the Norman Conquest. The Worminghurst branch was a family of credit, but not of distinction, until its fortunes culminated under the above-named Sir Bysshe.

In the character of Percy Bysshe Shelley three qualities become early manifest, and may be regarded as innate: impressionableness or extreme susceptibility to external and internal impulses of feeling; a lively imagination or erratic fancy, blurring a sound estimate of solid facts; and a resolute repudiation of outer authority or the despotism of custom. These qualities were highly developed in his earliest manhood, were active in his boyhood, and no doubt made some show even on the borderland between childhood and infancy. At the age of six he was sent to a day school at Warnham, kept by the Rev. Mr. Edwards; at ten to Sion House School, Brentford, of which the principal was Dr. Greenlaw, while the pupils were mostly sons of local tradesmen; at twelve (or immediately before that age, 29th July, 1804) to Eton. The headmaster of Eton, up to nearly the close of Shelley's sojourn in the school, was Dr. Goodall, a mild disciplinarian; it is therefore a mistake to suppose that Percy (unless during his very brief stay in the lower school) was frequently flagellated by the formidable Dr. Keate, who only became headmaster after Goodall. Shelley was a shy, sensitive, mopish sort of boy from one point of view,—from another a very unruly one, having his own notions of justice, independence, and mental freedom; by nature gentle, kindly, and retiring,—under provocation dangerously violent. He resisted the odious fagging system, exerted himself little in the routine of school-learning, and was known both as "Mad Shelley" and as "Shelley the Atheist." Some writers try to show that an Eton boy would be termed atheist without exhibiting any propensity to atheism, but solely on the ground of his being mutinous. However, as Shelley was a declared atheist a good while before attaining his majority, a shrewd suspicion arises that, if Etonians dubbed him atheist, they had some relevant reason for doing so.

Shelley entered University College, Oxford, in April, 1810, returned thence to Eton, and finally quitted the school at midsummer, and commenced residence in Oxford in October. Here he met a young Durham man, Thomas Jefferson Hogg, who had preceded him in the university by a couple of months; the two youths at once struck up a warm and intimate friendship. Shelley had at this time a love for chemical experiment, as well as for poetry, philosophy, and classical study, and was in all his tastes and bearing an enthusiast. Hogg was not in the least an enthusiast, rather a cynic, but he also was a steady and well-read classical student. In religious matters both were skeptics, or indeed decided anti-Christians; whether Hogg, as the senior and more informed disputant, pioneered Shelley into strict atheism, or whether Shelley,

[1] It is further worthy of remark that the young of *T. variegata* when first hatched closely resemble those of *T. casarca*, and when the former assume their first plumage they resemble their father more than their mother (*P. Z. S.*, 1866. p. 150).

as the more impassioned and unflinching speculator, outran the easy-going jeering Hogg, is a moot point; we incline to the latter opinion. Certain it is that each egged on the other by perpetual disquisition on abstruse subjects, conducted partly for the sake of truth and partly for that of mental exercitation, without on either side any disposition to bow to authority or stop short of extreme conclusions. The upshot of this habit was that Shelley and Hogg, at the close of some five months of happy and uneventful academic life, got expelled from the university. Shelley—for he alone figures as the writer of the "little syllabus," although there can be no doubt that Hogg was his confidant and coadjutor throughout—published anonymously a pamphlet or flysheet entitled *The Necessity of Atheism*, which he sent round, or intended to send round, to all sorts of people as an invitation or challenge to discussion. It amounted to saying that neither reason nor testimony is adequate to establish the existence of a deity, and that nothing short of a personal individual self-revelation of the deity would be sufficient. The college authorities heard of the pamphlet, somehow identified Shelley as its author, and summoned him before them—"our master, and two or three of the fellows." The pamphlet was produced, and Shelley was required to say whether he had written it or not. The youth declined to answer the question, and was expelled by a written sentence, ready drawn up. Hogg was next summoned, with a result practically the same. The precise details of this transaction have been much controverted; the best evidence is that which appears on the college records, showing that both Hogg and Shelley (Hogg is there named first) were expelled for "contumaciously refusing to answer questions," and for "repeatedly declining to disavow" the authorship. Thus they were dismissed as being mutineers against academic authority, in a case pregnant with the suspicion—not the proof—of atheism; but how the authorities could know beforehand that the two undergraduates would be contumacious and stiff against disavowal, so as to give warrant for written sentences ready drawn up, is nowhere explained. Possibly the sentences were worded without ground assigned, and would only have been produced *in terrorem* had the young men proved more malleable. The date of this incident was 25th March, 1811.

Shelley and Hogg came up to London, where Shelley was soon left alone, as his friend went to York to study conveyancing. Percy and his incensed father did not at once come to terms, and for a while he had no resource beyond pocket-money saved up by his sisters (four in number altogether) and sent round to him, sometimes by the hand of a singularly pretty school-fellow, Miss Harriet Westbrook, daughter of a retired and moderately opulent hotel-keeper. Shelley, especially in early youth, had a somewhat "priggish" turn for moralizing and argumentation, and a decided mania for proselytizing; his school-girl sisters, and their little Methodist friend Miss Westbrook, aged between fifteen and sixteen, must all be enlightened and converted to anti-Christianity. He, therefore, cultivated the society of Harriet, calling at the house of her father, and being encouraged in his assiduity by her much older sister Eliza. Harriet not unnaturally fell in love with him; and he, though not it would seem at any time ardently in love with her, dallied along the flowery pathway which leads to sentiment and a definite courtship. This was not his first love-affair; for he had but a very few months before been courting his cousin Miss Harriet Grove, who, alarmed at his heterodoxies, finally broke off with him—to his no small grief and perturbation at the time. It is averred, and seemingly with truth, that Shelley never indulged in any sensual or dissipated amour; and, as he advances in life, it becomes apparent, that though capable of the passion of love, and unusually prone to regard with much effusion of sentiment women who interested his mind and heart, the mere attraction of a pretty face or an alluring figure left him unenthralled. After a while Percy was reconciled to his father, revisited his family in Sussex, and then stayed with a cousin in Wales. Hence he was recalled to London by Miss Harriet Westbrook, who wrote complaining of her father's resolve to send her back to her school, in which she was now regarded with repulsion as having become too apt a pupil of the atheist Shelley. He replied counselling resistance. "She wrote to say" (these are the words of Shelley in a letter to Hogg, dating towards the end of July, 1811) "that resistance was useless, but that she would fly with me, and threw herself upon my protection." Shelley, therefore, returned to London, where he found Harriet agitated and wavering; finally they agreed to elope, travelled in haste to Edinburgh, and there, according to the law of Scotland, became husband and wife on 28th August. Shelley, it should be understood, had by this time openly broken, not only with the dogmas and conventions of Christian religion, but with many of the institutions of Christian polity, and in especial with such as enforce and regulate marriage; he held—with William Godwin and some other theorists—that marriage ought to be simply a voluntary relation between a man and a woman, to be assumed at joint option and terminated at the after-option of either party. If, therefore, he had acted upon his personal conviction of the right, he would never have wedded Harriet, whether by Scotch, English, or any other law; but he waived his own theory in favor of the consideration that in such an experiment the woman's stake, and the disadvantages accruing to her, are out of all comparison with the man's. His conduct, therefore, was so far entirely honorable; and, if it derogated from a principle of his own (a principle which, however contrary to the morality of other people, was and always remained matter of genuine conviction on his individual part), this was only in deference to a higher and more imperious standard of right.

Harriet Shelley was not only beautiful; she was amiable, accommodating, adequately well educated and well bred. She liked reading, and her reading was not strictly frivolous. But she could not (as Shelley said at a later date) "feel poetry and understand philosophy." Her attractions were all on the surface; there was (to use a common phrase) "nothing particular in her." For nearly three years Shelley and she led a shifting sort of life upon an income of £400 [$1944] a year, one-half of which was allowed (after his first severe indignation at the *mésalliance* was past) by Mr. Timothy Shelley, and the other half by Mr. Westbrook. The spouses left Edinburgh for York and the society of Hogg; broke with him upon a charge made by Harriet, and evidently fully believed by Shelley at the time, that, during a temporary absence of his upon business in Sussex, Hogg had tried to seduce her (this quarrel was entirely made up at the end of about a year); moved off to Keswick in Cumberland, coupled with the company of Southey, and some hospitality from the duke of Norfolk, who, as chief magnate in the Shoreham region of Sussex, was at pains to reconcile the father and his too unfilial heir; sailed thence to Dublin, where Shelley was eager, and in some degree prominent, in the good cause of Catholic emancipation, conjoined with repeal of the union: crossed to Wales, and lived at Nant-Gwillt, near Rhayader, then at Lynmouth in Devonshire, then at Tanyrallt in Carnarvonshire. All this was between September, 1811, and February, 1813. At Lynmouth an Irish servant of Shelley's was sentenced to six months' imprisonment for distributing and posting up printed papers, bearing no printer's name, of an inflammatory or seditious tendency—being a *Declaration of Rights* composed by the youthful reformer, and some verses of his named *The Devil's Walk*. At Tanyrallt Shelley was (to trust his own and Harriet's account, confirmed by the evidence of Miss Westbrook, the elder sister, who continued an inmate in most of their homes) attacked on the night of 26th February by an assassin who fired

three pistol-shots. The motive of the attack was undefined; the fact of its occurrence was generally disbelieved, both at the time and by subsequent inquirers. To analyze the possibilities and probabilities of the case would lead us too far; we can only say that we rank with the decided skeptics. Shelley was full of wild unpractical notions; he dosed himself with laudanum as a palliative to spasmodic pains; he was given to strange assertions and romancing narratives (several of which might properly be specified here but for want of space), and was not incapable of conscious fibbing. His mind no doubt oscillated at times along the line which divides sanity from insane delusion. It is difficult to suppose that he simply invented such a monstrous story to serve a purpose. The very enormity of the story tends to dissuade us from thinking so, and the purpose alleged seems disproportionately small—that of decamping from Tanyrallt ere creditors should become too pressing. Indeed, we decisively reject this supposed motive. On the other hand, nothing could be traced to corroborate Shelley's assertion. This was at any rate the break-up of the residence at Tanyrallt; the Shelleys revisited Ireland, and then settled for a while in London. Here, in June, 1813, Harriet gave birth to her daughter Ianthe Eliza (she married a Mr. Esdaile, and died in 1876). Here also Shelley brought out his first poem of any importance, *Queen Mab;* it was privately printed, as its exceedingly aggressive tone in matters of religion and morals would not allow of publication.

The speculative sage whom Shelley especially reverenced was William Godwin, the author of *Political Justice* and of the romance *Caleb Williams;* in 1796 he had married Mary Wollstonecraft, authoress of *The Rights of Woman*, who died shortly after giving birth, on 30th August, 1797, to a daughter Mary. With Godwin Shelley had opened a volunteered correspondence late in 1811, and he had known him personally since the winter which closed 1812. Godwin was then a bookseller, living with his second wife, who had been a Mrs. Clairmont; there were four other inmates of the household, two of whom call for some mention here—Fanny Wollstonecraft, the daughter of the authoress and Mr. Imlay, and Claire, the daughter of Mrs. Clairmont. Fanny committed suicide in October, 1816, being, according to some accounts which remain unverified, hopelessly in love with Shelley; Claire was closely associated with all his subsequent career. It was towards May, 1814, that Shelley first saw Mary Wollstonecraft Godwin as a grown-up girl (she was well on towards seventeen); he instantly fell in love with her, and she with him. Just before this, 24th March, Shelley had remarried Harriet in London, though with no obviously cogent motive for doing so; but, on becoming enamored of Mary, he seems to have rapidly made up his mind that Harriet should not stand in the way. She was at Bath while he was in London, and for awhile she heard nothing of him. They had, however, met again in London and come to some sort of understanding before the final crisis arrived,—Harriet remonstrating and indignant, but incapable of effective resistance,—Shelley sick of her companionship, and bent upon gratifying his own wishes, which as we have already seen were not at odds with his avowed principles of conduct. For some months past there had been bickerings and misunderstandings between him and Harriet, aggravated by the now detested presence of Miss Westbrook in the house; more than this cannot be said, for no more is at present known. It is certain, however, that evidence exists which, while not plainly proving any grave wrongdoing on Harriet's part, exculpates Shelley from the charge of having separated from her without what appeared to himself sufficient cause. The upshot came on 28th July, when Shelley aided Mary to elope from her father's house, Claire Clairmont deciding to accompany them. They crossed to Calais, and proceeded across France into Switzerland. Godwin and his wife were greatly incensed. Though he and Mary Wollstonecraft had entertained and avowed bold opinions regarding the marriage-bond, similar to Shelley's own, and had in their time acted upon these opinions, it is not clearly made out that Mary Godwin had ever been encouraged by paternal influence to think or do the like. Shelley and she chose to act upon their own likings and responsibility,—he disregarding any claim which Harriet had upon him, and Mary setting at nought her father's authority. Both were prepared to ignore the law of the land and the rules of society.

The three young people returned to London in September. In the following January Sir Bysshe Shelley died, and Percy became the immediate heir to the entailed property inherited by his father Sir Timothy. This entailed property seems to have been worth £6000 [$29,160] per annum, or little less. There was another very much larger property which Percy might shortly before have secured to himself, contingently upon his father's death, if he would have consented to put it upon the same footing of entail; but this he resolutely refused to do, on the professed ground of his being opposed upon principle to the system of entail; therefore, on his grandfather's death the larger property passed wholly away from any interest which Percy might have had in it, in use or in expectancy. He now came to an understanding with his father as to the remaining entailed property; and, giving up certain future advantages, he received henceforth a regular income of £1000 [$4860] a year. Out of this he assigned £200 [$972] a year to Harriet, who had given birth in November to a son, Charles Bysshe (he died in 1826). Shelley, and Mary as well, were on moderately good terms with Harriet, seeing her from time to time. His peculiar views as to the relations of the sexes appear markedly again in his having (so it is alleged) invited Harriet to return to his and Mary's house as a domicile; of course this curious arrangement did not take effect. Shelley and Mary (who was naturally always called Mrs. Shelley) now settled at Bishopgate, near Windsor Forest: here he produced his first excellent poem, *Alastor, or the Spirit of Solitude*, which was published soon afterwards along with a few others. In May, 1816, the pair left England for Switzerland, together with Miss Clairmont, and their own infant son William. They went straight to Sécheron, near Geneva; Lord Byron, whose separation from his wife had just then taken place, arrived there immediately afterwards. A great deal of controversy has lately arisen as to the motives and incidents of this foreign sojourn. The clear fact is that Miss Clairmont, who had a fine voice and some inclination for the stage, had seen Byron, as connected with the management of Drury Lane theatre, early in the year, and an amorous intrigue had begun between them in London. *Prima facie* it seems quite reasonable to suppose that she had explained the facts to Shelley or to Mary, or to both, and had induced them to convoy her to the society of Byron abroad; were this finally established as the fact, it would show no inconsistency of conduct, or breach of his own code of sexual morals, on Shelley's part. On the other hand it is asserted that documentary evidence of an irrefragable kind exists showing that Shelley and Mary were totally ignorant of the amour shortly before they went abroad. Whether or not they knew of it while they and Claire were in daily intercourse with Byron, and housed close by him on the shore of the Lake of Geneva, may be left unargued. The three returned to London in September, 1816, Byron remaining abroad; and in January, 1817, Miss Clairmont gave birth to his daughter named Allegra. The return of the Shelleys was closely followed by two suicides,—first that of Fanny Wollstonecraft (already referred to), and second that of Harriet Shelley, who on 9th November drowned herself in the Serpentine. The latest stages of the lovely and ill-starred Harriet's career have never been very explicitly recorded. It seems that she formed

a connection with some gentleman from whom circumstances or desertion separated her, that her habits became intemperate, and that she was treated with contumelious harshness by her sister during an illness of their father. She had always had a propensity (often laughed at in earlier and happier days) to the idea of suicide, and she now carried it out in act—possibly without anything which could be regarded as an extremely cogent predisposing motive, although the total weight of her distresses, accumulating within the past two years and a half, was beyond question heavy to bear. Shelley, then at Bath, hurried up to London when he heard of Harriet's death, giving manifest signs of the shock which so terrible a catastrophe had produced on him. Some self-reproach must no doubt have mingled with his affliction and dismay; yet he does not appear to have considered himself gravely in the wrong at any stage in the transaction, and it is established that in the train of quite recent events which immediately led up to Harriet's suicide he had borne no part.

This was the time when Shelley began to see a great deal of Leigh Hunt, the poet and essayist, editor of *The Examiner;* they were close friends, and Hunt did something (hardly perhaps so much as might have been anticipated) to uphold the reputation of Shelley as a poet—which, we may here say once for all, scarcely obtained any public acceptance or solidity during his brief lifetime. The death of Harriet having removed the only obstacle to a marriage with Mary Godwin, the wedding ensued on 30th December, 1816, and the married couple settled down at Great Marlow in Buckinghamshire. Their tranquillity was shortly disturbed by a Chancery suit set in motion by Mr. Westbrook, who asked for the custody of his two grandchildren, on the ground that Shelley had deserted his wife and intended to bring up his offspring in his own atheistic and anti-social opinions. Lord Chancellor Eldon delivered judgment towards 26th March, 1817. He held that Shelley, having avowed condemnable principles of conduct, and having fashioned his own conduct to correspond, and being likely to inculcate the same principles upon his children, was unfit to have the charge of them. He therefore assigned this charge to Mr. and Miss Westbrook, and appointed as their immediate curator Dr. Hume, an orthodox army physician, who was Shelley's own nominee. The poet had to pay for the maintenance of the children a sum which stood eventually at £120 [$583.20] per annum; if it was at first (as generally stated) £200 [$972] that was no more than what he had previously allowed to Harriet. This is the last incident of marked importance in the perturbed career of Shelley; the rest relates to the history of his mind, the poems which he produced and published, and his changes of locality in travelling. In March, 1818, after an illness which he regarded (rightly or wrongly) as a dangerous pulmonary attack, Shelley, with his wife, their two infants William and Clara, and Miss Clairmont and her baby Allegra, went off to Italy, in which country the whole short remainder of his life was passed. Allegra was soon sent on to Venice, to her father Byron, who, ever since parting from Miss Clairmont in Switzerland, showed a callous and unfeeling determination to see and know no more about her. In 1818 the Shelleys—mostly, not always, with Miss Clairmont in their company—were in Milan, Leghorn, the Bagni di Lucca, Venice and its neighborhood, Rome, and Naples; in 1819 in Rome, the vicinity of Leghorn, and Florence (both their infants were now dead, but a third was born late in 1819, the present baronet, Sir Percy Florence Shelley); in 1820 in Pisa, the Bagni di Pisa (or di San Giuliano), and Leghorn; in 1821 in Pisa and with Byron in Ravenna; in 1822 in Pisa and on the Bay of Spezia, between Lerici and San Terenzio. The incidents of this period are but few, and of no great importance apart from their bearing upon the poet's writings. In Leghorn he knew Mr. and Mrs. Gisborne, the latter a once intimate friend of Godwin; she taught Shelley Spanish, and he was eager to promote a project for a steamer to be built by her son by a former marriage, the young engineer Henry Reveley; it would have been the first steamer to navigate the Gulf of Lyons. In Pisa he formed a sentimental intimacy with the Contessina Emilia Viviani, a girl who was pining in a convent pending her father's choice of a husband for her; this impassioned but vague and fanciful attachment—which soon came to an end, as Emilia's character developed less favorably in the eyes of her Platonic adorer—produced the transcendental love-poem of *Epipsychidion* in 1821. In Ravenna the scheme of the quarterly magazine *The Liberal* was concerted by Byron and Shelley, the latter being principally interested in it with a view to benefiting Leigh Hunt by such an association with Byron. In Pisa Byron and Shelley were very constantly together, having in their company at one time or another Captain Medwin (cousin and schoolfellow of Shelley, and one of his biographers), Lieutenant and Mrs. Williams, to both of whom our poet was very warmly attached, and Captain Trelawny, the adventurous and romantic-natured seaman who has left important and interesting reminiscences of this period. Byron admired very highly the generous, unworldly, and enthusiastic character of Shelley, and set some value on his writings; Shelley half-worshipped Byron as a poet, and was anxious, but in some conjunctures by no means able, to respect him as a man. In Pisa he knew also Prince Alexander Mavrocordato, one of the pioneers of Grecian insurrection and freedom; the glorious cause fired Shelley, and he wrote the drama of *Hellas* (1821).

The last residence of Shelley was the Casa Magni, a bare and exposed dwelling on the Gulf of Spezia. He and his wife, with the Williamses, went there at the end of April, 1822, to spend the summer, which proved an arid and scorching one. Shelley and Williams, both of them insatiably fond of boating, had a small schooner named the "Don Juan" built at Genoa after a design which Williams had procured from a naval friend, and which was the reverse of safe. They received her on 12th May, found her rapid and alert, and on 1st July started in her to Leghorn, to meet Leigh Hunt, whose arrival in Italy had just been notified. After doing his best to set things going comfortably between Byron and Hunt, Shelley returned on board with Williams on 8th July. It was a day of dark, lowering, stifling heat. Trelawny took leave of his two friends, and about half-past six in the evening found himself startled from a doze by a frightful turmoil of storm. The "Don Juan" had by this time made Via Reggio; she was not to be seen, though other vessels which had sailed about the same time were still discernible. Shelley, Williams, and their only companion, a sailor-boy, perished in the squall. The exact nature of the catastrophe was from the first regarded as somewhat disputable, but it is only of late years (1875) that it has been keenly debated. The condition of the "Don Juan" when recovered did not favor any assumption that she had capsized in a heavy sea—rather that she had been run down by some other vessel, a felucca or fishing-smack. In the absence of any counter-evidence this would be supposed to have occurred by accident; but a rumor, not strictly verified and certainly not refuted, exists that an aged Italian seaman on his deathbed confessed that he had been one of the crew of the fatal felucca, and that the collision was intentional, as the men had plotted to steal a sum of money supposed to be on the "Don Juan," in charge of Lord Byron. In fact there was a moderate sum there, but Byron had neither embarked nor intended to embark. This may perhaps be the true account of the tragedy; at any rate Trelawny, the best possible authority on the subject, accepted it as true. He it was who laboriously tracked out the shore-washed corpses of Shelley and Williams, and who undertook the burning of them, after the ancient

Greek fashion, on the shore near Via Reggio, on the 15th and 16th of August. The great poet's ashes were then collected, and buried in the new Protestant cemetery in Rome. He was, at the time of his untimely death, within a month of completing the thirtieth year of his age—a surprising example of rich poetic achievement for so young a man.

The character of Shelley can be considered according to two different standards of estimation. We can estimate the original motive forces in his character; or we can form an opinion of his actions, and thence put a certain construction upon his personal qualities. We will first try the latter method. It cannot be denied by his admirers and eulogists, and is abundantly clear to his censors, that his actions were in some considerable degree abnormal, dangerous to the settled basis of society, and marked by headstrong and undutiful presumption. But it is remarkable that, even among the censors of his conduct, many persons are none the less impressed by the beauty of his character: and this leads us back to our first point—the original motive forces in that. Here we find enthusiasm, fervor, courage (moral and physical), an unbounded readiness to act upon what he considered right principle, however inconvenient or disastrous the consequences to himself, sweetness and indulgence towards others, extreme generosity, and the principle of love for humankind in abundance and superabundance. He respected the truth, such as he conceived it to be, in spiritual or speculative matters, and respected no construction of the truth which came to him recommended by human authority. No man had more hatred or contempt of custom and prescription; no one had a more authentic or vivid sense of universal charity. The same radiant enthusiasm which appeared in his poetry as idealism stamped his speculation with the conception of perfectibility and his character with loving emotion.

In person Shelley was attractive, winning, and almost beautiful, but not to be called handsome. His height was nearly 5 feet 11; he was slim, agile, and strong, with something of a stoop; his complexion brilliant, his hair abundant and wavy, dark-brown but early beginning to grizzle; the eyes, deep-blue in tint, have been termed "stag-eyes"—large, fixed, and beaming. His voice was wanting in richness and suavity—high-pitched, and tending to the screechy; his general aspect, though extremely variable according as his mood of mind and his expression shifted, was on the whole uncommonly juvenile.

From this necessarily very slight account of the life of Shelley we pass to a consideration—and this too must be equally slender—of his works in poetry. If we except Goethe (and for convenience sake leaving out of count any living writers, whose ultimate value cannot at present be assessed), we consider Shelley to be the supreme poet of the new era which, beginning with the French Revolution, remains continuous into our own day. Lord Byron and Victor Hugo come the nearest to Shelley in poetic stature, and each of them might for certain reasons be even preferred to him; Wordsworth also has his numerous champions. The grounds on which we set Shelley highest of all are mainly three. He excels all his competitors in ideality, he excels them in music, and he excels them in importance. By importance we here mean the direct import of the work performed, its controlling power over the reader's thought and feeling, the contagious fire of its white-hot intellectual passion, and the long reverberation of its appeal. Shelley is emphatically the poet of the future. In his own day an alien in the world of mind and invention, and in our day scarcely yet a denizen of it, he appears destined to become, in the long vista of years, an informing presence in the innermost shrine of human thought. Shelley appeared at the time when the sublime frenzies of the French revolutionary movement had exhausted the elasticity of men's thought—at least in England—and had left them flaccid and stolid; but that movement prepared another in which revolution was to assume the milder guise of reform, conquering and to conquer. Shelley was its prophet. As an iconoclast and an idealist he took the only position in which a poet could advantageously work as a reformer. To outrage his contemporaries was the condition of leading his successors to triumph and of personally triumphing in their victories. Shelley had the temper of an innovator and a martyr; and in an intellect wondrously poetical he united speculative keenness and humanitarian zeal in a degree for which we might vainly seek his precursor. We have already named ideality as one of his leading excellences. This Shelleian quality combines, as its constituents, sublimity, beauty, and the abstract passion for good. It should be acknowledged that, while this great quality forms the chief and most admirable factor in Shelley's poetry, the defects which go along with it mar his work too often—producing at times vagueness, unreality, and a pomp of glittering indistinctness, in which excess of sentiment welters amid excess of words. This blemish affects the long poems much more than the pure lyrics; in the latter the rapture, the music, and the emotion are in exquisite balance, and the work has often as much of delicate simplicity as of fragile and flower-like perfection.

In the course of our biographical narrative we have mentioned a few, but only a few, of Shelley's writings; we must now give some curt account of others. Of his early work prior to *Queen Mab*—such romances as *Zastrozzi* and *St. Irvyne*, such verse as the *Fragments of Margaret Nicholson*—we can only here say that they are rubbish. *Alastor* was succeeded (1817) by *The Revolt of Islam*, a poem of no common length in the Spenserian stanza, preaching bloodless revolution; it is amazingly fine in parts, but as a whole somewhat long-drawn and exhausting. This transcendental epic (for such it may be termed) was at first named *Laon and Cythna, or the Revolution of the Golden City*, and the lovers of the story were then brother and sister as well as lovers—an experiment upon British endurance which the publishers would not connive at. The year 1818 produced *Rosalind and Helen*, a comparatively weak poem, and *Julian and Maddalo*, a very strong one—demonstrating in Shelley a singular power of seeing ordinary things with directness, and at once figuring them as reality and transfiguring them into poetry. The next year, 1819, was his culmination, producing as it did the grand tragedy of *The Cenci* and the sublime ideal drama *Prometheus Unbound*, which we have no hesitation in calling his masterpiece. It embodies, in forms of surpassing imagination and beauty, Shelley's deepest and most daring conceptions. Prometheus, the human mind, has invested with the powers proper to himself Jupiter the god of heaven, who thereupon chains and torments Prometheus and oppresses mankind; in other words, the anthropomorphic god of religion is a creation of the human mind, and both the mind of man and man himself are enslaved as long as this god exercises his delegated but now absolute power. Prometheus, who is from of old wedded to Asia, or Nature, protests against and anathematizes the usurper enthroned by himself. At last the anathema takes effect. Eternity, Demogorgon, dismisses Jupiter to unending nothingness. Prometheus is at once unbound, the human mind is free; he is reunited to his spouse Nature, and the world of man passes from thraldom and its degradation into limitless progression, or (as the phrase goes) perfectibility, moral and material. This we regard as in brief the argument of *Prometheus Unbound*. It is closely analogous to the argument of the juvenile poem *Queen Mab*, but so raised in form and creative touch that, whereas to write *Queen Mab* was only to be an ambitious and ebullient tyro, to invent *Prometheus Unbound* was to be the poet of the future. *The Witch of Atlas* (1820) appears to us the most perfect work among all Shelley's longer poems, though it is neither the deepest nor the most interesting. It may be rated as a pure exercise of roving imagination—guided, however, by an intense sense of beauty, and by its author's exceeding fineness of nature. The poem has often been decried as practically unmeaning; we do not subscribe to this opinion. The "witch" of this subtle and magical invention seems to represent that faculty which we term "the fancy"; using this assumption as a clue, we find plenty of meaning in the poem, but necessarily it is fanciful or volatile meaning. The elegy on Keats, *Adonais*, followed in 1821; the *Triumph of Life*, a mystical and most impressive allegory, constructed upon lines marked out by Dante and by Petrarch, was occupying the poet up to the time of his death. The stately fragment which remains is probably but a small portion of the projected whole. The translations—chiefly from Homer, Euripides, Calderon, and Goethe—date from 1819 to 1822, and testify to the poetic endowment of Shelley not less absolutely than his own original compositions. From this list it will be readily seen that Shelley was not only a prolific but also a versatile poet. Works so various in faculty and in form as *The Revolt of Islam*, *Julian and Maddalo*, *The Cenci*, *Prometheus Unbound*, *Epipsychidion*, and the grotesque effusions of which *Peter Bell the Third* is the prime example, added to the consummate array of lyrics, have seldom to be credited to a single writer—one, moreover, who died before he was thirty years of age. In prose Shelley could be as admirable as in poetry; of late years it has even been pretended—but we regard this proposition as worthy of summary rejection—that his best and most enduring work is in the prose form. His letters to Thomas Love Peacock and others, and his uncompleted *Defence of Poetry*, are the chief monuments of his mastery in prose; and certainly no more beautiful prose—having much of the spirit and the aroma of poetry, yet without being distorted out of its proper essence—is to be found in the English language.

The chief original authorities for the life of Shelley (apart from his own writings, which contain a good deal of autobiography, if heedfully sifted and collated) are—(1) the notices by Mrs. Shelley interspersed in her edition of the *Poems;* (2) Hogg's amusing, discerning, and anthentic, although in some respects exaggerated, book; (3) Trelawny's *Records;* (4) the *Life* by Medwin; and (5) the articles written by Peacock. Some other writers, especially Leigh Hunt, might be mentioned, but they come less close to the facts. Among biographical works produced since Shelley's death, by authors who did not know him personally, much the largest is *The Real Shelley*, by J. C. Jeafferson (1885); it is controversial in method and decidedly hostile in tendency, and tries a man of genius by tests far from well adapted (in our opinion) to bring out a right result; it contains, however, an ample share of solid information and sharp disquisition. The memoir by W. M. Rossetti, prefixed to an edition of Shelley's *Poems* in two forms of publication, 1870 and 1878, was an endeavor to formulate in brief space, out of the then confused and conflicting records, an accurate account of Shelley—admiring, but not uncandidly one-sided. There is valuable material in Lady Shelley's *Shelley Memorials*, and in Dr. Garnett's *Relics of Shelley;* and the memoir written by Mr. Symonds, in the series *English Men of Letters*, is very agreeably and skilfully done. While we write (November, 1885) Prof. Dowden is engaged upon a life of Shelley, which may be expected to distance all its predeccssors in authority and completeness.[1] (W. M. R.)

SHELOMOH IBN GEBIROL. See AVICEBRON.

SHEM. See NOAH. Compare SEMITIC LANGUAGES.

SHEMAHA, a formerly important but now insignificant town in Transcaucasia, in 40° 38′ N. lat. and 66° 19′ E. long., on the Zagolovai, an affluent of the Peerssagat, which falls into the Caspian. It is situated in a mountainous, very picturesque country, covered with luxuriant vegetation, at about 2230 feet above the level of the Black Sea. In 1873 it had 25,087 inhabitants, of whom 18,680 were Tartars and Shachsevans, 5177 Armenians, and 1230 Russians. Some 300 Armenian families now profess Lutheranism—the result of a mission first established at Shemaha about twenty years ago. Shemaha was the capital of the khanate of Shirván, and was known to Ptolemy as Kamachia. Situated as it was on the high road from Europe to India, this old town must at one time have possessed very considerable importance, and evidence of the fact is found in the numerous ruins of large caravansarais, churches, and public buildings. About the middle of the 16th century it was the seat of an English commercial factory, under the well-known traveller Jenkinson (compare RUSSIA, vol. xxi. p. 101), afterwards envoy extraordinary of the khan of Shirván to Ivan the Terrible. In 1742 Shemaha was taken and destroyed by Nadir Shah, who, to punish the inhabitants for their Sunnite creed, built a new town under the same name about 16 miles to the west, at the foot of the main chain of the Caucasus. The new Shemaha was at different times a residence of the khan of Shirván, but it was finally abandoned, and in its place there stands now only a village called Akhsu, whilst the old town was rebuilt, and under the Russians became capital of the government of Shemaha. In recent times Shemaha has suffered greatly from earthquakes: in 1859 it was shaken to its foundations, and in consequence the seat of the governor was removed to Baku; in 1872 (16th January) there occurred a still more terrible shock, from which the town has never recovered. Silk manufacture is the principal industry in Shemaha. In 1873 there were one hundred and thirty silk-winding establishments, owned mostly by Armenians. The industry has, however, since 1864 considerably declined.

The district of Shemaha (4426 square miles), corresponding to the ancient khanate of Shirván, lies along the southern slope of the main chain of the Eastern Caucasus. It contains a population of 97,801 inhabitants (1873), of whom 8493 are Russians, 14,838 Armenians, 73,124 Tartars, 638 Jats (old Persian tribe), and 708 Jews. As everywhere in Transcaucasia, the number of males is considerably in excess over the females (100 to 81). The district occupies a sparsely-wooden mountainous region, completely shut up on the north, and open to the dry, large, and mostly desolate valley of Kura on the south. The climate is generally healthy, rather dry and moderately warm; in the lower parts the people suffer from malarious fever. The annual rain-fall in Shemaha is 14.52 inches, the mean summer temperature 73° Fahr., winter 37°. The soil, mostly of the Tertiary formation, is very rich and of considerable variety. This district occupies in Transcaucasia a foremost place in vine-growing and in the silk industry. The vine region, in the southwest of the district, is a long strip of land of breadth varying from 4 to 20 miles. The highest level of the vine is about 2500 feet above the sea. The plant is left unprotected in winter, and owing to the abundance of water occasioned by the melting snows and the heavy rains in spring, there is no need of irrigation. According to a general survey made in 1875 there are in the district 3098 vineyards, occupying a total of 1754 acres. The other products are principally wheat, cotton and rice. In 1875 the annual vintage at Shemaha was calculated at about 62,160 gallons. The best wine is that of Matrassy. The province of Shirván, now the district of Shemaha, has been frequently the theatre of terrible struggles and bloodshed. It was conquered by the Persians in 1501 under Shah Ismail I., and it continued with brief interruptions to be a part of the Persian dominions until the fall of the Safawí dynasty.

Shemaha, the capital of Shirván, was sacked in 1712 by the Lesghians; eight years later the town and the whole province were devastated by a certain Deghestani, Ala ud-Daulah, who was later recognized by Persia as the khan of Shirván. In 1724 the khanate was taken by Turkey, but ten years later Nadir Shah of Persia reconquered it after terrible ravages. On the departure of Nadir Shah soon afterwards Shirván enjoyed independence under the rule of Mahmud Seyyid, who rebuilt Shemaha. The Russians entered Shirván first in 1723, but soon retired. In 1795 they captured Shemaha as well as Baku; but the conquest was once more abandoned, and Shirván was not finally annexed to Russia until November, 1805, after the voluntary submission of its last khan Mustapha.

SHENANDOAH, a borough of the United States, in Schuylkill county, Pennsylvania, 12 miles north of Pottsville, is the centre of a great coal district, more than half the total yield of the Schuylkill region being produced within 3 miles of the town. Among its buildings are fifteen churches, a theatre, and two public halls. It was founded in 1863, and its population (partly Welsh and German), which increased from 2951 in 1870 to 10,148 in 1880, is estimated at over 15,000 in 1886.

Shenandoah is also the name of a well-known tributary of the Potomac.

SHENDY, a town on the right bank of the Nile, about 130 miles south of Berber and 100 north of Khartúm, which, while its present population does not exceed 2500, was previous to its destruction by the Egyptians in 1822 a place of some 50,000 inhabitants and a station on the great caravan route between Sennâr and Egypt and Mecca. The terrible massacre perpetrated by the Egyptians was in revenge for the treacherous assassination by the native chiefs at Shendy of Ismail Pasha and his suite, who were first drugged and then burned to ashes with their huts. Shendy was the capital of a considerable district, and lies only 20 miles south of the ruins of Meroe.

SHENSTONE, WILLIAM (1714–1763), is one of the best-known minor poets of the 18th century. He owes such distinction as he has at least as much to his choice of subjects and to the peculiarity of his life as to the felicity of his verse. Coming after a generation whose leading poets wrote for fashionable society, he shut himself up in the country, tried to follow the life Arcadian, and wrote in the spirit of a recluse. He inherited the small estate of Leasowes, in the parish of Hales-Owen, Worcestershire. He was born at Leasowes in 1714, and after passing through Pembroke College, Oxford, retired there to realize Pope's ideal in the *Ode to Solitude*, turned his paternal estate into an elaborate landscape garden, and lived there till his death in 1763. From the time that the management of the estate fell into his own hands, "he began," Johnson says, "to point his prospects, to diversify his surface, to entangle his walks, and to wind his waters,—which he did with such judgment and such fancy as to make his little domain the envy of the great and the admiration of the skilful." From this it will be seen that he did not anticipate late sentiment in his love of natural scenery; he was a true child of the Queen Anne

[1] [This work is now published in two volumes.—AM. ED.]

time in his liking for "Nature to advantage dressed." And it would appear from his letters that he was not a contented recluse, but was weakly desirous of the notice of the world in his Arcadian retreat. Still there is a certain air of sincerity in his references to natural beauty and grandeur. Burns wrote of him in the preface to his first issue of poems as a poet "whose divine elegies do honor to our language." Shenstone practiced the elegiac form assiduously, and some of his elegies are not without a certain imposing pomp and dignity of language, but we may safely suppose that it was the sentiments rather than the expression that captivated the peasant poet. His *Pastoral Ballads in Four Parts*, one of his earliest compositions, is also one of his best, and from its use in selections of poetry for the young is much more generally known. The triple rhythm and the simplicity of the language are happily suited to the pastoral fancy, and there is not too much of the artificial diction and imagery of such poetry. Such lines as—

> Yet time may diminish the pain;
> The flower, and the shrub, and the tree
> Which I rear'd for her pleasure in vain
> In time may have comfort for me—

come nearer Wordsworth's ideal of poetic diction than was common in the serious poetry of Shenstone's time. But his *Schoolmistress*, in the Spenserian stanza (published in 1742, and so relieved from any suspicion of being an imitation of Thomson), is the poem by which he keeps a place in literature.

SHEPTON MALLET, a market-town of Somersetshire, England, is situated at the eastern extremity of the Mendip Hills, on the Somerset and Devon and the East Somerset Railways, 5 miles east of Wells and 20 south of Bristol. The church of Sts. Peter and Paul, consisting of chancel, clerestoried nave, and aisles, is specially worthy of notice for its richly carved wooden roof and the ancient monuments of the Mallets and Gournays, formerly possessors of the manor. The grammar school was founded in 1677, and there are also a science and art school in connection with South Kensington, a literary institute, and a mechanics' institute. The principal public buildings are the courthouse (1857), the masonic hall (1861), the prison, and the district hospital (1880). The market cross, one of the finest in the county, 51 feet in height, erected by Agnes and Thomas Buckland in 1500, was restored in 1841. About the end of last century Shepton Mallet had important cloth manufactures, and stocking-knitting was also largely carried on. The brewing of ale and porter is now one of its principal industries, and it has also rope-works and brick and tile works. In the vicinity there are granite quarries and marble, asphalt, and lime works. The population of the urban sanitary district (area, 3572 acres) in 1871 was 5149, and in 1881 it was 5322.

Shepton, previous to the Conquest called Sepeton, was in the possession of the abbots of Glastonbury for four hundred years before it passed to Roger de Courcelle. Afterwards it came into the possession of the barons Malet or Mallet, one of whom was fined for rebellion in the reign of King John. From the Mallets it went to the Gournays, but in 1536 it reverted to the crown, and it is now included in the duchy of Cornwall. The town received the grant of a market from Edward II.

SHERBORNE, an ancient market-town of Dorsetshire, England, on the borders of Somersetshire, is situated on the southern slope of a hill overlooking the river Yeo, on the Southwestern Railway, 6 miles east from Yeovil and 118 southwest from London by rail. In 705 Sherborne was made by Ina, king of the West Saxons, the seat of a bishopric, which in 1078 was removed to Old Sarum (Salisbury). Previous to its removal a great Benedictine abbey had been founded by Bishop Roger. The minster or abbey church of St. Mary possesses a Norman tower, much altered by later additions, and transepts also originally Norman, but the greater part of the building is Perpendicular. It was restored in 1848–58 at an expense of over £32,000 [$155,520], chiefly contributed by Mr. W. Digby and Lord Digby. Ethelbald and Ethelbert, elder brothers of Alfred, were buried behind the high altar of the church, which contains a number of interesting tombs and monuments. Near the minster are the ruins of the castle, originally the palace of the bishops. It was besieged during the wars between Stephen and Maud, and also during those of the Commonwealth, when it was held for the king in 1642 by the marquis of Hertford, and resisted a five days' siege by the earl of Bedford, but was in 1645 taken by Fairfax, when it was dismantled and reduced to ruins. The older portion of the modern mansion was built by Sir Walter Raleigh. Sherborne grammar school, occupying the site of the abbey, was founded by Edward VI. in 1550, and holds a high rank among the public schools of England. Near the abbey close is the hospital of St. John, dating from the 15th century. A literary institution, now called the Macready Institution, was established in 1850. The manor of Sherborne went with the bishop's see, till in the reign of Elizabeth it was conferred on Sir Walter Raleigh. After his attainder it was bestowed by James I. on his favorite, Carr, after which it passed to the Digbys, the present owners. The population of the urban sanitary district (area 411 acres) in 1871 was 5545, and in 1881 it was 5053.

SHERIDAN, the name of an Anglo-Irish family, made illustrious by the dramatist Richard Brinsley, but prominently connected with literature in more than one generation before and after his. We take the family in chronological order.

Thomas Sheridan, D.D.

1. THOMAS SHERIDAN, D.D. (1684–1738), grandfather of the dramatist, was the first to connect the family with literature. He is chiefly known as the favorite companion and confidant of Swift during his later residence in Ireland. But enough is left of his writing to enable us to understand the secret of his attraction for a man not easily pleased. His correspondence with Swift and his whimsical treatise on the *Art of Punning*[1] make perfectly clear from whom his grandson derived his high spirits and delight in practical joking. The *Art of Punning* might have been written by the author of *The Critic*. Swift had a high opinion of his scholarship, and that it was not contemptible is attested by an edition of the *Satires* of Persius, printed at Dublin in 1728. When Swift came to Dublin as dean of St. Patrick's, Sheridan was established there as a schoolmaster of very high repute, — a fashionable schoolmaster, with a small landed patrimony in Cavan, and a bishop in the family two generations back. He so won upon the dean with his mirthfulness, wit, scholarship, good-nature, and honesty that in a short time no party made for the dean's entertainment was considered complete without Sheridan. Sheridan was his confidant in the affair of *Drapier's Letters;* it was at Quilca,[2] Sheridan's country cottage in Cavan, that *Gulliver's Travels* was prepared for the press; and this favored friend was from an early period in their acquaintance one of his most confidential correspondents when at a distance. Through Swift's influence he obtained a living near Cork, but damaged his prospects of further preferment by a feat of unlucky absence of mind. Having to preach at Cork on the anniversary of Queen Anne's death he hurriedly chose a sermon with the text, "Sufficient unto the day is the evil thereof," and was at once struck off the list of chaplains to the lord-lieutenant and forbidden the castle. In spite of this mishap, for which the archdeacon of Cork made amends by the present of a lease worth £250 [$1215] per annum, he "still remained," according to Lord Orrery, "a punster, a quibbler, a fiddler, and a wit," the only person in whose genial presence Swift relaxed his habitual gloom. His latter days

[1] Published in Nichols's Supplement to the works of Swift, 1779.
[2] Spelt Quilca, it may be noted, in the second T. Sheridan's *Life of Swift*.

were not prosperous, probably owing to his having "a better knowledge of books than of men or of the value of money," and he died in poverty and ill-health in 1738. The biographers of Brinsley Sheridan are disposed to dwell chiefly on the eccentricities of his ancestors, but both his grandfather and his father gave ample proof of more solid qualities than improvidence and wit. The original source of information about the schoolmaster grandfather is the father's *Life of Swift* (pp. 369–395), where his scholarship is dwelt upon as much as his improvident conviviality and simple kindliness of nature.

2. Thomas Sheridan (1721–1788), son of the above, born at Quilea in 1721, had a more conspicuous career than his father. This ambitious father sent him to an English school, Westminster; but he was forced by stress of circumstances to return to Dublin and complete his education at Trinity College. Then he went on the stage and at once made a local reputation. There is a tradition that on his first appearance in London he was set up as a rival to Garrick, and Moore countenances the idea that Garrick remained jealous of him to the end. For this tradition there is little foundation. Sheridan's first appearance in London was at Covent Garden in March, 1744, when, heralded in advance as the brilliant Irish comedian, he acted for three weeks in a succession of leading parts, *Hamlet* being the first. He did not appear in London again till ten years afterwards, when he was the leading actor for a season at the same theatre. In the interval he had been manager of a theatre in Dublin, had married a highly accomplished and well-born lady (see next notice), and had been driven from Dublin as a result of taking the unpopular side in politics. After his season in London he tried Dublin again, but after two years more of unremunerative management he left for England finally in 1758. By this time he had conceived his scheme of British education, and it was to push this rather than his connection with the stage that he crossed St. George's Channel. He lectured at Oxford and Cambridge, and received honorary degrees from both universities in 1758 and 1759. But the scheme did not make way, and we find him in 1760 acting under Garrick at Drury Lane. His merits as an actor may be judged from the description of him in the *Rosciad* (i. 987) at this period. He is placed in the second rank, next to Garrick, but there is no hint of possible rivalry. Churchill describes him as an actor whose conceptions were superior to his powers of execution, whose action was always forcible but too mechanically calculated, and who in spite of all his defects rose to greatness in occasional scenes. Churchill never erred on the side of praising too much, and his description may be accepted as correct, supported as it is by the fact that the actor eked out his income by giving lessons in elocution. Boswell has some amusing remarks on his success with a distinguished Scotch pupil who used his influence to get a pension for him from Lord Bute. Sheridan, however, attracted attention chiefly by his enthusiastic advocacy, in public lectures and books, of his scheme of education, in which oratory was to play a principal part. It is generally said that he traced all the evils and perils of the Commonwealth to the neglect of oratory. But this is a caricature. There was more serious substance in his indictment of the established system of education. His main count was that it did not fit the higher classes for their duties in life, that it was uniform for all and profitablo for none; and he urged as a matter of vital national concern that special training should be given for the various professions. Oratory came in as part of the special training of men intended for public affairs, but his main contention was one very familiar now,—that more time should be given in schools to the study of the English language. He rode his hobby with great enthusiasm, published an elaborate and eloquent treatise on education, and lectured on the subject in London, Oxford, Cambridge, Edinburgh, and other towns. In 1769, after a residence of some years in France, partly for economy, partly for his wife's health, partly to study the system of education there, he published a matured *Plan of Education*, with a letter to the king, in which he offered to devote the rest of his life to the execution of his theories on condition of receiving a pension equivalent to the sacrifice of his professional income. His offer was not accepted; but Sheridan, still enthusiastic, retired to Bath, and prepared a pronouncing *Dictionary of the English Language*, with a prosodial grammar. After his son's brilliant success he assisted in the management of Drury Lane, and occasionally acted. His *Life of Swift*, a very entertaining book in spite of its incompleteness as a biography, was published in 1784. He died at Margate in 1788. The year before his death he had a prospect of realizing his scheme of education in Ireland, but the high official who had sought his advice died just as the old man eagerly reached Dublin, and his hopes were disappointed.

Thomas Sheridan.

3. Frances Sheridan (1724–1766), wife of the above and mother of the dramatist, wrote two novels of high repute in their day, *Sidney Biddulph* and *Nourjahad*, and two plays, *The Discovery* and *The Dupe*. We have it on the authority of Moore that, when *The Rivals* and *The Duenna* were running at Covent Garden, Garrick revived *The Discovery* at Drury Lane, as a counter-attraction, "to play the mother off against the son, taking on himself to act the principal part in it." But the statement, intrinsically absurd, is inaccurate. *The Discovery* was not an old play at the time, but one of Garrick's stock pieces, and Anthony Bromville was one of his favorite characters. It was first produced in 1763. So far from being jealous of the elder Sheridan, Garrick seems to have been a most useful friend to the family, accepting his wife's play—which he declared to be "one of the best comedies he ever read"—and giving the husband several engagements. Mrs. Sheridan's novels and plays were all written in the last six years of her life. She died at Blois in 1766. Her maiden name was Chamberlaine. Her father was a dignitary in the Irish Church, her grandfather an English baronet. Her marriage with the actor was the result of romantic circumstances, fully detailed in the *Memoirs of Mrs. Frances Sheridan*, mentioned below.

Mrs. Frances Sheridan.

4. Richard Brinsley Butler Sheridan (1751–1816), second son of Thomas and Frances Sheridan, was born in Dublin in September, 1751. Moore records for the encouragement of slow boys that the future dramatist was "by common consent of parent and preceptor pronounced an impenetrable dunce." The plain fact is that the expression occurs in a smart letter about him and his sister, written by his mother to a schoolmaster. Mrs. Sheridan wrote that she had been the only instructor of her children hitherto, and that they would exercise the schoolmaster in the quality of patience, "for two such impenetrable dunces she had never met with." One of the children thus humorously described was Richard Brinsley, and the age of the "impenetrable dunce" at the time was seven. At the age of eleven he was sent to Harrow. There, to please orthodox biographers, he gave no such sign of future eminence as is implied in taking a high place in school. Dr. Parr, who was one of his masters, "saw in him vestiges of a superior intellect," but, though he "did not fail to probe and tease him," by no harrassing or tormenting process could he incite the indolent boy to greater industry than was "just sufficient to save him from disgrace." But these facts about young Sheridan's determined indolence in the study of Latin and Greek should be taken in connection with his father's peculiar theories on the subject of English education. The father's theories possibly did not encourage the son to learn Latin and Greek. Why, with his views on the unprofitableness of those

Richard Brinsley Sheridan.

studies, he sent his younger son to Harrow, is not obvious; but it was probably as much for social as for educational reasons. If so, the purpose was answered, for Sheridan was extremely popular at school, winning somehow, Dr. Parr confesses, "the esteem and even admiration of all his schoolfellows," and giving a foretaste of his mysterious powers of getting things done for him by making the younger boys steal apples for his own private store and good-humoredly defying the masters to trace the theft home to him.

Sheridan left Harrow at the age of seventeen, having impressed his schoolfellows at least, who are sometimes better judges than their masters, with a vivid sense of his powers. It was probably his father's design to send him afterwards to Oxford, but the family circumstances were too straitened to permit of it, and the educationist, who had just then returned from France, and was about to launch his appeal to the king on behalf of his new plan of education, took his son home and himself directed and superintended his studies. What his plans were for his brilliant son's future we have no means of knowing, but the probability is that, if the projected academy had become an accomplished fact, he would have tried to make Richard Brinsley an upper master in some one of its numerous departments. There are traces of method in the superficially harum-scarum Irishman's courses, and it looks as if he had intended both of his sons to help him in the magnificent project from which his sanguine temperament expected such great things,—the elder, who had been with him in France, in what would now be called the modern side, and the classically educated younger in the ancient side. Meantime, pending His Majesty's resolution on the projector's offer, Brinsley, besides being trained by his father daily in elocution, and put through a course of English reading in accordance with the system, received the accomplishments of a young man of fashion, had fencing and riding lessons at Angelo's, and began to eat terms at the Middle Temple. His destination apparently was the bar, if fortune should deny him the more glorious career of lieutenant in the new academy through which young England was to be regenerated.

As to how young Sheridan, with a cooler head to regulate his hot Irish blood, looked at his father's grand schemes, we have no record. But it is of importance to remember those schemes, and the exact stage they had now reached, in connection with the accepted view of Sheridan's behavior at this time, which represents him as a mere idler, hanging on at home like an ordinary ne'er-do-well, too indolent to work for any profession, simply enjoying himself and trusting recklessly to chance for some means of livelihood. The fact would seem to be that over and above whatever he did in the way of qualifying himself for a regular career—which possibly was little enough—he began from this time with fundamentally steady purpose to follow the bent of his genius. After leaving Harrow he kept up a correspondence with a school friend who had gone to Oxford. With this youth, whose name was Halhed, he had not competed for school honors; but both had dreams of higher things; and now they concocted together various literary plans, and between them actually executed and published metrical translations of Aristænetus—an obscure Greek or pseudo-Greek author brought to light or invented at the Renaissance, a writer of imaginary amorous epistles. The two literary partners translated his prose into verse which has the qualities of lightness, neatness, and wit, and is in no respect unworthy of being the apprentice-work of Sheridan.

In conjunction with the same young friend he began a farce entitled *Jupiter*. It was not completed, but the fragment is of interest as containing the same device of a rehearsal which was afterwards worked out with such brilliant effect in *The Critic*. Some of the dialogue is very much in Sheridan's mature manner. It would seem, indeed, that at this time, idle as he appeared, Sheridan was deliberately exercising his powers and preparing himself for future triumphs. Moore's theory is that his seeming indolence was but a mask; and extracts given from papers written in the seven years between his leaving Harrow and the appearance of *The Rivals*—sketches of unfinished plays, poems, political letters and pamphlets—show that he was far from idle. He was never much of a reader; he preferred, as he said, to sit and think—a process more favorable to originality than always having a book in his hand; but we may well believe that he kept his eyes open, and his father's connection with fashionable society gave him abundant opportunities. The removal of the family to Bath in 1771[1] extended his field of observation. Anstey's *New Bath Guide* had just been published and had greatly stimulated interest in the comedy of life at this fashionable watering-place.

Presently, too, already a favorite in Bath society from his charming manners and his skill as a writer of graceful and witty verses, the youth played a part in the living comedy which at once made him a marked man. There was in Bath a celebrated musical family —"a nest of nightingales,"—the daughters of the composer Linley,[a] the head of his profession in the fashionable town. The eldest daughter, a girl of sixteen, the prima donna of her father's concerts, was exceeding beautiful, and very much run after by suitors, young and old, honorable and dishonorable. In the latter class was a Captain Mathews, a married man; in the former, young Sheridan. Mathews had artfully won the girl's affections, and persecuted her with his importunities, threatening to destroy himself if she refused him. To protect her from this scoundrel's designs the younger lover, who seems to have acted at first only as a confidential friend, conceived the romantic plan of escorting Miss Linley to a nunnery in France.[2] After performing this chivalrous duty he returned and fought two duels with Mathews, which made a considerable sensation at the time. The youthful pair had gone through the ceremony of marriage in the course of their flight, but Sheridan chivalrously did not claim his wife, but kept the marriage secret, and was sternly denied access to Miss Linley by her father, who did not consider the professionless young man an eligible suitor. Ultimately, after a courtship romantic enough to have satisfied Lydia Languish, they were openly married in April, 1773.

Sheridan's daring start in life after this happy marriage showed a confidence in his genius which was justified by its success. Although he had no income, and no capital beyond a few thousand pounds brought by his wife, he took a house in Orchard Street, Portman Square, furnished it "in the most costly style," and proceeded to return on something like an equal footing the hospitalities of the fashionable world. His wife—"the celebrated Miss Linley"—was a most popular singer, but he would not allow her to appear in public. She was to be heard only at private concerts in their own house, and her beauty and accomplishments combined with her husband's wit to draw crowds of fashionable people to their entertainments. Sheridan's conduct may have been youthful pride and recklessness, the thoughtless magnificence of a strong and confident nature; all the same, it answered the purpose of deep-laid and daring policy. When remonstrated with by a friend, and asked how he found the means of supporting such a costly establishment, he is said to have answered—"My dear friend, it is my means." And so it proved, for his social standing and popularity helped to get a favorable start for his first comedy, *The Rivals*, produced at Covent Garden on the 17th January, 1775.

[1] Miss Lefanu corrects Moore's date of 1770, considering the difference important as bearing on Sheridan's education (*Memoirs*, p. 348).

[2] The letter from Miss Linley to a female friend, giving a minute account of her persecution by Mathews and deliverance by Sheridan, is declared by Mrs. Norton to be a "foolish forgery."—*Macmillan's Magazine*, iii, 178.

[a] [Thos. (1725-95) of Wells, composed music for *Beggars' Opera* and *The Duenna*, also the Carnival of Venice, and many popular songs. His son, Thos., friend of young Mozart, died in 1778 at the age of 22. William (1766-1835) rose in the Indian service, wrote glees, and compiled *The Dramatic Songs of Shakespeare*.—AM. ED.]

The Rivals is said to have been not so favorably received on its first night, owing to its length and to the bad playing of the part of Sir Lucius O'Trigger. But the defects were remedied before the second performance, and the piece at once took that place on the stage which it has never lost. It was the last season but one of Garrick's long career, and the current story preserved by Moore is that the run upon Covent Garden was such as to alarm the veteran of Drury Lane and drive him to extraordinary exertions to counterbalance the attractions of the new play. This seems to be a myth, natural enough in the circumstances, but unfounded in fact, for we have contemporary testimony[1] that Drury Lane was never more crowded than during the last years of Garrick's management, when it was known that he intended to retire from the stage. There were crowded houses at both theatres. Sheridan, though bearing his brilliant success lightly, proceeded at once to take the tide at the flood. *St. Patrick's Day, or the Scheming Lieutenant*, a lively farce, written it is said at the request of Clinch, in gratitude for his coming to the rescue of Sir Lucius, was produced in May. In the course of the year, with the assistance of his musical father-in-law, he wrote the comic opera of *The Duenna;* and by the end of the year, with an eye to the profits of theatrical management, he was in negotiation with Garrick for the purchase of his share of Drury Lane. *The Duenna* was the great theatrical success of the winter of 1775–76 ; it ran even longer than *The Beggar's Opera* had done —up to that time the longest run on record. The bargain with Garrick was completed in June, 1776. The sum paid for the half-share was £35,000 [$170,-100] ; of this Sheridan contributed £10,000 [$48,600]. None of his letters show where the money came from, and much wonder has been expressed on the subject; but after all it is not so very mysterious that the most brilliant dramatist of his time, in all the credit of unparalleled success, should have been able to borrow such a sum as this with the best theatrical property to offer as security. There is a tradition that Garrick advanced the money or let it lie at interest ; anyhow, the loan could not have appeared at the time a very risky speculation. Two years afterwards Sheridan and his friends bought the other half of the property for £45,000 [$218,700].

From the first the direction of the theatre would seem to have been mainly in Sheridan's hands. It was opened under the new management in February, 1777, with a purified version of Vanbrugh's *Relapse.* under the title of *A Trip to Scarborough.* This is printed among Sheridan's works, but he has no more title to the authorship than Colley Cibber to that of *Richard III.* His chief task was to remove indecencies; he added very little to the dialogue. Astonishment has been expressed that he should have fallen back on an old play instead of writing a new one. The fact is quoted among the proofs of his indolence. But the new manager, apart from the engagements of a popular man of fashion, probably found work and worry in his novel task of organization sufficient to leave him little leisure for composition. Vanbrugh's play was probably chosen for the simple reason that it suited his company. Possibly also he wished to make trial of their powers before entrusting them with a play of his own. *The School for Scandal* was produced little more than two months afterwards. Mrs. Abington, who had played Miss Hoyden in the *Trip*, played Lady Teazle, who may be regarded as a Miss Hoyden developed by six months' experience of marriage and town life. The actors who played the brothers Surface had been tried in the *Trip* in opposite characters, Charles playing Townly, while Joseph played Tom Fashion. It looks as if shrewd managerial caution was responsible for the delay quite as much as indolence. The former may at least have been in Sheridan's mind the plausible excuse for the latter. There are tales of the haste with which the conclusion of *The School for Scandal* was written, of a stratagem by which the last act was got out of him by the anxious company, and of the fervent "Amen" written on the last page of the copy by the prompter, in response to the author's "Finished at last, thank God!" But, although the conception was thus hurriedly completed, we know from Sheridan's sister that the idea of a "scandalous college" had occurred to him five years before in connection with his own experiences at Bath. His difficulty was to find a story sufficiently dramatic in its incidents to form a subject for the machinations of the character-slayers. He seems to have tried more than one plot, and in the end to have desperately forced two separate conceptions together. The dialogue is so brilliant throughout, and the auction scene and the screen scene so effective, that nobody cares to examine the construction of the comedy except as a matter of critical duty. But a study of the construction brings to light the difficulties that must have worried the author in writing the play, and explains why he was so thankful to have it finished and done with at last. After all, he worried himself in vain, for *The School for Scandal*, though it has not the unity of *The Rivals*, nor the same wealth of broadly humorous incident, is universally regarded as Sheridan's masterpiece. He might have settled the doubts and worries of authorship with Puff's reflection "What is the use of a good plot except to bring in good things?" The vitality of a play depends mainly on its good things in the way of character, incident, and happy saying, and to a very limited extent on their relevance to any central plan.

The third and last of Sheridan's great comedies, *The Critic*, was produced in 1779, the *The School for Scandal* meantime continuing to draw larger houses than any other play every time it was put on the stage. *The Critic* is perhaps the highest proof of Sheridan's skill as a dramatist, for in it he has worked out, with perfect success for all time, a theme which, often as it has been attempted, no other dramatist has ever succeeded in redeeming from tedious circumstantiality and ephemeral personalities. The laughable infirmities of all classes connected with the stage,—authors, actors, patrons, and audience,—are touched off with the lightest of hands ; the fun is directed, not at individuals, but at absurdities that grow out of the circumstances of the stage as naturally and inevitably as weeds in a garden. It seems that he had accumulated notes, as his habit was, for another comedy to be called *Affectation.* But apparently he failed to hit upon any story that would enable him to present his various types of affectation in dramatic interaction. The similar difficulty in his satire against scandal, of finding sufficiently interesting materials for the scandalmongers, he had surmounted with a violent effort. This other difficulty he might have surmounted too, if he had had leisure to "sit and think" till the happy thought came. But his energies were now called off in a different direction. His only dramatic composition during the remaining thirty-six years of his life was *Pizarro*, produced in 1799—a tragedy in which he made liberal use of some of the arts ridiculed in the person of Mr. Puff. He is said also to have written more of *The Stranger* than he was willing to acknowledge.

He entered parliament for Stafford in 1780. It was not a sudden ambition to shine on a wider stage after having gained the highest honors of the theatre. Ever since leaving Harrow he had dabbled a little in politics, had sketched letters in the manner of Junius, and began an answer to Johnson's *Taxation no Tyranny.* But he had not made any public appearance as a politician until his acquaintance with Fox led to his appearing on a Westminster platform with the great leader of opposition. Apparently he owed his election for Stafford to more substantial persuasives than the

[1] See *Blackwood's Magazine*, vol. xx., p. 26.

charms of his eloquence. He paid the burgesses five guineas [$25.51] each for the honor of representing them. It was the custom of the time. His first speech in parliament, like the first speech of a great parliamentarian of this century, between whose career and Sheridan's there are many striking points of resemblance and contrast, was a failure. But he persevered, spoke little for a time and chiefly on financial questions, soon took a place among the best speakers in the House, and under the wing of Fox filled subordinate offices in the short-lived ministries of 1782 and 1783. He was under secretary for foreign affairs in the Rockingham ministry, and a secretary of the treasury in the Coalition ministry. This was rapid promotion for a man who owed everything to his own talents, and yet not an excessive recognition of the services of such a speaker as he is described as having proved himself at this exciting period. In debate he had the keenest of eyes for the weak places in an opponent's argument, and the happy art of putting them in an irresistibly ludicrous light without losing his good temper or his presence of mind. In those heated days of parliamentary strife he was almost the only man of mark that was never called out, and yet he had not his match in the weapon of ridicule.

The occasion that gave Sheridan a chance of rising above the reputation of an extremely effective and brilliant debater into the ranks of great parliamentary orators was the impeachment of Warren Hastings. His speeches in that proceeding were by the unanimous acknowledgment of his contemporaries among the greatest delivered in that generation of great orators. The first was in 1787, on Burke's proposal that Hastings should be impeached. Sheridan spoke for three hours, and the effect of his oratory was such that it was unanimously agreed to adjourn and postpone the final decision till the House should be in a calmer mood. Of this, and of his last great speech on the subject in 1794, only brief abstracts have been preserved; but with the second, the four day's speech in Westminster Hall, on the occasion so brilliantly described by Macaulay, posterity has been more fortunate. The reader should, however be cautioned against accepting the version given in a collection of Sheridan's speeches published by a friend after his death. This long passed current as a genuine specimen of Sheridan's eloquence at its best, in spite of Moore's protest that he had in his possession a copy of a shorthand writer's report, and that the two did not correspond. But Gurney's verbatim reports of the speeches on both sides at the trial were published at Sir G. Cornewall Lewis's instigation in 1859, and from them we are able to form an idea of Sheridan's power as an orator. There are passages here and there of gaudily figurative rhetoric, loose ornament, and declamatory hyperbole such as form the bulk of the incorrect version; but the strong common sense, close argumentative force, and masterly presentation of telling facts enable us to understand the impression produced by the speech at the time.[1]

Sheridan's long parliamentary career terminated in 1812. He could not help being to the last a conspicuous figure both in society and in parliament, but from the time of the break up of the Whig party on the secession of Burke he was more or less an "independent member," and his isolation was complete after the death of Fox. The Begum speech remained his highest oratorical achievement. By it he is fixed in the tradition of the House as one of its greatest names. But his opinions on other great questions were given with a force and eloquence worthy of his position. When Burke denounced the French Revolution, Sheridan joined with Fox in vindicating the principle of non-intervention. He maintained that the French people should be allowed to settle their constitution and manage their affairs in their own way. But when the republic was succeeded by the empire, and it became apparent that France under Napoleon would interfere with the affairs of its neighbors, he employed his eloquence in denouncing Napoleon and urging the prosecution of the war. One of his most celebrated speeches was delivered in support of strong measures against the mutineers at the Nore. When the Whigs came into power in 1806 Sheridan was appointed treasurer of the navy, but was denied the honor of admission to the cabinet. After Fox's death he succeeded his chief in the representation of Westminster, and aspired to succeed him as leader of the party, but this claim was not allowed, and thenceforward Sheridan fought for his own hand. When the prince became regent in 1811 Sheridan's private influence with him helped to exclude the Whigs from power. For his interference on this occasion between the regent and his constitutional advisers Sheridan was severely blamed. To judge fairly as to how far he was justified in his conduct as a matter of private ethics, we must take into account his previous relations with the leaders of his party, a point on which Moore, one of the disappointed placemen, is somewhat reticent. Throughout his parliamentary career Sheridan was one of the boon companions of the prince, and his champion in parliament in some dubious matters of payment of debts. But he always resented any imputation that he was the prince's confidential adviser or mouthpiece. A certain proud and sensitive independence was one of the most marked features in Sheridan's parliamentary career. After a coolness arose between him and his Whig allies he refused a place for his son from the Government, lest there should be any suspicion in the public mind that his support had been bought.

His last years were harrassed by debt and disappointment. At the general election of 1812 he stood for Westminster and was defeated, and turned in vain to his old constituency of Stafford. He could not raise money enough to win back their confidence. As a member of parliament he had been safe against arrest for debt, but now that this protection was lost his creditors closed in upon him, and from this time till his death in 1816 the life of Sheridan, broken in health and fortune, discredited in reputation, slighted by old associates, so enfeebled and low-spirited as to burst into tears at a compliment, yet at times vindicating his reputation as the wittiest of boon companions, is one of the most painful passages in the biography of great men. Doubtless, in any attempt to judge of Sheridan as he was apart from his works, we must make considerable deductions from the mass of floating anecdotes that have gathered round his name. It was not without reason that his granddaughter Mrs. Norton denounced the unfairness of judging of the real man from unauthenticated stories about his indolent procrastination, his recklessness in money matters, his drunken feats and sallies, his wild gambling, his ingenious but discreditable shifts in evading and duping creditors. The real Sheridan was not a pattern of decorous respectability, but we may fairly believe that he was very far from being as disreputable as the Sheridan of vulgar legend. Against the stories about his reckless management of his affairs we must set the broad facts that he had no source of income but Drury Lane theatre, that he bore from it for thirty years all the expenses of a fashionable life, and that the theatre was twice burnt to the ground during his proprietorship. Enough was lost in those fires to account ten times over for all his debts. His biographers always speak of his means of living as a mystery. Seeing that he started with borrowed capital, it is possible that the mystery is that he applied much more of his powers to plain matters of business than he affected or got credit for. The records of his wild bets in the betting book of Brook's Club date in the years after the loss of his first wife, to whom he was devotedly attached. The reminiscences of his

[1] For a comparison of the two versions of the speech, and an able exposition of the qualities of Sheridan's oratory see Mr. W. Fraser Rae's *Wilkes, Sheridan, and Fox*, 1874.

son's tutor, Mr. Smyth, show anxious and fidgetty family habits, curiously at variance with the accepted tradition of his imperturbable recklessness. Many of the tricks which are made to appear as the unscrupulous devices of a hunted and reckless debtor get a softer light upon them if we ascribe them to a whimsical, boyish, ungovernable love of fun, which is a well-attested feature of his character. But the real Sheridan, as he was in private life, is irrecoverably gone. Even Moore, writing so soon after his death, had to lament that he could "find out nothing about him." Moore seems to have made an imperfect use of the family papers, and it is on record that Lord Melbourne, who had undertaken to write Sheridan's life, always regretted having handed over his materials to the professional biographer. He died on the 7th of July, 1816, and was buried with great pomp in Westminster Abbey.

There is, unfortunately, no complete authoritative biography of Sheridan. Mrs. Norton, his granddaughter, questioned the accuracy of Moore's *Life* in many particulars, and announced her intention of writing a history of the Sheridans from the family papers, of which Moore had made very partial use. But she never carried out the project. The current statements about the father and grandfather of the dramatist are inaccurate and misleading in several important respects. The best account of them—making allowance for a slight bias of family pride—is to be found in the *Memoirs of Mrs. Frances Sheridan*, by her granddaughter, the dramatist's niece, Miss Lefanu. There is an excellent sketch of Sheridan's political career in Mr. W. Fraser Rae's *Wilkes, Sheridan, and Fox*, and Mrs. Oliphant's *Sheridan*, in the "English Men of Letters" series, interprets his character with the luminous breadth and sympathy always to be expected from her. (W. M.)

SHERÍF, or SHEREEF. See MECCA, vol. xv. p. 678–9.

SHERIFF. For the office of sheriff in England, see COUNTY. For his jurisdiction in the revision of voters, see REGISTRATION. The position of the sheriff as an executive officer in the United States is very similar to that of the English sheriff. He is usually appointed by popular election. The marshals of the United States and their deputies have in each State the same powers in executing the laws of the United States as the sheriffs and their deputies have in executing the laws of the State.

So far as is known the sheriff, notwithstanding the Saxon etymology of his name (shire grieve or reeve), did not exist in Scotland before the beginning of the Norman period. In the feudal system he became the centre of the local administration of justice, the representative of the crown in executive as well as judicial business, and was always a royal officer appointed by and directly responsible to the king. The earliest sheriffs on record belong to the reigns of Alexander I. and David I., and the office was common before the death of Alexander III. In many cases it had become hereditary, the most remarkable instance being that of Selkirk, where a De Sinton held it from 1265 to 1305. The ordinance of Edward I. in 1305 recognized most of the existing officers, but rejected the hereditary character of the office by a declaration that the sheriffs were to be appointed and removable at the discretion of the king's lieutenant and the chamberlain. The inveterate tendency of feudalism reasserted itself, however, notwithstanding various attempts to check it, and an Act of James II. shows that the office had again become hereditary.

One of the consequences was that sheriffs ignorant of law required deputes to discharge their judicial duties. In the course of succeeding reigns, down to that of James VI., the jurisdiction of the sheriffs came to be much limited by grants of baronies and regalities which gave the grantees the right to hold both civil and criminal courts of less or greater jurisdiction to the exclusion of the sheriff.

The civil jurisdiction of the sheriff was originally of very wide extent, and was deemed specially applicable to questions relating to the land within the shire, but after the institution of the court of session in 1532 it became restricted, and all causes relating to property in land, as well as those requiring the action called declarator for establishing ultimate right, and most of those requiring equitable remedies, were withdrawn from it. Nor did it possess any consistorial jurisdiction, as its subjects (marriage, legitimacy, and wills) belonged to the officials of the bishop after the Reformation, when it was transferred to the commissary courts, and at a later period to the court of session. Practically, therefore, the civil jurisdiction of the sheriff fell under the head of actions concluding for payment of money and actions to regulate the possession of land. The criminal jurisdiction of the sheriff was in like manner in its origin of almost universal extent. But this was first limited to cases where the offenders were caught in or shortly after the act, afterwards to cases in which the trial could be held within forty days, and subsequently further restricted as the business of the justiciary court became more organized. The punishment of death, having by long disuse come to be held beyond the power of the sheriff, and the statutory punishments of transportation or penal servitude never having been entrusted to him, his jurisdiction as regards crimes was usually said to be limited to those punishable arbitrarily, that is, by imprisonment, fine, or admonition.

As a consequence of the suppression of the Jacobite rising of 1745, after 1st March, 1748, all heritable sheriffships were extinguished, and no sheriffship was to be thereafter granted either heritably or for life, or for any certain term exceeding one year, but this provision was not taken advantage of, and the office of sheriff-principal practically ceased, though that name is sometimes given to the sheriff-depute, 20 Geo. II. c. 43. The Act declared that there should be but one sheriff-depute or stewart-depute in every shire or stewartry, who was to be an advocate of three years' standing, appointed by the crown, with such continuance as His Majesty should think fit for the next seven years, and after that period *ad vitam aut culpam*. This period was extended by 28 Geo. II. c. 7 for fifteen years, and thereafter (since 1769) the sheriff-depute has held his office *ad vitam aut culpam*. Power was given to him by 20 Geo. II. c. 43 to appoint one or more persons as substitutes during his pleasure, for whom he should be answerable. At first no legal qualification was necessary and no salary paid, but gradually the sheriff-depute delegated more legal business to the substitute, and before 1761 it had become customary for the sheriff-depute to give him some allowance. In 1787 he was placed on the civil establishment and paid by the crown; in 1825 a qualification of three years' standing (now five years by 40 and 41 Vict. c. 50) as an advocate or procurator before a sheriff court was required (6 Geo. IV. c. 23); in 1838 he was made removable by the sheriff-depute, only with the consent of the lord president and lord justice clerk, and it was made compulsory that he should reside in the sheriffdom, the provision of 20 Geo. II. c. 43, which required the sheriff-depute so to reside for four months of each year, being repealed (1 and 2 Vict. c. 119); and in 1877 the right of appointment of the substitutes was transferred from the sheriff-depute to the crown (40 and 41 Vict. c. 50).

While the sheriff-depute has still power to hear cases in the first instance, and is required to hold a certain number of sittings in each place where the sheriff-substitute holds courts, and also once a year a small-debt court in every place where a circuit small-debt court is appointed to be held, the ordinary course of civil procedure is that the sheriff-substitute acts as judge of first instance, with an appeal under certain restrictions from his decision to the sheriff-depute, and from him to the court of session in all causes exceeding £25 [$121.50] in value. An appeal direct from the sheriff-substitute to the court of session is competent, but is not often resorted to.

As regards criminal proceedings, summary trials are usually conducted by the sheriff-substitute; trials with a jury either by him or, in important cases, by the sheriff-depute. The sheriff-substitute also has charge of the preliminary investigation into crime, the evidence in which, called a precognition, is laid before him, and if necessary taken before him on oath at the instance of his procurator-fiscal, the local crown prosecutor.

The duties of the sheriff-depute are now divided into miuisterial or administrative and judicial. The ministerial are the supervision of the accounts of the inferior officers of the sheriffdom; the superintendence of parliamentary elections; the holding by himself or his substitutes of the courts for registratiou of electors; the preparation of the list of persous liable to serve both on criminal and civil juries; the appointment of sheriff officers and supervision of the execution of judicial writs by them; and the striking of the "fiars." He has also to attend the judges of judiciary at the circuit courts for the county or counties over which his jurisdiction extends. He is generally responsible for the peace of the county, and supervises the police establishment. He is *ex-officio* a justice of the peace and commissioner of supply. Iu addition to those general duties of sheriffs-depute, particular sheriffs are attached to the Board of Supervision for the Relief of the Poor, the Prison Board of Scotland, the Board of Northern Lighthouse Commissioners, and the Scottish Fishery Board.

The judicial duties of the sheriff-depute are, as regards crimes, the trial of all causes remitted by the counsel of the crown for the trial by sheriff and jury, as well as summary trials if he chooses to take them. This now means most crimes for which a maximum of two years' imprisonment (iu practice eighteen months is the longest sentence imposed) is deemed sufficient, and which are not by statute reserved for the justiciary court. His civil jurisdiction is regulated by several statutes too technical for detail, but may be said generally to extend to all suits which conclude for payment of money, whatever may be the cause of action, with the exceptiou of a few where the payment depends ou status, all actions with rcference to the possession of land or right in land, aud actions relative to the right of succession to movable property. Iu bankruptcy he has a cumulative aud alternative jurisdiction with the court of session, and in the service of heirs with the sheriff of chancery. Formerly the jurisdiction of the sheriff was absolutely excluded after the institution of the court of scssiou iu four important classes of action—(1) relative to property in lands or rights in lands; (2) requiring the use of peculiar forms of action, *e.g.*, declarator, reduction, and suspension; (3) involving the exercise of the *nobile officium*, a supreme equitable jurisdiction of the court of session; and (4) for the determination of rights of status, as well as in many cases in which the proceedings rest ou special statutes which gave an exclusive jurisdiction to the court of session. But large exceptions have been made by recent legislation from this exclusion. By another series of statutes, for the most part connected with local administration, as the Road, Burial Grounds, Lunacy, Public-houses, and General Police and Education Acts, the jurisdiction of the court of session is excluded either as an original court or a court of review, aud the sheriff court has exclusive jurisdiction.

The courts which the sheriff holds are (1) the criminal court; (2) the ordinary civil court; (3) the small-debt court for cases under £12 [$58.32] in value (6 Geo. IV. c. 48); (4) the debts recovery court for cases above £12 [$58.32] and under £50 [$243] in value (30 and 31 Vict. c. 96); and (5) the registration court. His judgmeut in the criminal court is subject to review by the court of justiciary, and in the ordinary civil court aud the debts recovery court by the court of session. In the small debt court it is final, except in certain cases where an appeal lies to the next circuit court of justiciary. The sheriff-substitute may competently exercise all the judicial jurisdiction of the sheriff, subject to appeal in civil cascs other than small-debt cases. As regards his administrative functions he assists the sheriff generally, and may act for him iu the registratiou and fiars court, and he superintends the preliminary stage of criminal inquiries consulting with the sheriff if neccssary; but the other administrative duties of the officc are conducted by the sheriff-depute in person. The salaries of the sheriffs-depute vary from £2000 [$9720] to £500 [$2430] a year, those of sheriffs-substitute from £1400 [$6804] to £500 [$2430].

There is a priucipal sheriff-clerk appointed by the crown for each county, who has depute clerks under him in the principal towns, and a procurator-fiscal for the conduct of crimiual prosecutions for each county and district of a county, who is appointed by the sheriff with the sanction of the home secretary.

Besides the sheriffs of counties, there is a sheriff of chancery appointed by the crown, whose duties are confined to the service of heirs, with a salary of £500 [$2430].

(Æ. M.)

SHERLOCK, Thomas (1678–1761), bishop of London, the son of Dr. William Sherlock, noticed below, was born at London in 1678. He was educated at Catherine Hall, Cambridge, and in 1704 succeeded his father as master of the Temple. He took a prominent part in the Bangorian controversy against Hoadly, whom he succeeded as bishop of Bangor in 1728; he was afterwards translated to Salisbury in 1734, and to London in 1738. He published against Collins's *Grounds and Reasons of the Christian Religion* a volume of sermons entitled *The Use and Intent of Prophecy in the Several Ages of the World* (1725); and in reply to Woolston's *Discourses on the Miracles* he wrote a volume entitled *The Trial of the Witnesses of the Resurrection of Jesus* (1729), which in a very short time ran through fourteen editions. His *Pastoral Letter* (1750) on "the late earthquakes" had a circulation of many thousands, and four volumes of *Sermons* which he published in his later years (1754–58) were also at one time highly esteemed. He died in 1761. A collected edition of his works in 5 vols. 8vo, by Hughes, appeared in 1830.

SHERLOCK, William (1641–1707), dean of St. Paul's, was born at Southwark in 1641, and was educated at Eton and Cambridge (Peterhouse). In 1669 he became rector of St. George, Botolph Lane, London, and in 1681 he was appointed a prebendary of St. Paul's. In 1684 he published *The Case of Resistance to the Supreme Powers stated and resolved according to the Doctrine of the Holy Scriptures*, an ably written treatise, in which he drew the distinction between active and passive obedience which was at that time generally accepted by the high church clergy; in the same year he was made master of the Temple. In 1686 he was reproved for preaching against popery and his pension stopped. After the Revolution he was suspended for refusing the oaths to William and Mary, but before his final deprivation he yielded, justifying his change of attitude in *The Case of the Allegiance due to Sovereign Powers stated and resolved according to Scripture and Reason and the Principles of the Church of England* (1691). During the period of his suspension he wrote a *Practical Discourse concerning Death*, which became very popular and has passed through many editions. In 1690 and 1693 he published volumes on the doctrine of the Trinity which involved him in a warm controversy with South and others. He became dean of St. Paul's in 1691, and died at Hampstead in 1707.

SHERMAN, a city of the United States, in Grayson county, Texas, 73 miles north of Dallas, is a substantially built and flourishing place, with a court-house and a college. Its population, only 1439 in 1870, was 6093 in 1880 and has since increased to about 8000. The surrounding country is a cotton and grain district.

SHERWIN, John Keyse (1751–1790), engraver and history-painter, was born in 1751 at East Dean in Sussex. His father was a wood-cutter employed in shaping bolts for shipbuilders, and the son followed the same occupation till his seventeenth year, when, having shown an aptitude for art by copying some miniatures with exceptional accuracy, he was befriended by Mr. William Mitford, upon whose estate the elder Sherwin worked, and was sent to study in London, first under John Astley, and then for three years under Bartolozzi—for whom he is believed to have executed a large portion of the plate of Clytie, after Annibal Caracci, published as the work of his master. He was entered as a student of the Royal Academy, and gained a silver medal, and in 1772 a gold medal for his painting of Coriolanus Taking Leave of his Family. From 1774 till 1780 he was an exhibitor of chalk drawing and of engravings in the Royal Academy. Establishing himself in St. James Street as a painter,

designer, and engraver, he speedily attained popularity and began to mix in fashionable society. His drawing of the Finding of Moses, a work of but slight artistic merit, which introduced portraits of the princess royal of England and other leading ladies of the aristocracy, hit the public taste, and, as reproduced by his burin, sold largely. In 1785 he succeeded Woollett as engraver to the king, and he also held the appointment of engraver to the prince of Wales. His professional income rose to about £12,000 [$58,320] a year; but he was constantly in pecuniary difficulties, for he was shiftless, indolent, and without method, open-handed and even prodigal in his benefactions,—and prodigal, too, in less reputable directions, for he became a reckless gambler, and habits of intemperance grew upon him. He died in extreme penury on the 24th of September, 1790,—according to Steevens, the editor of Shakespeare, at "The Hog in the Pound," an obscure alehouse in Swallow Street, or, as stated by his pupil J. T. Smith, in the house of Robert Wilkinson, a printseller in Cornhill.

It is as an engraver that Sherwin is most esteemed; and it may be noted that he was ambidexterous, working indifferently with either hand upon his plates. His drawing is correct, his line excellent, and his textures are varied and intelligent in expression. Such of his plates as the Holy Family after Nicholas Poussin, Christ Bearing the Cross after Murillo, the portrait of the Marquis of Buckingham after Gainsborough, and that of Pitt occupy a high place among the productions of the English school of line-engravers. He also worked after Pine, Dance, and Kauffman.

SHETLAND ISLANDS. See ORKNEY AND SHETLAND.

SHIELD. See ARMS AND ARMOR, and HERALDRY.

SHIELD, WILLIAM (1748–1829), composer of English operas, was born at Swalwell, near Newcastle, in 1748. His father began to teach him singing before he had completed his sixth year, but died three years later, leaving him in charge of guardians who made no provision whatever for continuing his musical education, for which he was thenceforward dependent entirely upon his own aptitude for learning, aided by a few lessons in thoroughbass which he received from Charles Avison. Notwithstanding the difficulties inseparable from this imperfect training, he obtained admission into the opera band in 1772, at first as a second violin, and afterwards as principal viola; and this engagement he retained for eighteen years. In the meantime he turned his serious attention to composition, and in 1778 produced his first comic opera, *The Flitch of Bacon*, at the Little Theatre in the Haymarket, with so great success, that he was immediately engaged as composer to Covent Garden theatre, for which he continued to produce English operas, and other dramatic pieces, in quick succession, until 1797, when he resigned his office, and devoted himself to composition of a different class, producing a great number of very beautiful glees, some instrumental chamber music, and other miscellaneous compositions. He died in London, January 25, 1829, and was buried in the south cloister at Westminster Abbey.

Shield's most successful dramatic compositions were *Rosina*, *The Mysteries of the Castle*, *The Lock and Key*, and *The Castle of Andalusia*. As a composer of songs he was in no degree inferior to his great contemporary Charles Dibdin. Indeed *The Arethusa*, *The Heaving of the Lead*, and *The Post Captain* are as little likely to be forgotten as Dibdin's *Tom Bowling* or *Saturday Night at Sea*. His vein of melody was inexhaustible, thoroughly English in character, and always conceived in the purest and most delicate taste; and hence it is that many of his airs are still sung at concerts, though the operas for which they were written have long been banished from the stage. His *Introduction to Harmony* (1794 and 1800) contains a great deal of valuable information; and he also published a useful treatise, *The Rudiments of Thoroughbass*.

SHIELDS, NORTH. See TYNEMOUTH, within which borough the port is included.

SHIELDS, SOUTH, a seaport, market-town, and municipal and parliamentary borough of Durham, is situated on the south bank of the Tyne, at its mouth, immediately opposite North Shields and Tynemouth, and on the North-Eastern Railway, 18 miles north-east of Newcastle-on-Tyne. It is connected with North Shields and Tynemouth by steam ferries. The town possesses a spacious market-place, and some of the newest streets are wide and handsome, but the old street running along the shore is narrow and mean. Formerly salt was largely manufactured, but the principal industries now are the manufacture of glass and chemicals, and shipbuilding and ship refitting and repairing, for which there are docks capable of receiving the largest vessels. The North-Eastern Railway Company posseses extensive docks, and the port has a large trade in coal; but, owing to the fact that in the shipping returns of the United Kingdom it is included under the general title "Tyne Ports," it is impossible to give an accurate statement regarding the number and tonnage of vessels. The number of fishing vessels connected with the port in 1884 was 15, of 204 tons and employing 98 men. At the mouth of the Tyne there is a pier about a mile in length. A townsman of South Shields, William Wouldhave, was the inventor of the lifeboat, and the first lifeboat was built there by Henry Greathead, and first used in a storm in 1789.[1] The principal public buildings are the church of St. Hilda, with a picturesque old tower; the town-hall in the market-place; the exchange; the custom-house; the mercantile marine offices; the public library and museum, which includes a large hall for public meetings and a school of science and art in connection with South Kensington; the high school, the grammar school, the marine school, the masters' mariners' asylum, the Ingham infirmary, and the union workhouse. There is a pleasant marine park near the pier. On elevated ground near the harbor are the remains of a Roman station, where numerous coins, portions of an altar, and several sculptured memorial stones have been dug up. The site of the old station was afterwards occupied by a fort of considerable strength, which was captured by the Scots under Colonel Stewart, 20th March, 1644. The town was founded by the convent of Durham about the middle of the 13th century, but on account of the complaints of the burgesses of Newcastle an order was made in the 43d year of Henry III., stipulating that no ships should be laden or unladen at Shields, and that no "shoars" or quays should be built there. This early check seems to have been long injurious to its prosperity, for until the present century it was little more than a fishing station. It received a charter of incorporation in 1850, and is divided into three wards, governed by a mayor, eight aldermen, and twenty-four councillors. In 1832 it received the privilege of returning a member to parliament. The corporation act as the urban sanitary authority, and the town has a specially good water supply from reservoirs at Cleadon. The population of the municipal and parliamentary borough (area 1839 acres) was 45,336 in 1871, and in 1881 it was 56,875.

SHI'ITES. See SUNNITES AND SHI'ITES.

SHIKÁRPUR, a British district in the province of Sind, Bombay presidency, India, with an area of 10,000 square miles, lying between 27° and 29° N. lat. and between 67° and 70° E. long. It is bounded on the N. by Khelat, Upper Sind Frontier district, and the river Indus;[2] on the E. by the native states of Bahawalpur and Jaisalmir; on the S. by Khairpur state; and on the W. by the Khirthar Mountains. Shikárpur is a vast alluvial plain, broken only at Sukkur and Rohri by limestone hills. The Kirthar range attains an elevation of 7000 feet, and forms a natural boundary between the district and Baluchistan. Ex-

[1] [Lionel Lukin is credited with the invention and construction of the first lifeboat; for details see vol. xiv. p. 575.—AM. ED.]

[2] [The Indus river traverses the district here described in a southwest direction.—AM. ED.]

tensive patches of salt land, known as *kalar*, are frequently met with, especially in the upper portion of Shikárpur, and towards the Jacobabad frontier barren tracts of clay land and ridges of sand-hills, covered with caper and thorn jungle, form a poor but distinctive feature in the landscape. The desert portion of Rohri subdivision, known as the Registhán, is very extensive. The forests (207 square miles) are situated on the banks of the Indus, mostly in the Rohri and Shikárpur subdivisions. The Indus Valley State Railway runs through the district, and the Kandahar railway also goes through a part of it.

In 1881 the population numbered 852,986 (males 461,033, females 391,953), of whom 93,341 were Hindus, 684,275 Mohammedans, and 736 Christians. The chief towns are Shikárpur, Sukkur (population 27,389), Larkhana (13,188), and Rohri (10,224). The cultivated land in 1882–83 amounted to 764,488 acres, of which 108,636 were twice cropped. Cereals—chiefly rice, joár (millet), and wheat—form the principal crops; but a considerable area is also under pulses and oil-seeds. The chief manufactures are carpets and coarse cotton cloths. The total revenue raised in 1882–83 amounted to £234,792 [$1,141,089.12], of which the land contributed £189,869 [$922,763.34]. Passing from the dominion of the caliphs, Shikárpur was overrun by Mahmud of Ghazni in 1025, and a little later was governed by the Sumras, the Sammas, and the Arghuns in succession. The Kalhora dynasty came into prominence in the 18th century, and was followed by the Tálpur mirs, who annexed a part of the Durani territory and incorporated it in the district. In 1843 Shikárpur passed to the British, and in 1852 the greater part of the Rohri subdivision was resumed from the mir of Khairpur, who had acquired it by fraud.

SHIKÁRPUR, the chief town of the above district, is situated 18 miles west of the Indus, in a tract of low-lying country annually flooded by the canals from that river. It is a great entrepôt for transit trade between the Bolan Pass and Karachi. The population in 1881 numbered 42,496 (males 22,889, females 19,607).

SHILOH, a town of Ephraim, where the sanctuary of the ark was, under the priesthood of the house of Eli. According to 1 Sam. iii. 3, 15, this sanctuary was not a tabernacle but a temple, with doors. But the priestly narrator of Josh. xviii. 1 has it that the tabernacle was set up there by Joshua after the conquest. In Judges xxi. 19 *sq.* the yearly feast at Shiloh appears as of merely local character. Shiloh seems to have been destroyed by the Philistines after the disastrous battle of Ebenezer; *cf.* Jeremiah vii. 12 *sq.* The position described in Judges, *loc. cit.* (*cf. Onomastica*, ed. Lagarde, p. 152), gives certainty to the identification with the modern Seilûn lying some 2 miles east-southeast of Lubbán (Lebonah), on the road from Bethel to Shechem. Here there is a ruined village, with a flat double-topped hill behind it, offering a strong position, which suggests that the place was a stronghold as well as a sanctuary. A smiling and fertile landscape surrounds the hill. The name Seilûn corresponds to Σιλοῦν in Josephus. LXX. has Σηλώ, Σηλώμ. The forms given in the Hebrew Bible (שילה, שילו) have dropped the final consonant, which reappears in the adjective שילוני. On Shiloh in Gen xlix. 10 see JUDAH.

SHIMOGA, or SHEEMOGA, a district in the northwest of the native state of Mysore, Southern India. It forms a part of the Nagar division, and is situated between 13° 30′ and 14° 38′ N. lat. and between 74° 44′ and 76° 5′ E. long. It has an area of 3797 square miles, and is bounded on the N. and W. by the Bombay districts of Dhárwár and N. Kánara, and E. and S. by the districts of Chitaldroog and Kadur. Its river system is twofold; in the east the Tungra, Bhadra, and Varada unite to form the Tungabhadra, which ultimately falls into the Kistna and so into the Bay of Bengal, while in the west a few minor streams flow to the Shirávati, which near the northwestern frontier bursts through the Western Ghâts by the celebrated Falls of Gersoppa, said to be the grandest cataract in India. Flowing over a rocky bed 250 yards wide, the river here throws itself in four distinct falls down a tremendous chasm 960 feet deep.

The western half of the district is very mountainous and covered with magnificent forest, and is known as the Malnád or hill country, some of the peaks being 4000 feet above sea-level. The general elevation of Shimoga is about 2000 feet; and towards the east it opens out into the Maidán or plain country, which forms part of the general plateau of Mysore. The Malnád region is very picturesque, its scenery abounding with every charm of tropical forests and mountain wilds; on the other hand the features of the Maidán country are for the most part comparatively tame. The mineral products of the district include iron-ore and laterite. On the summits of the Ghâts stones possessing magnetic qualities are occasionally found. The soil is loose and sandy in the valleys of the Malnád, and in the northeast the black cotton soil prevails. Bison are common in the *talúk* of Sagar, where also wild elephants are occasionally seen; while tigers, leopards, bears, wild hogs, *sámbhar* and *chitál* deer, and jungle sheep are numerous in the wooded tracts of the west. Shimoga presents much variety of climate. The southwest monsoon is felt in full force for about 25 miles from the Ghâts, bringing an annual rainfall of more than 150 inches, but the rainfall gradually diminishes to 31 inches at Shimoga station and to 25 inches or less at Chennagiri. There is no railroad in the district, but it contains 225 miles of roads.

The population in 1881 was 499,728 (males 259,296, females 240,432); Hindus numbered 470,678, Mohammedans 27,574, and Christians 1476. The only place with more than 10,000 inhabitants is Shimoga town, the capital and headquarters, which is situated on the Tunga river, with a population of 12,040. Rice is the staple food-crop of the district; the next in importance is sugar-cane; areca-nuts are also extensively grown; and miscellaneous crops include oil-seeds, vegetables, fruits, pepper, and cardamoms. Of the total area of 3797 square miles only 699 are returned as cultivated and 702 as cultivable. The chief manufactures are coarse cotton cloths, rough country blankets or *kamblis*, iron implements, brass and copper wares, pottery, and jaggery. The district is also noted for its beautiful sandal-wood carving.

During the Mohammedan usurpation of Mysore from 1761 to 1799, unceasing warfare kept the whole country in constant turmoil. After the restoration of the Hindu dynasty Shimoga district repeatedly became the scene of disturbances caused by the maladministration of the Deshasta Bráhmans, who had seized upon every office and made themselves thoroughly obnoxious. These disturbances culminated in the insurrection of 1830, which led to the direct assumption of the entire state by the British.

SHINTO. See JAPAN, vol. xiii. p. 590.

SHIP. The generic name (A. S. *scip*, Ger. *Schiff*, Gr. *σκάφος*, from the root *skap*, *cf.* "scoop") for the invention by which man has contrived to convey himself and his goods upon water points in its derivation to the fundamental conception by which, when realized, a means of flotation was obtained superior to the raft, which we may consider the earliest and most elementary form of vessel. The trunk of a tree hollowed out, whether by fire or by such primitive tools as are fashioned and used with singular patience and dexterity by savage races, represents the first effort to obtain flotation depending on something other than the mere buoyancy of the material. The poets, with characteristic insight, have fastened upon these points. Homer's hero Ulysses is instructed to make a raft with a raised platform upon it, and selects trees "withered of old, exceeding dry, that might float lightly for him" (*Od.*, v. 240). Virgil, glorifying the dawn and early progress of the arts, tells us, "Rivers then first the hollowed alders felt" (*Georg.*, i. 136, ii. 451). Alder is a heavy wood and not fit for rafts. But to make for the first time a dug-out canoe of alder, and so to secure its flotation, would be a triumph of primitive art, and thus the poet's expression represents a great step in the history of the invention of the ship.

Primitive efforts in this direction may be classified in the following order: (1) rafts—floating logs, or bundles of brushwood or reeds or rushes tied together; (2) dug-outs—hollowed trees; (3) canoes of bark, or of skin stretched on framework or inflated skins (balsas); (4) canoes or boats of pieces of wood stitched or

fastened together with sinews or thongs or fibres of vegetable growth; (5) vessels of planks, stitched or bolted together with inserted ribs and decks or half decks; (6) vessels of which the framework is first set up, and the planking of the hull nailed on to them subsequently. All these in their primitive forms have survived, in various parts of the world, with different modifications marking progress in civilization. Climatic influences and racial peculiarities have imparted to them their specific characteristics, and, combined with the available choice of materials, have determined the particular type in use in each locality. Thus on the northwest coast of Australia is found the single log of buoyant wood, not hollowed out but pointed at the ends. Rafts of reeds are also found on the Australian coast. In New Guinea catamarans of three or more logs lashed together with rattan are the commonest vessel, and similar forms appear on the Madras coast and throughout the Asiatic islands. On the coast of Peru rafts made of a very buoyant wood are in use, some of them as much as 70 feet long and 20 feet broad; these are navigated with a sail, and, by an ingenious system of centre boards, let down either fore or aft between the lines of the timbers, can be made to tack. The sea-going raft is often fitted with a platform so as to protect the goods and persons carried from the wash of the sea. Upright timbers fixed upon the logs forming the raft support a kind of deck, which in turn is itself fenced in and covered over.[1] Thus the idea of a deck, and that of side planking to raise the freight above the level of the water and to save it from getting wet, are among the earliest typical expedients which have found their development in the progress of the art of shipbuilding.

Whether the observation of shells floating on the water, or of split reeds, or, as some have fancied, the nautilus, first suggested the idea of hollowing out the trunk of a tree, the practice ascends to a very remote antiquity in the history of man. Dug-out canoes of a single tree have been found associated with objects of the Stone Age among the ancient Swiss lake dwellings; nor are specimens of the same class wanting from the bogs of Ireland and the estuaries of England and Scotland, some obtained from the depth of 25 feet below the surface of the soil. The hollowed trunk itself may have suggested the use of the bark as a means of flotation. But, whatever may have been the origin of the bark canoe, its construction is a step onwards in the art of shipbuilding. For the lightness and pliability of the material necessitated the invention of some internal framework, so as to keep the sides apart, and to give the stiffness required both for purposes of propulsion and the carrying of its freight. Similarly, in countries where suitable timber was not to be found, the use of skins or other water-tight material, such as felt or canvas, covered with pitch, giving flotation, demanded also a framework to keep them distended and to bear the weight they had to carry. In the frame-work we have the rudimentary ship, with longitudinal bottom timbers, and ribs, and cross-pieces, imparting the requisite stiffness to the covering material. Bark canoes are found in Australia, but the American continent is their true home. In northern regions skin or woven material made water-tight supplies the place of bark.

The next step in the construction of vessels was the building up of canoes or boats by fastening pieces of wood together in a suitable form. Some of these canoes, and probably the earliest in type, are tied or stitched together with thongs or cords. The Madras surf boats are perhaps the most familiar example of this type, which, however, is found in the Straits of Magellan and in Central Africa (on the Victoria Nyanza), in the Malay Archipelago and in many islands of the Pacific. Some of these canoes show a great advance in the art of construction, being built up of pieces fitted together with ridges on their inner sides, through which the fastenings are passed.[2] These canoes have the advantage of elasticity, which gives them ease in a seaway, and a comparative immunity where ordinary boats would not hold together. In these cases the body of the canoe is constructed first and built to the shape intended, the ribs being inserted afterwards, and attached to the sides, and having for their main function the uniting of the deck and cross-pieces with the body of the canoe. Vessels thus stitched together, and with an inserted framework, have from a very early time been constructed in the Eastern seas far exceeding in size anything that would be called a canoe, and in some cases attaining to 200 tons burden.

From the stitched form the next step onwards is to fasten the materials out of which the hull is built up by pegs or treenails; and of this system early types appear among the Polynesian islands and in the Nile boats described by Herodotus (ii. 96), the prototype of the modern "nuggur." The raft of Ulysses described by Homer presents the same detail of construction. It is remarkable that some of the early types of boats belonging to the North Sea present an intermediate method, in which the planks are fastened together with pins or treenails, but are attached to the ribs by cords passing through holes in the ribs and corresponding holes bored through ledges cut on the inner side of each plank.

We thus arrive, in tracing primitive efforts in the art of ship construction, at a stage from which the transition to the practice of setting up the framework of ribs fastened to a timber keel laid lengthwise, and subsequently attaching the planking of the hull, was comparatively simple. The keel of the modern vessel may be said to have its prototype in the single log which was the parent of the dug-out. The side planking of the vessel, which has an earlier parentage than the ribs, may be traced to the attempt to fence in the platforms upon the sea-going rafts, and to the planks fastened on to the sides of dug-out canoes so as to give them a raised gunwale.[3] The ribs of the modern vessel are the development of the framework originally inserted after the completion of the hull of the canoe or built-up boat, but with the difference that they are now prior in the order of fabrication. In a word, the skeleton of the hull is now first built up, and the skin, etc., adjusted to it; whereas in the earlier types of wooden vessels the outside hull was first constructed, and the ribs, etc., added afterwards. It is noticeable that the invention of the outrigger and weather platform, the use of which is at the present time distributed from the Andaman Islands eastward throughout the whole of the South Pacific, has never made its way into the Western seas. It is strange that Egyptian enterprise, which seems at a very early period to have penetrated eastward down the Red Sea and round the coasts of Arabia towards India, should not have brought it to the Nile, and that the Phœnicians, who, if the legend of their migration from the shores of the Persian Gulf to the coast of Canaan be accepted, would in all probability, in their maritime expeditions, have had opportunities of seeing it, did not introduce it to the Mediterranean. That they did not do so, if they saw it at all, would tend to prove that even in that remote antiquity both nations possessed the art of constructing vessels of a type superior to the outrigger canoes, both in speed and in carrying power.

The earliest representations that we have as yet of Egyptian vessels carry us back, according to the best authorities, to a period little short of 3000 years before Christ. Some of these are of considerable size, as is shown by the number of rowers, and by the cargo consisting in many cases of cattle. The earliest of all presents us with the peculiar mast of two pieces, stepped

[1] The raft of Ulysses described in Homer (*Od.*, v.) must have been of this class.

[2] See Capt. Cook's account of the Friendly Islands, La Pérouse on Easter Island, and Williams on the Fiji Islands.

[3] Compare the planks upon the Egyptian war galleys, added so as to protect the rowers from the missiles of the enemy.

apart but joined at the top. In some the masts are shown lowered and laid along a high spar-deck. The larger vessels show on one side as many as twenty-one or twenty-two and in one case twenty-six oars, besides four or five steering. They show considerable camber, the two ends rising in a curved line which in some instances ends in a point, and in others is curved back and over at the stern and terminates in an ornamentation, very frequently of the familiar lotus pattern. At the bow the stem is sometimes seen to rise perpendicularly, forming a kind of forecastle, sometimes to curve backward and then forward again like a neck, which is often finished into a figure-head representing some bird or beast or Egyptian god. On the war galleys there is frequently shown a projecting bow with a metal head attached, but well above the water. This, though no doubt used as a ram, is not identical with the beak *à fleur d'eau*, which we shall meet with in Phœnician and Greek galleys. It is more on a level with the proembolion of the latter.

The impression as regards the build created by the drawings of the larger galleys is that of a long and somewhat wall-sided vessel with the stem and stern highly raised. The tendencies of the vessel to "hog," or rise amidships, owing to the great weight fore and aft unsupported by the water, is corrected by a strong truss passing from stem to stern over crutches. The double mast of the earlier period seems in time to have given place to the single mast furnished with bars or rollers at the upper part, for the purpose apparently of raising or lowering the yard according to the amount of sail required. The sail in some of the galleys is shown with a bottom as well as a top yard. In the war galleys during action it is shown rolled up like a curtain with loops to the upper yard. The steering was effected by paddles, sometimes four or five in number, but generally one or two fastened either at the end of the stern or at the side, and above attached to an upright post in such a way as to allow the paddle to be worked by a tiller.

There are many remarkable details to be observed in the Egyptian vessels figured in Duemichen's *Fleet of an Egyptian Queen*, and in Lepsius's *Denkmäler*. The Egyptian ship, as represented from time to time in the period between 3000 and 1000 B.C., presents to us a ship proper as distinct from a large canoe or boat. It is the earliest ship of which we have cognizance. But there is a noticeable fact in connection with Egypt which we gather from the tomb paintings to which we owe our knowledge of the Egyptian ship. It is evident from these records that there were at that same early period, inhabiting the littoral of the Mediterranean, nations who were possessed of sea-going vessels which visited the coasts of Egypt for plunder as well as for commerce, and that sea-fights were even then not uncommon. Occasionally the combination of these peoples for the purpose of attack assumed serious proportions, and we find the Pharaohs recording naval victories over combined Dardanians, Teucrians, and Mysians, and, if we accept the explanations of Egyptologists, over Pelasgians, Daunians, Oscans, and Sicilians. The Greeks, as they became familiar with the sea, followed in the same track. The legend of Helen in Egypt, as well as the numerous references in the *Odyssey*, point not only to the attraction that Egypt had for the maritime peoples, but also to long-established habits of navigation and the possession of an art of shipbuilding equal to the construction of sea-going craft capable of carrying a large number of men and a considerable cargo besides.

But the development of the ship and of the art of navigation clearly belongs to the Phœnicians. It is tantalizing to find that the earliest and almost the only evidence that we have of this development is to be gathered from Assyrian representations. The Assyrians were an inland people, and the navigation with which they were familiar was that of the two great rivers, Tigris and Euphrates. After the conquest of Phœnicia they had knowledge of Phœnician naval enterprise, and accordingly we find the war galley of the Phœnicians represented on the walls of the palaces unearthed by Layard and his followers in Assyrian discovery. But the date does not carry us to an earlier period than 900–800 B.C. The vessel represented is a bireme war galley which is "aphract," that is to say, has the upper tier of rowers unprotected and exposed to view. The apertures for the lower oars are of the same character as those which appear in Egyptian ships of a much earlier date, but without oars. The artist has shown the characteristic details, though somewhat conventionally. The fish-like snout of the beak, the line of the parodus or outside gangway, the wickerwork cancelli,[1] the shields ranged in order along the side of the bulwark, and the heads of a typical crew on deck (the *πρωρεύς* looking out in front in the forecastle, an *ἐπιβάτης*, two chiefs by the mast, and, aft, the *κελευστής* and *κυβερνητής*). The supporting timbers of the deck are just indicated. The mast and yard and fore and back stay, with the double steering paddle, complete the picture.

But, although there can be little doubt that the Phœnicians, after the Egyptians, led the way in the development of the shipwright's art, yet the information that we can gather concerning them is so meagre that we must go to other sources for the description of the ancient ship. The Phœnicians at an early date constructed merchant vessels capable of carrying large cargoes, and of traversing the length and breadth of the Mediterranean, perhaps even of trading to the far Cassiterides and of circumnavigating Africa. They in all probability (if not the Egyptians) invented the bireme and trireme, solving the problem by which increased oarpower and consequently speed could be obtained without any great increase in the length of the vessel.

It is, however, to the Greeks that we must turn for any detailed account of these inventions. The Homeric vessels were aphract and not even decked throughout their entire length. They carried crews averaging from fifty to a hundred and twenty men, who, we are expressly told by Thucydides, all took part in the labor of rowing, except perhaps the chiefs. The galleys do not appear to have been armed as yet with the beak, though later poets attribute this feature to the Homeric vessel. But they had great poles used in fighting, and the term employed to describe these (*ναύμαχα*) implies a knowledge of naval warfare. The general characteristics are indicated by the epithets in use throughout the *Iliad* and the *Odyssey*. The Homeric ship is sharp (*θοή*) and swift (*ὠκεῖα*); it is hollow (*κοιλή*, *γλαφυρή*, *μεγακήτης*), black, vermillion-cheeked (*μιλτοπάρῃος*), dark-prowed (*κυανόπρῳρος*), curved (*κορωνίς*, *ἀμφιέλισσα*), well-timbered (*ἐὔσσελμος*), with many thwarts (*πολύζυγος*, *ἑκατόζυγος*). The stems and sterns are high, upraised, and resemble the horns of oxen (*ὀρθοκραίραι*). They present a type parallel in the history of the shipping of the Mediterranean with that of the vikings' vessels of the North Sea.

On the vases, the earliest of which may date between 700 and 600 B.C., we find the bireme with the bows finished off into a beak shaped as the head of some sea monster, and an elevated forecastle with a bulwark evidently as a means of defence. The craft portrayed in some instances are evidently pirate vessels, and exhibit a striking contrast to the trader, the broad ship of burden (*φορτίς εἰρεία*), which they are overhauling. The trireme, which was developed from the bireme and became the Greek ship of war (the long ship, *ναῦς μακρά*, *navis longa*, *par excellence*), dates, so far as Greek use is concerned, from about 700 B.C. according to Thucydides, having been first built at Corinth by Aminocles. The earliest sea-fight that the same author knew of he places at a somewhat later date,—664 B.C., more than ten centuries later than some of those portrayed in the Egyptian tomb paintings.

[1] See Rawlinson, *Ancient Monarchies*, vol. ii. p. 176.

The trireme was the war ship of Athens during her prime, and, though succeeded and in a measure superseded by the larger rates,—quadrireme, quinquereme, and so on, up to vessels of sixteen banks of oars (*inhabilis prope magnitudinis*),—yet, as containing in itself the principle of which the larger rates merely exhibited an expansion, a difference in degree and not in kind, has, ever since the of revival letters, concentrated upon itself the attention of the learned who were interested in such matters. The literature connected with the question of ancient ships, if collected, would fill a small library, and the greater part of it turns upon the construction of the trireme and the disposition of the rowers therein.

During the present century much light has been thrown upon the disputed points by the discovery (1834) at the Piræus of some records of the Athenian dockyard superintendents, which have been published and admirably elucidated by Boeckh. Further researches carried out by his pupil Dr. Graser, who united a practical knowledge of ships and shipbuilding with all the scholarship and industry and acumen necessary for such a task, have cleared up most of the difficulties which beset the problem, and enable us to describe with tolerable certainty the details of construction and the disposition of the rowers in the ancient ship of war.

One point it is necessary to insist on at the outset, because upon it depends the right understanding of the problem to be solved. The ancients did not employ more than one man to an oar. The method employed in mediæval galleys is entirely alien to the ancient system. M. Jal, Admiral Fincati, Admiral Jurien de la Gravière, and a host of other authorities have all been led to erroneous views by neglect of the ancient texts, which overwhelmingly establish this as an axiom of the ancient marine—"one oar one man."

The distinction between "aphract" and "cataphract" vessels must not be overlooked in a description of the ancient vessels. The words, meaning "unfenced" and "fenced," refer to the bulwarks which covered the upper tier of rowers from attack. In the aphract vessels these side plankings were absent and the upper tier of rowers was exposed to view from the side. Both classes of vessels had upper and lower decks, but the aphract class carried their decks on a lower level than the cataphract. The system of side planking with a view to the protection of the rowers dates from a very early period, as may be seen in some of the Egyptian representations, but among the Greeks it does not seem to have been adopted till long after the Homeric period. The Thasians are credited with the introduction of the improvement.

In describing the trireme it will be convenient to deal first with the disposition of the rowers and subsequently with the construction of the vessel itself. The object of arranging the oars in banks was to economize horizontal space and to obtain an increase in the number of oars without having to lengthen the vessel. We know from Vitruvius that the "interscalmium," or space horizontally measured from oar to oar, was 2 cubits. This is exactly borne out by the proportion of an Attic aphract trireme, as shown on a fragment of a bas-relief found in the Acropolis. The rowers in all classes of banked vessels sat in the same vertical plane, the seats ascending in a line obliquely towards the stern of the vessel. Thus in the trireme the thranite, or oarsman of the highest bank, was nearest the stern of the set of three to which he belonged. Next behind him and somewhat below him sat his zygite, or oarsman of the second bank; and next below and behind the zygite sat the thalamite, or oarsman of the lowest bank. The vertical distance between these seats was 2 feet, the horizontal distance about 1 foot. The horizontal distance, it is well to repeat, between each seat in the same bank was 3 feet (the seat itself about 9 inches broad). Each man had a resting place for his feet, somewhat wide apart, fixed to the bench of the man on the row next below and in front of him. In rowing, the upper hand, as is shown in most of the representations which remain, was held with the palm turned inwards towards the body. This is accounted for by the angle at which the oar was worked. The lowest rank used the shortest oars, and the difference of the length of the oars on board was caused by the curvature of the ship's side. Thus, looked at from within, the rowers amidship seemed to be using the longest oars, but outside the vessel, as we are expressly told, all the oar-blades of the same bank took the water in the same longitudinal line. The lowest or thalamite oar-ports were 3 feet, the zygite 4½ feet, the thranite 5½ feet above the water. Each oar-port was protected by an *ascoma* or leather bag, which fitted over the oar, closing the aperture against the wash of the sea without impeding the action of the oar. The oar was tied by a thong, against which it was probably rowed, which itself was attached to a thowl (*σκαλμός*). The port-hole was probably oval in shape (the Egyptian and Assyrian pictures show an oblong). We know that it was large enough for a man's head to be thrust through it.

The benches on which the rowers sat ran from the vessel's side to timbers which, inclined at an angle of about 64° towards the ship's stern, reached from the lower to the upper deck. These timbers were, according to Graser, called the diaphragmata. In the trireme each diaphragma supported three, in the quinquereme five, in the octireme eight, and in the famous tesseraconteres forty seats of rowers, who all belonged to the same "complexus," though each to a different bank. In effect, when once the principle of construction had been established in the trireme, the increase to larger rates was effected, so far as the motive power was concerned, by lengthening the diaphragmata upwards, while the increase in the length of the vessel gave a greater number of rowers to each bank. The upper tiers of oarsmen exceeded in number those below, as the contraction of the sides of the vessel left less available space towards the bows.

Of the length of the oars in the trireme we have an indication in the fact that the length of supernumerary oars (*περίνεω*) rowed from the gangway above the thranites, and therefore probably slightly exceeding the thranitic oars in length, is given in the Attic tables as 14 feet 3 inches. The thranites were probably about 14 feet. The zygite, in proportion to the measurement must have been 10½, the thalamite 7½ feet long. Comparing modern oars with these, we find that the longest oars used in the British navy are 18 feet. The university race is rowed with oars 12 feet 9 inches. The proportion of the loom inboard was about one-third, but the oars of the rowers amidships must have been somewhat longer inboard. The size of the loom inboard preserved the necessary equilibrium. The long oars of the larger rates were weighted inboard with lead. Thus the topmost oars of the tesseraconteres, of which the length was 53 feet, were exactly balanced at the rowlock.

Let us now consider the construction of the vessel itself. In the cataphract class the lower deck was 1 foot above the water line. Below this deck was the hold, which contained a certain amount of ballast, and through an aperture in this deck the buckets for baling were worked, entailing a labor which was constant and severe on board an ancient ship at sea. The keel (*τρόπις*) appears to have had considerable camber. Under it was a strong false keel (*χέλυσμα*), very necessary for vessels that were constantly drawn up on the shore. Above the keel was the kelson (*δρύοχον*), under which the ribs were fastened. These were so arranged as to give the necessary intervals for the oar-ports above. Above the kelson lay the upper false keel, into which the mast was stepped. The stem (*στεῖρα*) rose from the keel at an angle of about 70° to the water. Within was an apron (*φάλκις*), which was a strong piece of timber curved and fitting to the end of the keel and beginning of the stern-post and firmly bolted into both, thus giving solidity to the bows, which had to bear the beak and sustain the shock of ramming. The stem was carried upwards and curved generally backwards towards the forecastle and rising above it, and then curving forwards again terminated in an ornament which was called the acrostolion. The stern post was carried up at a similar angle to the bow, and, rising high over the poop, was curved round into an ornament which was called "aplustre" (*ἄφλαστον*). But, inasmuch as the steering was effected by means of two rudders (*πηδάλια*), one on either side, there was no need to carry out the stern into a rudder post as with modern ships, and the stern was left therefore much more free, an advantage in respect of the manœuvring of the ancient Greek man-of-war, the weapon being the beak or rostrum, and the power of turning quickly being of the highest importance.

Behind the "aplustre," and curving backwards, was the "cheniscus" (*χηνισκός*), or goose head, symbolizing the floating powers of the vessel.[1] After the ribs had been set up and covered in on both sides with planking, the sides of the vessel were further strengthened by waling-pieces carried from stern to stem and meeting in front of the stern-post. These were further strengthened with additional balks of timber, the lower waling-pieces meeting about the water-level and prolonged into a sharp three-toothed spur, of which

[1] [The "cheniscus" sometimes terminated the stern, but usually the stern-post. The rostrum or beak with its subsidiary parts, was attached to the prow as a weapon of offence. Hence, in this paragraph stern should be read instead of stern-post.—Am. Ed.]

the middle tooth was the longest. This was covered with hard metal (generally bronze) and formed the beak. The whole structure of the beak projected about 10 feet beyond the stern-post. Above it, but projecting much less beyond the stern-post, was the "proembolion" (προεμβόλιον), or second beak, in which the prolongatiou of the upper set of waling-pieces met. This was generally fashioned into the figure of a ram's head, also covered with metal; and sometimes again between this and the beak the second line of waling-pieces met in another metal boss called the προεμβολίς. These bosses, when a vessel was rammed, completed the work of destruction begnn by the sharp beak at the water level, giving a raking blow which caused it to heel over and so eased it off the beak, and releasiug the latter before the weight of the sinking vessel could come upon it. At the point where the prolongation of the second and third waliug-pieces began to converge inwards towards the stem on either side of the vessel stont catheads (ἐπωτίδες) projected, which were of use, not only as supports for the anchors, but also as a means of inflicting damage on the upper part of an enemy's vessel, while protecting the side gangways of its own and the banks of oars that worked under them. The catheads were strengthened by strong balks of timber, which were firmly bolted to them under either extremity and both withiu aud without, and rau to the ship's side. Above the curvature of the upper waling pieces into the προεμβόλιον were the cheeks of the vessel, generally painted red, and in the upper part of these the eyes (ὀφθαλμοί), auswering to our hawse holes, through which ran the cables for the anchors. On either side the trireme, at about the level of the thranitic benches, projected a gangway (πάροδος) snpported by brackets (βίαχα) springing from the upper waling-piece, and resting against the ribs of the vessel. This projection was of about 18 to 24 inches, which gave a space, increased to about 3 feet by the iuward curve of the prolongation of the ribs to form supports for the deck, for a passage on either side of the vessel. This gangway was planked in along its outer side so as to afford protection to the seamen and marines, who conld pass along its whole length without impeding the rowers. Here, in action, the sailors were posted as light-armed troops, and wheu needed could use the long supernumerary oars (περίνεῳ) mentioned above. The ribs, prolonged upwards upon an inward curve, supported on their upper ends the cross beams (στρωτῆρες) which tied the two sides of the vessel together and carried the deck. Iu the cataphract class these took the place of the thwarts (ζύγα), which in the earlier vessels, at a lower level, yoked together the sides of the vessel, and formed also benches for the rowers to sit on, from which the latter had their name (ζυγῖται), having been the uppermost tier of oarsmen in the bireme; while those who sat behind aud below them in the hold of the vessel were called θαλαμῖται or θαλάμακες (from θάλαμος). In the trireme the additional upper tier was named from the elevated bench (θρᾶνος) on which they were placed (θρανῖται). On the deck were stationed the marines (ἐπιβάται), fighting men in heavy armor, few in number in the Attic trireme iu its palmy days, but many in the Roman quinquereme, when the ramming tactics were antiquated, and wherever, as in the great battles in the harbor at Syracuse, land tactics took the place of the maritime skill which gave victory to the ram in the open sea. The space occnpied by the rowers was termed ἔγκωπον. Beyond this, fore and aft, were the παρεξειρέσιαι, or parts outside the rowers. These occupied 11 feet of the bows and 14 feet in the steru. In the fore part was the forecastle, with its raised deck, on which was stationed the πρωρεύς with his men. In the stern the decks (ἴκρια) rose in two or three gradations, upon which was a kind of deck-house for the captaiu and a seat for the steerer (κυβερνήτης), who steered by means of ropes attached to the tillers fixed in the upper part of the paddles, which in later times, at least, ran over wheels (τροχιλίαι), giving him the power of changing his vessel's course with great rapidity. Behind the deck-honse rose the flagstaff, on which was hoisted the pennant, and from which probably signals were given in the case of an admiral's ship. On either side of the deck ran a balustrade (*cancelli*), which was covered for protection duriug action with felt (*cilicium*, παραρρύματα τριχινά) or canvas (π. λευκά). Above was stretched a strong awning of hide (κατάβλημα), as a protection against grappling irons and missiles of all kinds. In Romau vessels towers were carried up fore and aft from which darts could be showered ou the enemy's deck; the heavy corvus or boarding bridge swung suspeuded by a chain near the bows; and the ponderous δέλφις huug at the ends of the yards ready to fall on a vessel that came near enongh alongside. But these were later iuventions and for larger ships. The Attic trireme was built light for speed and for ramming purposes. Her dimensions, so far as we can gather them from the scattered notices of antiquity, were probably approximately as follows: length of rowing space (ἔγκωπον) 93 feet; bows 11 feet; stern 14 feet; total 118 feet; add 10 feet for the beak. The breadth at the water-line is calculated at 14 feet, and above at the broadest part 18 feet, exclusive of the gangways; the space between the diaphragmata mentioned above was 7 feet. The deck was 11 feet above the water-line and the draught about 8 to 9 feet. All the Attic triremes appear to have been built upon the same model, and their gear was interchangeable. The Athenians had a peculiar system of girding the ships with long cables (ὑποζώματα), each trireme having two or more, which, passing through eyeholes in front of the stern-post, ran all round the vessel lengthwise immediately under the waling-pieces. They were fastened at the steru aud tightened up with levers. These cables, by shrinking as soon as they were wet, tightened the whole fabric of the vessel, and in action, in all probability, relieved the hull from part of the shock of ramming, the strain of which would be sustained by the waling-pieces convergent iu the beaks. These rope-girdles are not to be confused with the process of undergirding or frapping, such as is uarrated of the vessel in which St. Paul was being carried to Italy. The trireme appears to have had three masts. The mainmast carried square sails, probably two in number. The foremast and the mizzen carried lateen sails. In action the Greeks did not use sails, and everything that could be lowered was stowed below. The mainmasts and larger sails were often left ashore if a conflict was expected.

The crew of the Attic trireme consisted of from 200 to 225 men in all. Of these 174 were rowers,—54 on the lower bank (thalamites), 58 ou the middle bank (zygites), and 62 on the upper bank (thranites),—the upper oars being more numerous because of the contraction of the space available for the lower tiers near the bow and stern. Besides the rowers were about 10 mariues (ἐπιβάται) and 20 seamen. The officers were the trierarch and next to him the helmsman (κυβερνήτης), who was the navigating officer of the trireme. Each tier of rowers had its captain (στοιχαρχός). There were also the captain of the forecastle (πρωρεύς), the "keleustes" who gave the time to the rowers, and the ship's piper (τριηραυλής). The rowers descended into the seven-foot space between the diaphragmata and took their places in regular order, beginning with the thalamites. The economy of space was such that, as Cicero remarks, there was not room for one mau more.

The improvement made in the build of their vessels by the Corinthian and Syracusan shipwrights, by which the bows were so much strengthened that they were able to meet the Athenian attack stem on (προσβολή), caused a change of tactics, and gave au impetus to the building of larger vessels—quadriremes and quinqueremes—in which increased oar-power was available for the propulsion of the heavier weights.

In principle these vessels were only expansions of the trireme, so far as the disposition of the rowers was concerned, but the speed could not have increased in proportion to the weight, and hence arose the variety of contrivances which superseded the ramming tactics of the days of Phormio. In the century that succeeded the close of the Peloponnesian War the fashion of building big vessels became prevalent. We hear of various numbers of banks of oars up to sixteen (ἑκκαιδεκήρης)—the big vessel of Demetrius Poliorcetes. The famous tesseraconteres or forty-banked vessel of Ptolemy Philopator was in reality nothing more than a costly and ingenious toy, and never of any practical use. The fact, however, of its construction shows the extent to which the shipwright's art had been developed among the ancients.

The Romans, who developed their naval power during the First Punic War, were deficient in naval construction till they learnt the art from their enemies the Carthaginians. They copied a quinquereme which had drifted on to the coast, and, with crews taught to row on frames set up on dry land, manned a fleet which we are told was built in sixty days from the time the trees were cut down. After the Punic War, in which the use of boarding tactics gave the Romans command of the sea, the larger rates—quinqueremes, hexiremes, octiremes—continued in use until at Actium the fate of the big vessels was sealed by the victory of the light Liburnian galleys. The larger classes, though still employed as guardships for some time, fell into disuse,

and the art of building them and the knowledge of their interior arrangements were lost.

Table of Measurements, etc., after Graser.

	Trireme.	Quinquereme.	Tesseraconteres.
Length, exclusive of beak...	(?) 149 ft.[1]	168 ft.	420 ft.
Beam, greatest.....	18 "	26 "	76 "
Passage between *διαφράγματα*	7 "	11 "	49 "
Draught.....	8½"	11½ "	20 "
Tons measurement.....	(?) 232	534	11,320 (?)
Number of rowers.....	174	310	4,054 "
Crew, total complement.....	225	375	7,500 "

Mediæval Ships.—It is not at present possible to trace in its successive stages the transition from the ancient ship of war to the mediæval galley. The sailing vessels of the time of the early Roman empire, such as that in which St. Paul suffered shipwreck or the great merchantman described by Lucian, were the direct precursors, not only of the mediæval merchant vessels, but also of the large sailing vessels which, after the invention of gunpowder, and the consequent necessity of carrying marine artillery, superseded the long low galleys propelled by oars. The battle of Actium gave the death-blow to the ancient type of vessel with its many banks of oars. The light Liburnian galleys which, though fully decked, were aphract, and, according to Lucan's testimony (bk. iii.),

Ordine contentæ gemino crevisse Liburnæ,

had only two banks of oars, were biremes. This apparently became the type of Roman war galleys; and, though the old name trireme survived, its meaning became simply "man of war," and did not any longer imply three banks of oars. Light vessels were in vogue, and galleys with single banks of oars are common in the representations on coins and in such frescos as survive, but trireme and quinquereme, etc., have vanished.

A cloud of obscurity rests on these, the dark ages of naval history. We know nothing of the character and composition of the fleet in which Ricimer defeated the Vandals in the 5th century of our era. Nor have we any details of the fleets of the Byzantine empire until the end of the 9th century, when a light is thrown upon the subject by the *Tactica* of the emperor Leo. This emperor, in giving his directions as to the constitution of his fleet, prescribes that dromones (*δρομώνες*) that is, trirenes—are to be got ready in the dockyards with a view to a naval engagement. The vessels are not to be too light or too heavy. They are to be armed with siphons for the projection of Greek fire. They are to have two banks of oars, with twenty-five rowers a-piece, on each side. Some of the vessels are to be large enough to carry two hundred men; others are to be smaller, like those called galleys or one-banked vessels, swift and light (*ἐλάττους δρομικωτάτους οἱόνει γαλαίας ἢ μονήρεις λεγομένους ταχινοὺς καὶ ἐλαφρούς*). Here we have the name galleys distinctively attached to vessels with one bank of oars. This passage should have saved much of the labor that has been thrown away in attempting to prove that the distribution of rowers in the mediæval galleys was upon the same principle as that observed in the ancient biremes or triremes.

The light thrown by the philosophic Byzantine on the naval construction and equipment of his time is but a passing flash. After the 9th century there is darkness again until the 11th and 12th centuries, when the features of the mediæval galley first begin to be visible. And here perhaps it is not out of place to say that it is necessary to distinguish between those imaginary representations of the antique in which painters, such as Tintoret, give fanciful arrangement to the oars of their galleys, so as to meet their ideas of bireme or trireme, from those that are historically faithful and figure, perhaps in an ungainly and inartistic manner, the galleys of Venice and Genoa as they appeared in the Middle Ages. It would exceed the space at our disposal here to enter into details which can be gathered from Jal's *Archéologie Navale* and the *Glossaire Nautique* of the same author, or the later works of Admiral Jurien de la Gravière and Admiral Fincati. It must suffice to indicate here a few of the main characteristics in which the mediæval galley differs from the ancient, and exhibits the last development of manpower as applied to motion in vessels larger than the boats of the present day.

These characteristics may be sketched briefly. Upon the mediæval galley, which was essentially a one-banked galley (*μονόκροτον*), the use of the longer oar or sweep took the place of the small paddling oars of the ancient vessel. The increased length of the oar requiring for its efficiency greater power than one man could employ led to the use of more than one man to an oar. The necessity therefore arose of placing the weight (or point at which the oar, used as a lever, worked against the thowl, and so pressed against the water, which is the fulcrum) at a greater distance from the force or man who moved the lever. This was gained by the invention of the apostis. Upon the hull of the mediæval galley was laid a frame-work which stood out on either side from it, giving on either side a strong external timber, running parallel to the axis of the vessel, in which the thowls were fixed against which the oars were rowed. It will be readily understood how this arrangement gave a greater length inboard for the oar as compared with that of the ancient vessels, where the thowl stood in the aperture of the vessel's side or port-hole. On the inner side, rising inwards towards the centre line of the decks and inclining upwards, were the banks or benches for the rowers, arranged *à la scaloccio*, who could each grasp the handle of the oar, moving forward as they depressed it for the feather, and backward for the stroke as they raised their hands for the immersion of the blade. The stroke no doubt was slower than that of the ancient galleys, but much more powerful. For the rest we must refer to the works above mentioned, where the reader will find minute descriptions of the build and the equipment of mediæval vessels, such as those which fought at Lepanto or carried the proud ensign of the Genoese republic.

Literature.—1. For Ancient Ships: Duemichen, *Fleet of an Egyptian Queen;* Chabas, *Études sur l'Antiquité Historique;* Rawlinson, *Ancient Monarchies;* Scheffer, *De Militia Navali Veterum;* Boeckh, *Urkunden über das Seeswesen des Attischen Staates;* B. Graser, *De Re Navali Veterum;* Id., *Das Model eines Athenischen Fünfreihenschiffes (Pentere) aus der Zeit Alexanders des Grossen im Königlichen Museum zu Berlin;* Id., *Die Gemmen des Königlichen Museums zu Berlin mit Darstellungen antiker Schiffe;* Id., *Die ältesten Schiffsdarstellungen auf antiken Münzen;* A. Cartauld, *La Trière Athénienne;* Breusing, *Die Nautik der Alten;* Smith, *Voyage and Shipwreck of St. Paul.* 2. For Mediæval Shipping: A. Jal, *Archéologie Navale* and *Glossaire Nautique;* Jurien de la Gravière, *Derniers Jours de la Marine à Rames*, Paris, 1885; Fincati, *Le Triremi.* (E. WA.)

SHIPBUILDING.

WITHIN the memory of the present generation shipbuilding, like many other arts, has lost dignity by the extended use of machinery and by the subdivision of labor. Forty years ago it was still a "mystery" and a "craft." The well-instructed shipbuilder had a store of experience on which he based his successful practice. He gained such advantages in the form and trim and rig of his vessels by small improvements, suggested by his own observation or by the traditions

The art of shipbuilding.

[1] Taking the interscalmium at 4 feet; but this does not agree with Vitruvius, who gives 2 cubits.

of his teachers, that men endeavored to imitate him, neither he nor they knowing the natural laws on which success depended. He had also a good eye for form, and knew how to put his materials together so as to avoid all irregularity of shape on the outer surfaces, and how to form the outlines and bounding curves of the ship so that the eye might be compelled to rest lovingly upon them. He was skilled also in the qualities of timber. He knew what was likely to be free from "rends" and "shakes" and "cups" which would cause leakage, and which would be liable to split when the bolts and treenails were driven through it. He knew what timber would bear the heat of tropical suns without undue shrinking, and how to improve its qualities by seasoning. He could foretell where and under what circumstances premature decay might be expected, and he could choose the material and adjust the surroundings so as to prevent it. He knew what wood was best able to endure rubbing and tearing on hard ground, and how it ought to be formed so that the ship might have a chance of getting off securely when she accidentally took the ground or got on shore. Such men were to be found on all the seacoasts of Europe and on the shores of the Atlantic in America.

A great change came over the art when steam was introduced. The old proportions and forms so well suited for the speeds of the ships and for the forces impressed upon them were ill adapted for propulsion by the paddle, and still less so for propulsion by the screw. Experience had to be slowly gained afresh, for the lamp of science burned dimly. It needed to be fed by results, by long records of successes and failures, before it was able to direct advancing feet. The further change from wood to iron and then to steel almost displaced the shipwright. Ships for commercial purposes may be said to be built now, so far as their external hulls are concerned, by draftsmen and boilermakers. The centres of the shipbuilding industry have changed. The ports where oaks (Italian, English, and Dantzic), pines from America and the north of Europe, teak from Moulmein, and elm from Canada were most accessible,—these marked the suitable places for shipbuilding. The Thames was alive with the industry from Northfleet to the Pool. It still lingers, but is slowly dying out. Travellers along the Mediterranean shores from Nice to Genoa mark the completeness of the change which a few years have made. The Tyne and the Clyde and the Mersey have become the principal centres of the trade. It has been drawn there because the iron and coal are near.

The science of naval construction.

But, while the art of shipbuilding has lost dignity, the science of naval construction has increased in importance. English art is of an eminently practical character. It is shy of experiment, as being costly in itself and likely to lead to delays and changes of system and of plant. It loves large orders and rapid production. It practices great subdivision of the details in order to cheapen production, and it stereotypes modes of work. There is no lack of boldness and enterprise; but the patient continuous inquiry and the slow but sure building up of theory upon research,—this is the exception. Naval construction in England has had the good fortune during the last quarter of a century to have not only a thriving industry but a home for research. Twenty-five years ago, when the high-pressure condensing engine was in its infancy, when shipbuilding steel was not, and armor-plated ships had not yet displaced the wooden line-of-battle ship, this home was founded. The Institution of Naval Architects may be fairly called the home for research in naval construction. It owes its establishment mainly to four well-known men—John Scott Russell, Dr. Joseph Woolley, Lord Hampton, for many years its honored president, and Sir Edward Reed, its first secretary. It has published every year a volume of *Transactions* recording the experience of all the shipbuilders and marine engineers in England. These *Transactions* contain also valuable contributions from French, Italian, German, and other eminent constructors and engineers.

Admiralty experiments on fluid resistance, etc.

Shortly after the foundation of the Institution one of its members, Mr. William Froude, set up an experimental establishment at Torquay, under the auspices and with the assistance of the Admiralty. The object was to submit to experiment various proportions and forms of ships in model in order to compare the relative resistances in the same model at various speeds, and in different forms and proportions at equal speeds. There was some reason to doubt the possibility of inferring from a model on a scale of ¾ of an inch to a foot what would happen in a ship of corresponding form and proportions. In order to establish satisfactorily the relations between the real and the model ship a series of experiments was desirable upon a real ship in which the resistances could be measured by a dynamometer at various speeds and compared with those indicated by the model. Up to the date of this trial the "scale of comparison" which had been employed by Mr. Froude was based upon *prima facie* theoretical truth, and it had some experimental justification. It may be stated as follows, as given by Mr. Froude in the volume for 1874 of the *Transactions* of the Institution of Naval Architects:

If a ship be D times the "dimension," as it is termed, of the model, and if at the speeds V_1, V_2, V_3 . . . the measured resistances of the model are R_1, R_2, R_3 . . . ., then for speeds $D^{\frac{1}{2}}V_1$, $D^{\frac{1}{2}}V_2 D^{\frac{1}{2}}V_3$, . . . of the ship, the resistances will be D^3R_1, D^3R_2 D^3R_3 . . . To the speeds of model and ship thus related it is convenient to apply the term "corresponding speeds." For example, suppose two similar ships, the length, breadth, depth, etc., of which were double one of the other. Then, if at a given speed (say 10 knots) the resistance of the smaller ship were ascertained, we may infer that at a speed of $\sqrt{2}\times 10 = 14.14$ knots in the larger ship there would be a resistance 8 times as great as in the smaller vessel.

This law is in accordance with the old rule that the resistance varies as the square of the velocity, and also as the area of the surface exposed to resistance. It takes into account both the resistance due to surface friction (subject to some correction) and the formation of deadwater eddies. The passage of the ship through the water creates waves which are dependent for their character upon the proportions and form of the ship. These constitute also an element of resistance. They are due to differences of hydrodynamic pressure inherent in the system of stream-lines which the passage of the ship creates. These wave-configurations should be precisely similar when the originating forms are similar and are travelling at speeds proportional to the square roots of their respective dimensions, because the resulting forces will be in that case as the square of the speeds. For example, if the surface of the water surrounding a ship 160 feet long, travelling at 10 knots an hour, were modelled together with the ship, on any scale, the model would equally represent, on half that scale the water surface surrounding a ship of similar form 320 feet long, travelling at 14.14 knots an hour; or again, on 16 times that scale, the water surface surrounding a model of the ship 10 feet long, travelling at 2½ knots. Experiment has abundantly confirmed this proportion as to the similarity of waves caused by similar forms travelling at corresponding speeds. The resistance caused to these forms respectively by the development of the waves would, therefore, also be proportionate to the cubes of the dimensions of the forms and would follow the law of comparison stated above. It is necessary, however, to observe that, in dealing with surfaces having so great a disparity in length and speed as those of a model and of a ship, a very tangible correction is necessary in regard to surface friction.

The vessel tried by Mr. Froude for confirming the law of comparison was H.M.S. "Greyhound," of 1157 tons. She was towed by H.M.S. "Active," of 3078 tons, from the end of a boom 45 feet long, so as to avoid interferences of "wake." It was found to be possible to tow up to a speed of nearly 13 knots. The actual amount of towing strain for the "Greyhound" was approximately as follows: at 4 knots, 0.6 ton; at 6, 1.4 tons; at 8, 2.5 tons; at 10, 4.7 tons; and at 12 9.0 tons.

Comparing the indicated horse-power of the "Greyhound" when on her steam trials and the resistance of the ship as determined by the dynamometer, it appears that, making allowance for the slip of the screw, which is a legitimate expenditure of power, only about 45 per cent. of the power exerted by the steam is usefully employed in propelling the ship, and that the remainder is wasted in friction of engines and screw and in the detrimental reaction of the propeller on the stream lines of the water closing in around the stern of the vessel.

We may describe in Mr. Froude's own words the system of experiment now regularly carried out for the Admiralty, a system which has been successfully copied in other countries and also by a private shipbuilding firm, Messrs. Denny of Dumbarton:

"That system of experiments involves the construction of models of various forms (they are really fair-sized boats of from 10 to 25 feet in length), and the testing by a dynamometer of the resistances they experienced when running at various assigned appropriate speeds. The system may be described as that of determining the scale of resistance of a model of any given form, and from that the resistance of a ship of any given form, rather than as that of searching for the best form, and this method was preferred as the more general, and because the form which is best adapted to any given circumstances comes out incidentally from a comparison of the various results. We drive each model through the water at the successive assigned appropriate speeds by an extremely sensitive dynamometrical apparatus, which gives us in every case an accurate automatic record of the model's resistance, as well as a record of the speed. We thus obtain for each model a series of speeds and the corresponding resistances; and to render these results as intelligible as possible, we represent them graphically in each case in a form which we call the 'curve of the resistance' for the particular model. On a straight base line, which represents speed to scale we mark off the series of points denoting the several speeds employed in the experiments, and at each of these points we plant an ordinate which represents to scale the corresponding resistance. Through the points defined by these ordinates we draw a fair curved line, and this curve constitutes what I have called the curve of resistance. This curve, whatever be its features, expresses for the model of that particular form what is in fact and apart from all theory the law of its resistance in terms of its speed; and what we have to do is if possible to find a rational interpretation of the law. Now we can at once carry the interpretation a considerable way; for we know that the model has so many square feet of skin in its surface, and we know by independent experiments how much force it takes to draw a square foot of such skin through the water at each individual speed. The law is very nearly—and for present convenience we may speak as if it were exactly—that skin resistance is as the area simply, and as the square of the speed. Now, we have so many square feet of immersed skin in the model, and the total skin resistance is a certain known multiple of the product of that number of square feet and the square of the speed. Now, when we lay off on the curve of resistance a second curve which represents that essential and primary portion of the resistance, then we find this to be the result: the curve of skin resistance when drawn is found to be almost identical with the curve of total resistance at the lower speeds; but as the speed is increased the curve of total resistance is found to ascend more or less, and in some cases to ascend very much above the curve of skin resistance. The identity of the two curves at the lower speeds is the practical representation of a proposition which the highest mathematicians have long been aware of, and which I have lately endeavored to draw the public attention to, and to render popularly intelligible, namely, that when a ship of tolerably fine lines is moving at a moderate speed the whole resistance consists of surface friction. The old idea that the resistance of a ship consists essentially of the force employed in driving the water out of her way and closing it up behind her, or, as it has sometimes been expressed, in excavating a channel through the track of water which she traverses—this old idea has ceased to be tenable as a real proposition, though *prima facie* we know that it was an extremely natural one. We now know that, at small speeds, practically the whole resistance consists of surface friction, and some derivative effects of surface friction, namely, the formation of frictional eddies, which is due to the thickness of the stem and of the sternpost; but this collateral form of frictional action is insignificant in its amount unless the features of the ship in which it originates are so abruptly shaped as to constitute a departure from that necessary fineness of lines which I have described; and we do not attempt to take an exact separate account of it. Thus we divide the forces represented by the curve of resistance into two elements,—one 'skin resistance,' the other which only comes into existence as the speed is increased, and which we may term 'residuary resistance.' And we have next to seek for the cause and governing laws of this latter element. Now when the passage of the model along the surface of the water is carefully studied, we observe that the special additional circumstance which becomes apparent as the speed is increased is the train of waves which she puts in motion; and indeed it has long been known that this circumstance has important bearings on the growth of resistance. It is in fact certain that the constant formation of a given series involves the operation of a constant force, and the expenditure of a definite amount of power, depending on the magnitude of those waves and the speed of the model; and, as we thus naturally conclude that the excess of resistance beyond that due to the surface friction consists of the force employed in wave making, we in a rough way call that residuary resistance 'wave-making resistance.'

"Perhaps I had better say a few words more about the nature and character of these waves. The inevitably widening form of the ship at her 'entrance' throws off on each side a local oblique wave of greater or less size according to the speed and to the obtuseness of the wedge, and these waves form themselves into a series of diverging crests, such as we are all familiar with. These waves have peculiar properties. They retain their identical size for a very great distance with but little reduction in magnitude. But the main point is that they become at once dissociated from the model, and after becoming fully formed at the bow, they pass clear away into the distant water and produce no further effect on her resistance. But, besides those diverging waves, there is produced by the motion of the model another notable series of waves which carry their crests transversely to her line of motion. Those waves when carefully observed, prove to have the form shown in detail in Fig. 1. In the figure there is shown the form of a model which has a long parallel middle body accompanied by the series of these transverse waves as they appear at some one particular speed with the profile of the series defined against the side of the model; only I should mention that for the sake of distinctness the vertical scale of the waves has been made double the horizontal scale, so that they appear relatively to the model about twice as high as they really are. The profile is drawn from exact and careful measurements of the actual wave features as seen against the side of the model. It is seen that the wave is largest where its crest first appears at the bow, and it reappears again and and again as we proceed sternwards along the straight side of the model, but with successively reduced dimensions at each reappearance. That reduction arises thus: in proportion as each individual wave has been longer in existence, its outer end has spread itself farther into the undisturbed water on either side, and, as the total energies of the wave remain the same, the local energy is less and less, and the wave-crest, as viewed against the side of the ship, is constantly diminishing. We see the wave-crest is almost at right angles to the ship, but the outer end is slightly deflected sternward from the circumstance that when a wave is entering undisturbed water its progress is a little retarded and it has to deflect itself into an oblique position, so that its oblique progress shall enable it exactly to keep pace with the ship. The whole wave-making resistance is the resistance expended in generating, first the diverging bow waves, which, as we have seen, cease to act on the ship when once they have rolled clear of the bow; secondly, these transverse waves, the crests of which remain in contact with the ship's side; and thirdly, the terminal wave, which appears independently at the stern of the ship. This latter wave arises from causes similar to those which create the bow wave, namely, the pressure of the streams, which, forced into divergence then, here converge under the run

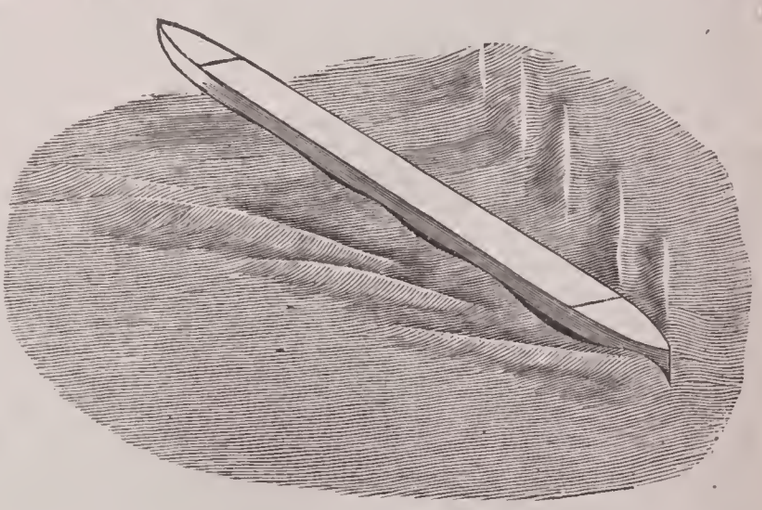


FIG. 1.

of the vessel, and reëstablish an excess of pressure at their meeting. The term 'wave-making resistance' represents, then, the excess of resistance beyond that due to surface friction, and that excess we know to be chiefly due to this formation of waves by the ship."

Pursuing these experiments it was found that not only was there a certain length of form necessary in a ship designed to attain a certain speed economically,—a fact which Mr. Scott Russell did much to establish,—but that there was also a considerable increase in wave-making resistance dependent upon the position of the after-body or run of the ship with reference to the wave-system left by the bow. Stating this again in Mr. Froude's words:

"The waves generated by the ship in passing through the water originate in the local differences of pressure caused in the surrounding water by the vessel passing through it; let us suppose, then, that the features of a particular form are such that these differences of pressure tend to produce a variation in the water level shaped just like a natural wave, or like portions of a natural wave of a certain length.

"Now an ocean wave of a certain length has a certain appropriate speed at which only it naturally travels, just as a pendulum of a certain length has a certain appropriate period of swing natural to it. And, just as a small force recurring at intervals corresponding to the natural period of swing of a pendulum will sustain a very large oscillation, so, when a ship is travelling at the speed naturally appropriate to the waves which its features tend to form, the stream line forces will sustain a very large wave. The result of this phenomenon is, that as a ship approaches this speed the waves become of exaggerated size, and run away with a proportionately exaggerated amount of power, causing corresponding resistance. This is the cause of that very disproportionate increase of resistance experienced with a small increase of speed when once a certain speed is reached.

"We thus see that the speed at which the rapid growth of resistance will commence is a speed somewhat less than that appropriate to the length of the wave which the ship tends to form. Now, the greater the length of a wave is the higher is the speed appropriate to it; therefore the greater the length of the waves which the ship tends to form the higher will be the speed at which the wave-making resistance begins to become formidable. We may therefore accept it as an approximate principle that the longer are the features of a ship which tend to make waves the higher will be the speed she will be able to go before she begins to experience great wave-making resistance, and the less will be her wave-making resistance at any given speed. This principle is the explanation of the extreme importance of having at least a certain length of form in a ship intended to attain a certain speed; for it is necessary, in order to avoid great wave-making resistance, that the 'wave features,' as we may term them, should be long in comparison with the length of the wave which would naturally travel at the speed intended for the ship.

"This view of the matter, then, recognizes the tendency of a ship, when the speed bears a certain relation to the length of her wave-making features, to make large waves and to incur corresponding wave-making resistance. But it does not take account of the possibility of the waves made by one feature of the form so placing themselves with reference to other features as, by the differences of pressure essential to their existence, either to cause an additional resistance, or on the other hand to cause a forward force which partly counterbalances the resistance originally due to their creation. The way in which this may occur we have seen strikingly exhibited in the results of the experiments I have been describing. We see that in the very long parallel-sided form the sternmost of the train of waves left by the bow has become so small that its effect on the stern is almost insensible; and here we find, consequently, the united resistance due simply to the generation of a separate wave-system by each end of the ship. As we gradually reduce the length of middle-body, the stern is brought within the reach of waves large enough to produce a sensible effect, and according as it is brought into conjunction with a crest or hollow, the total wave-making resistance becoming least of all (except at the very highest speed) when the middle-body is reduced to nothing."

The variations in residuary resistance due to these transverse wave-formations are variations of quasi-hydrostatic pressure against the after-body, corresponding with the changes in its position with reference to the phases of the train of waves, there being a comparative excess of pressure (causing a forward force or diminution of resistance) when the after-body is opposite a crest, and the reverse when it is opposite a trough.

It may be proper to introduce here some remarks as to the stream lines which have been referred to in the foregoing considerations. The statement of the case as given by Mr. Froude, and derived by him mainly from the investigations of Prof. Rankine, is as follows:

"By a 'perfect fluid' is meant one the displacements of which are governed solely by the laws expressed in the equation of fluid motion, the particles of which therefore are without viscosity, and are capable of gliding rectilinearly along a perfectly smooth surface or past each other without frictional interference. By an imperfect fluid is meant one in which, as in water, as well as those with which we are practically acquainted, such frictional interference is inevitable. Stream lines.

"Dealing first, then, with the case of steady rectilinear motion in a perfect incompressible fluid, infinitely extended in all directions, it is plain that the motion will create differences of pressure, and therefore changes of velocity, in the particles of the surrounding fluid, which thus move in what are called 'stream lines.' At the commencement of the motion of the body the particles of the fluid undergo acceleration in their respective stream-line paths, and these accelerations imply a resistance experienced by the body; but after the motion has become established the differences of pressure satisfy themselves by keeping up the stream-line configuration; the energy which the particles receive from the body while they are being pushed aside by it along their stream-line paths is finally redelivered by them to it as they collapse around it, and come to rest after its passage, and the integrals of the + and — pressures on the body are exactly equal at every moment. The manner in which this is effected is governed by the general laws of fluid motion, as expressed by the well-known equations; and, since these equations contain no term which implies a loss of energy, the energy existing in the body, as well as in the stream-line system, remains unaltered; so that, if the motion is steady, or without acceleration or retardation, the body passes through this theoretically perfect fluid absolutely without resistance. Nor must it be thought a paradox (for it is unquestionable), that even a plane moving steadily at right angles to itself through a perfect fluid would in the manner described experience no resistance. But if the fluid, instead of being infinite in all directions, be bounded by a definite free surface parallel to the line of motion, such as a water level, the existence of this surface cuts off the reactions of all those particles which would have existed beyond the surface had the fluid been unlimited alike in all directions, and which would have given back in the manner described the energy imparted to them. By the absence of these reactions the stream-line motions which would have existed in the infinite fluid are modified, and the differences of pressure involve corresponding local elevations of the surface of the water in the vicinity of the moving body. And since, in consequence of the action of gravitation (the force which controls the surface), a water protuberance seeks immediately to disperse itself into the surrounding fluid in accordance with the laws of wave motion, the local elevation partly discharges itself along the surface by waves which carry with them the amount of energy embodied in their production. This energy is, in fact, part of the aggregate energy which was imparted to the particles of fluid while they were being pushed aside, and which, in the infinitely extended fluid would have been wholly restored to the body during their collapse after its passage, but is now, in fact, dissipated. The exact equality between the + and — pressures no longer exists, and the body experiences a definite resistance which it would not do if the fluid were infinite in all directions.

"It is clear, moreover, that the nearer the moving body approaches the surface the greater are the differences of pressure to be satisfied, the greater will be the waves formed, and the greater the dissipation of energy. Thus, for example, a fish will experience an increase of resistance as its path lies nearer to the surface, the train of waves it creates becoming then a visible accompaniment of its progress. *A fortiori*, when the body moves along the surface as a ship does on water, those differences of pressure which would exist during the motion if the fluid were infinite in all directions satisfy themselves in still larger waves, which, in fact, are the waves which accompany the body in its motion. The waves which thus visibly accompany a vessel *in transitu* form a marked phenomenon in river steaming. Thus we see how, although in a perfect fluid extended infinitely in all directions, a body, when once put in motion, would move absolutely without resistance, yet, when the fluid is bounded by a gravitating surface at or near the line of motion, the body will experience resistance by the formation of waves, notwithstanding that the fluid is a perfect one.

"If the fluid is again supposed to be infinite in all directions, but imperfect, the phenomena previously described undergo appropriate modifications, and the moving body

will also suffer a specific resistance,—in the first place by its having to overcome the friction and viscosity of those particles of the fluid with which it is in contact, and next because the friction of the surrounding particles *inter se* destroys that orderly arrangement of the stream-line configuration which allows of the energy imparted to the particles being returned without loss. If the supposed imperfect fluid is bounded by a free surface, as already described, and the body moves at or near this surface, it will experience resistances depending on fluid friction, almost exactly in the same manner as if the fluid were infinite in all directions. It will also experience very nearly the same resistance in virtue of the wave-making action as in the perfect fluid; and we here see the two sources of resistance existing independently of each other, and due to totally different causes."

Stability.

Important as the question is as to the effect of form upon resistance, that of its effect upon stability or steadiness at sea is even more so. Before the use of steam for the propulsion of ships the speed which could be attained in seagoing ships by sail power was largely a question of stability or power to carry a large spread of canvas without inclining or "heeling" too greatly. Small differences in the form of the transverse sections of the ship in the region of the load water-line and under water were influential in this respect, and naval constructors occupied themselves greatly with such questions. The form of the problem completely changes when the propelling power is no longer an upsetting force. The important questions in steamships are the proportions of length, breadth, and depth; the form of "entrance" and "run"; the construction of propelling machinery within the ship; and the proportions, form, and number of revolutions of the propeller. But, while this is so, the effect of the stability of the steamship upon her behavior at sea, as a question of rolling or "laboring," remains very great. There are, moreover, a very large number of seagoing ships still dependent upon sails for their propulsion, and the question of sailing power is very important in vessels employed on our coasts for commerce and for pleasure. The latest and most complete investigation of questions of stability is to be found in Sir Edward J. Reed's recently published work, *The Stability of Ships*. There is a more popular exposition of the subject by Mr. W. H. White, director of naval construction, in his *Manual of Naval Architecture* (1877, 2d ed. 1882), of which use has been made in the following pages.

A ship floating freely and at rest in still water displaces a volume of water exactly equal in weight to her own weight. The circumstances of the water in which she floats are in fact the same whether the cavity made in the water by the ship is filled by the ship as in Fig. 2, or by a volume of water

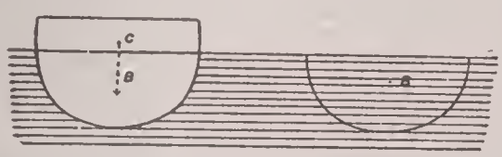


Fig. 2.

Fig. 3.

having the same weight as the ship (Fig. 3). When the ship occupies the cavity the whole of her weight may be supposed to be concentrated at her centre of gravity, G, Fig. 2, and to act vertically downwards. When the cavity is filled with water its weight, called in relation to the ship the "displacement," may be supposed to be concentrated at B, Fig. 3, which is the centre of gravity of the "displacement" or of the displaced water. This centre of gravity is usually known in relation to the ship as the "centre of buoyancy." The weight of this water may be supposed to be concentrated at B, and to act vertically downwards. As this water would remain in the cavity at rest, its downward pressure must be balanced by equal upward pressures, that is by the buoyancy of the surrounding water. These upward pressures must act in the same way as if there were a single pressure equal and opposite to the weight of the water, and acting through the "centre of buoyancy." In Fig. 2 a ship is represented floating freely and at rest in still water. Her total weight may be supposed to act vertically downwards through the centre of gravity G, and the buoyancy vertically upwards through the centre of buoyancy. The second condition which the ship floating freely and at rest in still water will always satisfy is therefore said to be that her centre of gravity will lie in the same vertical line with the centre of gravity of the volume of water which she displaces. So long as the ship rests under the action of these opposing and balanced forces the line joining the centres B and G is vertical and represents the common line of action of the weight and buoyancy. There are of course horizontal fluid pressures acting upon her, but these are balanced among themselves.

The ship may be floating at rest, but under constraint, and not freely. There may be the pressure of wind on the sails, or the strain of a rope holding her in a position of rest although the centres B and G are no longer in the same vertical line. Fig. 4 represents such a case. The vessel is

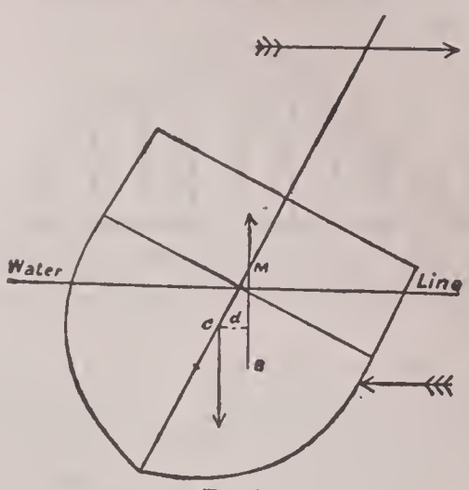


Fig. 4.

at rest, but there is some external force operating other than that of buoyancy; and the equal and opposite forces of the weight and buoyancy act in different vertical lines, and no longer balance each other. They form a mechanical "couple," tending to move the ship from the position of constrained rest in which she is shown. If W represents the total weight of the ship (in tons), and d the perpendicular distance between the parallel lines of action of the weight and buoyancy (in feet), then the operative moment of the "couple" is represented by the product of the two quantities W and d, measured in foot-tons. If the constraint is removed, and the vessel is freed from all external forces save those of the fluid in which she floats, she will move under the operation of the "couple" towards the upright position until the consequent alteration in the form of the cavity of the displacement brings the centre of buoyancy into the same vertical with the centre of gravity of the ship. What has been illustrated by reference to transverse inclination of the ship is equally true of oblique or longitudinal inclinations. If the position of the weights in the ship remains unaltered under such changes of inclination the centre of gravity remains unaltered. In all calculations it has to be assumed that the centre of gravity is a fixed point in the ship, and that movable weights will be secured in the ship. With this assumption the position of the centre of gravity of a ship can be correctly assigned by calculation, small disturbances caused by movements of men, etc., not being large enough to be appreciable.

The statical stability of a ship may be defined as the effort which she makes when inclined steadily by external forces to overcome the constraint and return to the position in which she floats freely, at or near the upright. This effort, as already explained, depends upon the position of the centre of buoyancy B, or the distance from the vertical line through G which the altered form of the cavity of the displacement has caused it to assume. It may always be measured by the product of the two quantities W (in tons) and d (in feet) (see Fig. 4). This product in foot-tons is known as the "moment of statical stability" for the particular angle of inclination and corresponding position of B which are assumed. A little reflection will show that when large angles of inclination are reached the centre B ceases to recede from the vertical through the centre of gravity of the ship, but will, as the inclination increases, approach this vertical line, and eventually pass to the other side of it.

The moment of statical stability is at its maximum when the distance d is greatest. The angle which the ship has reached when the centre B has reached this point is called the "angle of maximum stability." As the centre B travels backwards from this position with the increasing inclination of the ship the distance d decreases and the righting power of the ship decreases proportionately. When B passes the vertical line through G the moment of stability changes its character and becomes an upsetting force, which will continue to act until the ship reaches a new position of rest, usually bottom upwards. The angle which the ship reaches before this change takes place, *i.e.*, when B passes to the other side of the vertical line through G, is called the "angle of vanishing stability" and it indicates the ship's "range of stability." The change may occur at very small angles

if the ship is crank and her sides are low in the water. It may not and sometimes does not occur, on the other hand, until the ship is lying on her beam ends.

If a curve is plotted out showing these positions and indicating also how d first increases and then decreases as the ship is inclined more and more from the upright, the curve is known as the curve of stability. A "stiff ship" is one which opposes great resistance to inclination from the

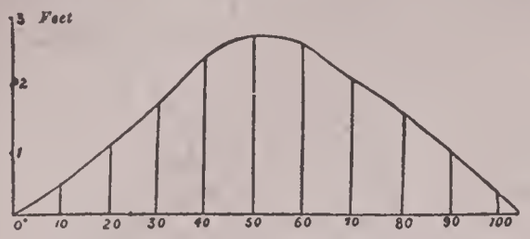


FIG. 5.—Curve of stability of a high-sided ship, having small metacentric height. The vertical line to left shows the various lengths of d, and the horizontal line the angles of inclination (in degrees).

upright when under sail or acted upon by external forces. A "crank ship" is one very easily inclined, the sea being supposed to be smooth and still. A "steady ship" is one which when exposed to the action of waves keeps nearly upright. Crank ships are usually the steadiest ships. Changes in the height of the point of intersection M (Fig. 4) above the centre of gravity indicate corresponding changes in the stiffness of a ship. Speaking generally, the stiffness of the ship may be considered to vary with the height of M above G. The line BM does not cut GM in the same point at considerable inclinations as it does at a very small inclination. The point of intersection at the smallest conceivable inclination receives a definite name. It is known as the metacentre, and the distance GM is in this condition called the metacentric height. See HYDROMECHANICS.

The followiug table contains particulars of the metacentric heights of different kinds of vessels of war, and the corresponding time of an oscillation iu still water:

Names of Ships.	Metacentric Height.	Period of a Double Roll.
	Feet.	Seconds.
H.M.S. "Sultau".....	2.5	8.9
H.M.S. "Inconstant".....	2.8	8.0
H.M.S. "Devastation".....	3.7	6.76
American monitor (shallow draft)	14.0	2.7
"Inflexible" when rolled in still water in Suda Bay.....	7.65	10.7

Generally speaking, decrease in metacentric height is accompanied by a lengthening of the period of an oscillation. The ship swings more slowly as she loses stiffness.

Oscillations.

There is no sensible difference in the time occupied by a ship in a swing or roll from side to side, whether she rolls through only three or four degrees on either side of the upright or twelve or fiftcen degrees. For larger angles there would be small differences.

The tables which have been given show some remarkable changes in the stability conditions in ships of war within recent years. Sailing ships were formerly made with so little deviation from existing types that it was not found to be necessary to ascertain their exact measure of stability or to lay down rules for regulating it. The position of the centre of gravity was modified by ballast, and as much as nine or ten per cent. of the displacement was allowed for this. Heavy rolling and great uneasiness of ship from excessive stability had often to be endured. In other cases crankness or inability to carry sail had to be accepted. When armored ships were first introduced they had about the same metacentric height (6 feet) as is to be found in the earlier sailing frigates. The "Normandie" in the French navy and the "Prince Consort" in the English navy had from 6 to 7 feet, and they were exceedingly uneasy and deep-rolling ships. It was soon discovered that a reduction in metacentric height would cure this evil. The later ships in both navies were accordingly designed to have a metacentric height of about 3 feet. The "Magenta" had 3¼ feet and the "Hercules" 3 feet. This change altered the period during which the ship made a double oscillation, *i.e.*, from starboard back to starboard, to 14 to 16 seconds instead of from 10 to 11 seconds, as it had been in the "Normandie" and "Prince Consort." The effect on the behavior of the ship in a seaway was most remarkable. These ships with small metacentric height might be put into the trough of a sea, and as the waves crossed them they steadily rose and fell, hardly inclining their masts. The effect on gunnery practice was also valuable, but there is always a peril attending steadiness obtained by such means: vessels having small metacentric height require careful handling under sail or they may be overset and lost. There is another defect in this system, viz., that wounds in action will cause the ship to incline sooner and more considerably, and they become more dangerous than they would be in a stiffer ship. Bilge-keels and water-chambers are now employed in the English navy, together with, and as opposing influences to, much greater metacentric height. These devices were introduced into the "Inflexible" in order to counteract the influence of a metacentric height of 8 feet which was designedly given to her. They have proved very effective, but there is another feature in this vessel which has tended to prevent uneasiness and heavy rolling. The time of an oscillation or quickness of rolling, depends not only upon the metacentric height but upon the moment of inertia about a longitudinal axis. The time of an oscillation from starboard to starboard may be written thus:

$$2T = 1.1\sqrt{K^2/m},$$

where T is the ship's period in seconds for a single roll, m is the metacentric height, or height of metacentre above the centre of gravity in feet, and K is the radius of gyration in feet. The moment of inertia is increased by widening the ship, putting heavy armor on her sides, and placing the turrets and guns out towards the sides of the ship. It was seen that these features in the "Inflexible," which were elements in her design, would favor her and tend to counteract the great metacentric height. The event has shown that, while a metacentric height of 6 feet in the "Normandie" gave 10 seconds to 11 seconds period, 8 feet in the "Inflexible" only gives 11 seconds as a period, corresponding with a radius of gyration of 28 feet. The feeling expressed that "in order to provide against the impossible contingency of the loss of stability by complete waterlogging of the ends we had made an intolerable ship" was not justified. The ship is now so stiff that when the ends are waterlogged the running in and out of all her guns on one side only inclines her 2½ degrees, while in the "Monarch" when intact and light the same operation inclines the ship 5 degrees.

Resistance to oscillation.

The resistance offered by the water to the rolling of the ship consists of three parts: (1) that due to the rubbing of the water against the bottom of the ship as she rolls; (2) that due to the flat surfaces which are carried through the water, such as outside keels and deadwood; (3) the creatiou of waves by the rolling ship to replace those which move away from the ship. The creation of these surface waves expends energy and checks the motion of the ship which makes the creative effort.

Bilge-keels

Mr. White, giving briefly the results of some of the experiments of Mr. Froude made for the Admiralty, says:

"Experiments have been made by Mr. Froude to show how rapidly the rate of extinction may be increased by deepening bilge-keels. A model of the 'Devastation' was used for this purpose, and fitted with bilge-keels, which, on the full-sized ships, would represent the various depths given in the following table. The model was one thirty-sixth of the full size of the ship, and was weighted so as to float at the proper water-line, to have its centre of gravity iu the same relative position as that of the ship, and to oscillate in a period proportional to the period of the ship. In smooth water it was heeled to an angle of 8½ degrees, and was then set free, and allowed to oscillate until it came practically to rest, the number of oscillations, and their period being observed. The following results were obtained:

Model fitted with	Number of Double Rolls before Model was practically at rest.	Period of Double Roll.
		Seconds.
No bilge-pieces.....	31½	1.77
A single 21-inch bilge-keel on each side	12½	1.9
" 36-inch " "	8	1.9
Two 36 inch " "	5¾	1.92
A single 72-inch " "	4	1.99

"Not content with obtaining the aggregate value of the resistances for ships, Mr. Fronde has separated them into their component parts, assigning values to frictional and keel resistances as well as to surface disturbance. In doing so, he has been led to the conclusion that surface disturbance is by far the most important part of the resistance offered to rolling, as the following figures given by him for a few ships will show:

Ships.	Frictional.	Keel, Bilge-keel, and Deadwood.	Total Resistance.	Surface Distnrbance.
Sultan.....	354	5,036	20,000	14,610
Inconstant...	140	4,060	21,500	17,300
Volage	96	2,944	14,100	11,060
Greyhound..	120	700	4,700	3,880

"Frictional and bilge-keel resistances in this table have been obtained by calculation from the drawings of the ship, Mr. Froude making use of data as to coefficients for friction and for head resistance which he had previously obtained by independent experiments, and which may therefore be regarded as leading to thoroughly trustworthy results. It will be noticed that in no case does the sum of the frictional and keel resistances much exceed one-fourth of the total resistance, while it is much less than one-fourth in other cases. The consequence is that surface disturbance must be credited with the contribution of three-fourths or thereabouts of the total resistance, a result which could scarcely have been predicted. Waves are constantly being created as the vessel rolls, and as constantly moving away, and the mechanical work done in this way reacts in a reduction of the amplitude of successive oscillations. Very low waves, so low as to be almost imperceptible, owing to their great length in proportion to their height, would suffice to account even for this large proportionate effect. For example, Mr. Froude estimates that a wave 320 feet long and only 1¼ inches in height would fully account for all the work credited to surface disturbance in the fourth case in the preceding table.

"Another important deduction from the figures in the table is the large proportionate effect of 'keel' resistance as compared with frictional resistance, thus establishing the advantages of deep bilge-keels. Ships of the Royal Navy recently constructed have been furnished with much deeper bilge-keels than were formerly in use, but a limit to the depths that can be fitted is often reached, because of the necessity for compliance with certain conditions and extreme dimensions, in order that the vessels may be able to enter existing docks."

Water chambers.

In the Royal Navy advantage has also been taken of the power of loose water within a ship to quell motion. It was first employed in the "Inflexible" in a part of the ship lying above the bomb-proof deck, and at the level of the water-line. Its use resulted from a discussion, when the "Inflexible" was designed, of the probable effect of water entering this region of the ship through shot holes. The matter has since been thoroughly established by experiment, and affords a new and valuable means of preventing heavy rolling in ships having large initial stability. There is now no hesitation in giving a metacentric height of 6 feet, and obtaining all the security against upsetting which this ensures, because it is felt that the violent rolling formerly inseparable from stiffness can be prevented. The investigation into this matter has been conducted by Mr. Philip Watts, Mr. R. E. Froude, and Mr. W. E. Smith, acting for the Admiralty.

The accompanying memorandum, prepared by the present writer in 1884, gives the general results:

"In investigating the phenomena attending the use of water as a means of quelling the motion of ships, Mr. Froude has not only taken advantage of the experiments made in the 'Edinburgh' by running men across the decks, but he has also studied similar phenomena in a model water-chamber, mounted, not on a model of a ship, but on a large pendulum weighted to the required 'period,' the relative level of the model chamber and the axis of rotation being made to correspond approximately to scale with that in the ship.

"The conclusions, stated in the form of a comparison between the quelling effects of bilge-keels and of moving water, are as follows: (1) There is a certain depth of water in the chamber which gives the maximum effect; this is dependent upon the width of the chamber and the period of the ship. (2) With this depth of water the growth of resistance to rolling commences almost at zero of angle, whereas with either a greater or less depth there is practically no resistance at all due to the water up to a certain angle, which angle increases with increase of departure from the proper depth. (3) At larger angles of roll the disadvantage of departure from the proper depth of water is not marked. (4) The resistance of water in a chamber does not increase at all uniformly with increase of angle of roll, but increases rapidly at first and at the larger angles becomes more nearly constant for all angles. (5) The best quantity of water for the original chamber in the 'Edinburgh' was 43 tons; the best for the chamber enlarged by removal of cork walls was 79 tons; and the best for the chamber extending to the sides of the ship would be 100 tons. The first-named extension improved the resistance at 10° by 21 per cent., and the further extension by another 22 per cent.

"As compared with bilge-keels the matter is stated as follows: while 2 feet addition to the breadth of the bilge-keels adds in round numbers two-thirds to the existing extinguishing power of hull and bilge-keels on the 'Edinburgh' at all angles of rolling, the fully extended water-chamber adds at 3° of roll about six times, and at 5° about three times that power; at 12° the chamber adds no more than 2 feet of bilge-keel, while at 18° it only adds half as much. It is therefore evident that, while both are valuable, the water-chamber is for most kinds of service much the more valuable of the two.

"Explaining the cause of the phenomena, Mr. Fronde says:

"'The extinguishing or quelling effect of water depends, of course, *cæteris paribus*, upon the value of the moment represented by the transference of water from side to side, *i.e.*, with a given quantity of water, upon the distance moved by its centre of gravity. This distance increases with increase of angle of roll, and consequently the extinction similarly increases up to a certain point, where we appear to have approximately reached the maximum possible transference of water, and consequently the maximum extinction of which the quantity of water is capable with the dimensions of the chamber. This point occurs generally at a moderate angle, and above this angle the extinction becomes practically constant. But the extinguishing effect of the water of course largely depends also upon the timing of its motion from side to side,—the extinction being greatest when that motion takes place most nearly at the time of extreme angle of ship, *i.e.*, in such a manner as that the water may be as much as possible running downhill when it is moving across, and as much as possible upon the rising side of the ship when it is stationary. If, on the other hand, the motion of the water across were to take place when the ship is quite upright, the extinction would be *nil*. It is therefore conceivable that for the same total degree of motion or transference of water we may have a very different degree of extinction, according to the timing of that motion. In the motion of the water energy is necessarily wasted, and it is clear that, if we are dealing with a permanent condition of things, *i.e.*, if the ship is being steadily maintained at a constant angle of roll, this waste of energy in each run of water from side to side must be exactly equal to the energy taken out of the ship in each swing by the extinction. The motion of the water may be and generally is of a type very wasteful of energy, the water either rushing across in a mass, and consuming its energy by breaking with great violence against the opposite side, as it does at the larger angles of rolling, or, at more moderate angles, running across in a breaking wave or bore, which consumes its energy as it goes in its own internal resistance; and under these circumstances the timing of the motion appears invariably to approach pretty nearly to that giving the maximum extinction for the degree of motion. But the motion of the water sometimes takes the form of a mere alternating slope of surface, or tidal swing from side to side, and here there is very little waste of energy, the energy of motion of the flow of water in one direction being converted into potential energy in the shape of rise of water at the side, and then given out again to the water flowing back to the other side, and so on. The waste of energy in this form of motion being almost *nil*, the timing is almost exactly that appropriate to *no* extinction, the water being in the middle of its passage across and the surface being level when the ship is upright.'

"The value of the chamber of course increases as its length in the direction of the keel of the ship increases. The actual size of the chamber we adopted appears to give valuable results, although its extent was necessarily limited."

Tabular Statement of Results of the Above Experiments.

	Empty Chamber. Existing Bilge-keels.	Fully Extended Chamber.	Empty Chamber. Two Feet additional Width of Bilge-keel.	Wave Slope.
	°	°	°	°
Steady rolling in co-periodic waves.....	.5	.9	3.8	.39
	10	3.8	7.5	1.22
	15	10.5	11.1	2.63
	20	16.6	14.7	4.59
Irregular rolling represented by angle accumulated from rest in five successive co-periodic waves.....	.5	1.3	4.1	.47
	10	4.5	7.7	1.32
	15	10.7	11.2	2.67
	20	16.6	14.8	4.64

In some lectures recently delivered Mr. Smith, assistant constructor of the navy, illustrated the use of water in quelling motion by models as shown below.

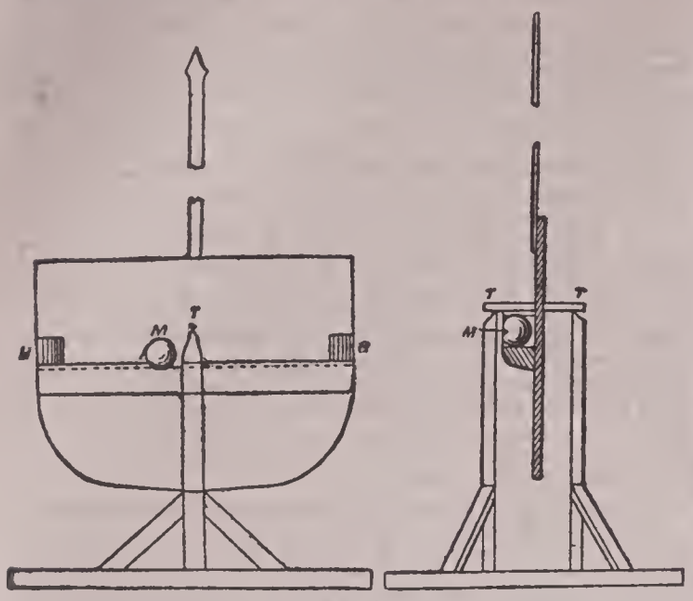


FIG. 6.

"The models represented the midship sections of the 'Admiral' class, and were both of the same weight and size. Each model was mounted on trunnions, marked T, and both oscillated freely on these trunnions in exactly the same time. The models were placed one behind the other, so that the parallelism of the masts was evident to the audience. The model in Fig. 7 was provided with a glass tube into which varying quantities of water could be put. An amount of water representing $\frac{1}{100}$ of the total weight of the model, *i.e.*, 100 tons in a 10,000-ton ship, was now placed in the tube, the models were started from the same angle as before, and the model with the loose water, instead of keeping up exactly with the other, or rolling more violently, came almost instantaneously to rest.

"The tube was filled with varying quantities of water, and the effect was always to stop the model much sooner than the model with no weights free to move. The two models were always started from the same angle, so that their relative behavior could be easily seen. When the tube was quite full there was practically no effect. The two models rolled almost together. The same effect resulted from the motion of a marble representing in weight 100 tons in a ship of 10,000 tons. The same reduction must always occur in a rolling ship if we have a loose weight of any kind, whether the weight be water or a gun. If this reduction did not take place we should have something to explain which would be quite inexplicable. For suppose we have two ships alike in all respects as regards size, shape, weight, time of oscillation, etc., and situated on precisely the same seas, but one having all her weights properly secured, and the other with a weight capable of traversing the deck every time the ship rolls. If the two vessels were to roll to exactly the same extent we should have the sea not only rolling the ship with the loose weight to the same extent as the ship with all her weights fixed, but the sea would, in addition, be doing all the work involved in the traversing of the heavy weight across the deck, which is quite impossible under the circumstances of perfect similarity we have supposed. The sea can only do the same work on both. In the one case that work consists entirely in rolling the vessel, in the other it consists partly of rolling the ship and partly in dashing the weight about. The rolling in the latter must therefore inevitably be less than in the former case."

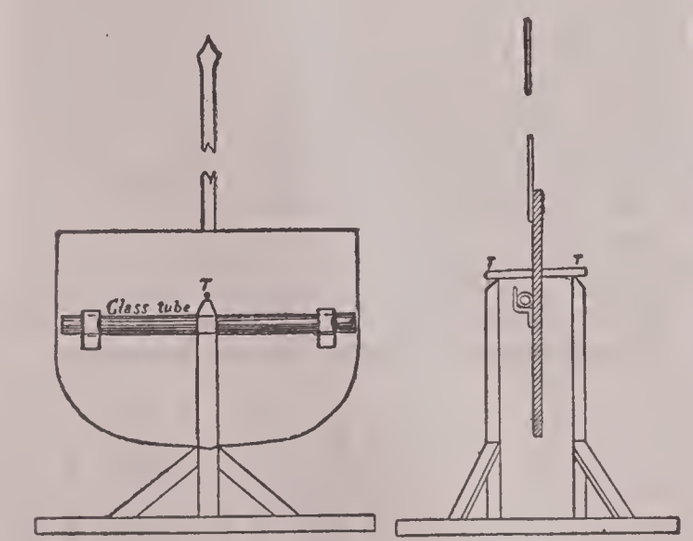


FIG. 7.

Dynamical stability is the "work" done or energy expended in heeling the ship from the upright to any inclined position. The unit of "work" employed in measuring dynamical stability is a foot-ton. When the vessel is gradually inclined the forces inclining her must do work depending upon the amount of the statical stability at the successive instantaneous inclinations passed through, and these are given by the curve of stability already described. Dynamical stability is of value as a means of comparing the resistance of ships to upsetting under the action of suddenly applied forces, such as squalls of wind. Illustrating this Mr. White says: Dynamical stability.

"Roughly speaking, it may be said that a force of wind which, steadily and continuously applied, will heel a ship of ordinary form to a certain angle will, if it strikes her suddenly when she is upright, drive her over to about twice that inclination, or in some cases further still. A parallel case is that of a spiral spring; if a weight be suddenly brought to bear upon it, the extension will be about twice as great as that to which the same weight hanging steadily will stretch the spring. The explanation is simple. When the whole weight is suddenly brought to bear upon the spring, the resistance which the spring can offer at each instant, up to the time when its extension supplies a force equal to the weight, is always less than the weight; and this unbalanced force stores up work which carries the weight onwards, and about doubles the extension of the spring corresponding to that weight when at rest.

Structure.

The changes which have come about in materials and modes of construction within the last 50 years have been most remarkable. The first steamer built expressly for regular voyages between Europe and America was not built until 1837. Dr. Lardner stated at about this date: "We have an extreme limit of a steamer's practicable voyage, without receiving a relay of coals, a run of about 2000 miles." The "Great Western," built by Patterson of Bristol and engined by Maudslay of London under the superintendence of Sir I. K. Brunel, was the first such ship, and she was launched July 19, 1837. She was 212 feet long between the perpendiculars, 35 feet 4 inches broad, and had a displacement of 2300 tons. She was propelled by paddles. Iron vessels were built early in the present century for canal service, then for river service, and later for packet service on the coasts. In about the year 1838 iron vessels of small dimensions were built for ocean service. The largest iron vessel built up to 1841 was less than 200 feet long. In 1843 we get for the first time the ocean-going steamship in its present form, built of iron, and propelled by the screw. This was the "Great Britain," 286 feet long, projected and designed by Brunel. Time has abundantly justified these bold enterprises on the part of Brunel, which he had to carry through in the face of great opposition. He entered with equal boldness on another innovation in 1850, viz., the use of very large dimensions on the ground of economy of power. It was not until 1852 that he had the opportunity to put these views forward in a way to satisfy him. The different sizes of vessels discussed before the design was finally settled for the "Great Eastern" were as follows: Great Western. Great Britain. Great Eastern.

No.	Length.	Breadth.	Midship Section.	Draught.
1	663	79.9	1646	24
2	634	76.39	1640	25
3	609	73.5	1639	26
4	730	87	2090	28

The dimensions eventually settled were—length, 680 feet; beam, 83 feet; mean draught, about 25 feet; screw engine, indicated horse-power, 4000, and nominal horse-power, 1600; paddle, indicated horse-power, 2600, and nominal horse-power, 1000; to work with steam 15 lb to 25 lb; speed of screw, 45 to 55 revolutions; paddle, 10 to 12.

The "Great Eastern," produced by the joint skill of Brunel and Scott Russell, remains in advance of present practice, although she has served as a model for the best of it. Her great size rendered it possible to give to her an amount of security against fatal injury to her hull which cannot be attained in smaller ships. It is a mistake to suppose that large ships are less secure than small ones. The

large ship can receive without inconvenience a wound which would be fatal to a small one, and the possibilities of obtaining high speed increase with the size. Had a higher speed been aimed at in the "Great Eastern," it might have altered the whole current of her history, and changed also the history of shipbuilding itself.

Bulk-heads.

The question of bulkheads, on which Brunel insisted so much in this ship, is one which underlies all questions of construction. If the number of bulkheads in ships were increased as they ought to be, the numbers and sizes of the ribs or frames of the ship would be modified, and the system of construction generally would be changed, and become more like that of the "Great Eastern." The question is therefore one which justifies some further consideration, so that it may be popularly understood.

Iron ships are commonly made with less than half their bulk out of water. If water enters such a ship, and the amount which enters does not exceed in bulk that portion of the bulk of the ship which is out of the water, *and which will, when immersed, exclude the water*, then the ship, if she does not turn over, will still float. If, however, the inflow cannot be stopped, but continues, the ship soon sinks.

Let us suppose the case of a ship 50 feet long, 10 feet wide, and 10 feet deep, divided into five equal parts by four watertight partitions, and floating in water with half its bulk immersed (Fig. 8). Suppose now that a hole is made

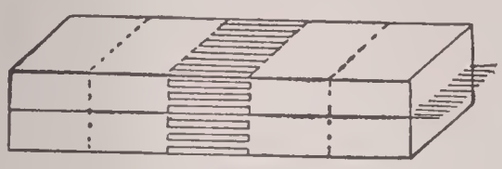


FIG. 8.

in the middle of this ship under the water, so that water can flow freely in, then the part of the ship which is shaded ceases to have floating power. The water in this shaded place is no longer displaced, but is admitted, and if the ship is to continue afloat, the other parts of the ship must displace water to the amount by which this shaded part has ceased to do so. As it is one-fifth of the whole immersed bulk which is lost, the remaining four compartments must sink, so as each to support one-fourth of the whole, instead of one-fifth, as before; *i. e.*, the draught of water, or immersion of the whole ship, will be increased, and the ship will, if she has stability enough to keep upright, finally float at rest again at this deeper immersion. The water will rise in the centre compartment to the level of the water outside, and will then cease to flow in. The additional immersion will be only one and a quarter feet, but in an ordinary ship, divided into compartments of equal length, there would be a greater increase of immersion by the injury of a centre compartment, because the end compartments are narrow, and must sink deeper in order to bear their share of the burden imposed by the loss of the buoyancy of the centre division.

Or it may be other than a central compartment which is damaged, and in that case the ship tips, and finds a new floating line, with the end towards which the damaged division lies depressed more than the other end.

If it should happen that the divisional partitions, or bulkheads as they are called, rise only a few inches above the water level which the ship floats at when undamaged, then, on the occurrence of a bad leak filling one compartment, the tops of the bulkheads are brought, by the increased immersion of the ship, beneath the water-level, the water will rise through the hatches, or openings in the deck, in the damaged compartment, will flow over the entire deck, and the ship will be lost, either by the filling of other compartments by the water passing down into them, or by the capsizing of the ship. This latter event will generally happen, although only one compartment is full, if the sea has free access to the deck from end to end of the ship, and it becomes wholly immersed.

In 1866 the president of the Institution of Naval Architects said: "The circumstances of the sad event of the loss of the 'London,' accompanied as it was by the simultaneous loss of another ship of still larger size, and of a higher reputed character" (the "Amalia"), "was, I think, an event so remarkable that I should be very sorry indeed if this annual meeting of this Institution were to pass by without some notice being taken of the extraordinary circumstances of the loss of that ship, and without some discussion upon what we suppose to be the causes of the loss, and the faults, if any, of the construction of those ships." "The passengers who pass to and fro are not judges of the question; they can take no precaution for their own safety; it is to the skill and science of those who build these ships that the passenger trusts, and to the care which the legislature and the Government are bound to take of their fellow-subjects."

Subsequently the council of the Institution arrived at the following conclusions and offered them as recommendations to shipbuilders and shipowners:

Recommendations of the Council of the Institution of Naval Architects.

"1. No general rule can be safely laid down for regulating the proportions of length and depth to the breadth of a ship, and a great variety of proportions of length and depth to breadth may be safely adopted, and the ship made sound and seaworthy, by judicious form, construction, and lading.

"2. The construction load-water-line of every ship, and her scale of displacement from light to load-water-line, should be appended to every design of a ship, showing the extreme draught to which she should be laden; and measures should be taken to insure that this information be recorded on the ship's papers. It is desirable also that along with a ship's papers, in the possession of the captain, there should always be carried a scale of displacement, a sail draft, and a set of outline plans of the ship, comprising a longitudinal section, and at least four cross sections of the ship. On these plans should be marked the capacity, in tons of 40 cubic feet, of each compartment of the hold. The surplus buoyancy of each compartment up to the load-water-line, or its power to carry deadweight, should be given in tons deadweight. These papers should always accompany the ship's register, and a copy of them should be lodged in the custom house of the port from which the ship hails.

"3. There is a minimum height of freeboard which cannot be safely reduced in sea-going ships of ordinary fitment; and it is desirable to fix this minimum height. Freeboard should be understood to be the vertical height of the upper surface of the upper deck (not spar deck) at the side, amidships, above the load-water-line. The proportion of freeboard should increase with the length. One-eighth of the beam is a minimum freeboard for ordinary sea-going ships of not more than five breadths to the length, and $\frac{1}{12}$ of the beam should further be added to the freeboard for each additional breadth in the length of the ship; this would give:

For a ship of 32 feet beam and 160 feet long, 4 feet freeboard;
For a length of 192 feet, 5 feet freeboard;
For a length of 224 feet, 6 feet freeboard;
For a length of 256 feet, 7 feet freeboard;—the beam remaining the same.

But, as the addition of a spar-deck on long vessels may be considered an equivalent or substitute for the increased freeboard required for extra length, a complete spar-deck would leave the freeboard of these extra lengths at the original height of 4 feet.

"4. It is not considered desirable to offer any recommendations with regard to poops and forecastles. It must depend entirely upon the professional judgment of the designer of a ship, whether, looking to her proportions, form, and purpose, the additions of poop and forecastle are expedient and safe. In general, where poops and forecastles are adopted, they should be closed and seaworthy, but their weight may be inexpedient in long fine ships; and there are cases where a light top-gallant forecastle (*i.e.*, an open forecastle raised above the level of the upper deck) may be useful in keeping heavy seas out of the ship. In general, spar-decks in long ships are preferable to poop and forecastle, and no diminution of freeboard should be allowed for a poop or forecastle.

"5. It would add much to the strength and security of steamships if transverse and longitudinal bulkheads, coal bunkers, iron lower decks, and screw alley were all so connected with the hull of the ship and with each other as to form independent cellular compartments, watertight, and having all their communications with the decks and each other by watertight doors worked from the deck. In proportioning the compartments of a ship (and especially of ships devoted to passengers) it is very desirable so to arrange them that if any *two* adjacent compartments be filled, or placed in free communication with the sea, the remaining compartments will float the ship. It is considered that no iron passenger ship is well constructed unless her compartments be so proportioned that she would float safely were any one of them to fill with water, or be placed in free communication with the sea. Double bottoms are to be regarded as a great element, both of safety and strength, in the structure of a large iron ship.

"6. It is very desirable that sufficient ventilation should always be provided in passenger ships to admit of closing all side scuttles and battening down, or otherwise inclosing, all hatches in bad weather.

"7. In regard to hatchways and openings in the deck no limits can be set to their size; but it is desirable to carry the beams of the ship across them without interruption wherever practicable; they may also be made removable where required, being replaced on going to sea. All coamings over engine and boiler rooms in passenger ships should be as high as practicable, of iron, and riveted to the beams and carlings. Openings in the deck may be fitted with solid coverings, hinged in place so as to be readily closed.

"8. It being considered that all openings in the sides or ends of vessels are subject to accidents that endanger the safety of ships, it is desirable that the side and stern windows should, in addition to the glass lights, have *hinged dead-lights*, with a view to their being always in place, and that all cargo ports should be strongly secured by iron cross bars.

"9. It is believed that all openings from and communications with the sea from engine-room and pipes should be protected by conical, or Kingston, or sluice valves, and similar precautions should be taken for all openings through the bottom of the ship, where damage to pipes or ship would admit water into the holds.

"10. It is considered that all steam vessels, if of iron, should have a brass-barrelled hand-pump to every compartment except the forward and after ones (the former to have a sluice cock), or that, as a substitute for these pumps, there should be patent

pumps having independent connections to this extent. They should also have a donkey engine and pump capable of pumping from the bilge and from the sea, of feeding the boilers, and of throwing water on deck. All vessels should have one or more bilge-pumps, worked by the large engines, with bilge injection pipes if the engines have condensers. In large vessels the donkey engines should have a separate boiler high above the water-line, and also communication with the main boilers. All vessels should have a set of bilge pipes connecting every hold and the engine compartments with these pumps. As a security against fire there should be pumps on the upper deck, fitted as force pumps, and provided with a sufficient length of hose (with the necessary copper delivery jets) to reach either extremity of the vessel, and also provided with suction hose or pipes from the sea. The cocks by which the working of the pumps is regulated should be carefully arranged and marked, and great care should be taken that both cocks and pipes are accessible. A plan of the whole should accompany the ship's papers, and the crew should be periodically exercised in their use.

"11. The stowage of a ship, whether done by contract or not, should be done under inspection of the captain of the ship, and should be conducted under his own orders only; and he alone should be held responsible for the good stowage of his ship. Ships are often very badly stowed, the weights being sometimes too low, thus causing them to roll with such rapid and violent motions as to carry away the spars, and otherwise endanger the safety of the ship, and at other times too high, thus making the ships crank, and liable to turn over. A ship may, however, generally, whatever her form, be so stowed as to avoid both dangers. As the character of the ship in these respects varies, so does the number of oscillations she would make per minute if she were set rolling in still water, by men running across her deck, or other means, and then allowed to come to rest; that is, if the ship be crank the number of oscillations per minute will be few, and if she be too stiff they will be numerous; but, under the same conditions of stowage, the number will always be very nearly the same, whatever the amount of the impulse to set her rolling may be. Although this peculiarity has long been known to scientific men, no such observations have been made in merchant ships as would justify any specific rule on the subject. It is, however, most desirable that information should be collected upon it, and that the attention of the owners and captains of vessels should be called to it.

"12. It is believed that the present rules of the Board of Trade regarding boats, life-boats, and their tackle are good in principle. The responsibility of keeping all boats in constant readiness and efficiency obviously rests on the captain, and must fix on him the blame for all neglect and its consequences. Every open boat built of iron or steel should be fitted with sufficient watertight spaces to float her.

"13. The system of proportioning anchors and cables by Lloyd's, and of proving under license of the Board of Trade by Act of Parliament is so far satisfactory; but, as the proof-test alone cannot establish the excellence of the cable, the reputation of the makers must be relied upon.

"14. In order to provide for the rapid clearance of the upper deck from water which may break over the ship, flap-boards should be fitted to the lower part of the bulwarks, sufficient in number and in area to admit of the rapid escape of the water.

"15. Water-closets on decks below or near the water-line, may be the means of gradually and imperceptibly flooding the ship, and endangering her safety, unless the pipes and valves are strong and are carefully fitted."

It is in the directions indicated in these recommendations that the honesty and skilfulness of the modern builder of steam and sailing ships of war come into play, and some judgment may be formed by the general public of the character of the ship by inquiring into matters upon which the council thought it necessary to make such recommendations. The guarantee which the public have of the fitness of passenger ships for service, as a question of proper construction and state of efficiency, is the survey and certificates of the Board of Trade. The law runs thus:

Board of Trade surveys.

The owner of every steam vessel constructed or intended to carry passengers (except vessels which fall within the definition of foreign-going ships contained in the Mercantile Marine Act, 1850, and are employed in the conveyance of the royal public mails or despatches under contract with and under the superintendence of the lord high admiral or the commissioners for executing the office of lord high admiral) shall cause such steam vessel to be surveyed twice at least in every year, at the times hereinafter directed, by a shipwright surveyor and an engineer surveyor appointed for the purposes of this Act by the lords of the said committee, such shipwright surveyor in the case of an iron steam vessel being a person properly qualified to survey iron steam vessels, and shall obtain a declaration of the sufficiency and good condition of the hull of such steamer, and of the boats and other equipments thereof, required by this Act; and also, if the lords of the said committee so require, a statement of the number of passengers (whether deck passengers or other passengers) which such vessel is constructed to carry, under the hand of such shipwright surveyor, and a declaration of the sufficiency and good condition of the machinery of such steamer under the hand of such engineer surveyor; and in such declarations it shall be distinguished whether such vessel is in construction and equipments adapted for sea service as well as for river or lake service, or for river or lake service only; such declaration shall state the local limits within which such vessel is, in the judgment of the surveyor, adapted for plying; and in the case of sea-going vessels the declaration of one of the surveyors shall contain a statement that he is satisfied that the compasses have been properly examined and adjusted; and such owner shall transmit such declaration to the lords of the said committee within fourteen days after the dates thereof respectively.

As to the fifth recommendation of the council of the Institution of Naval Architects, it must be observed that there is at present no law relating to the subdivision of steamships. There was a clause (No. 300) in the Merchant Shipping Act of 1854, which was virtually a reproduction of clause 20 of the Steam Navigation Act of 1851, and which read as follows:

"1. Every steamship built of iron of 100 tons or upwards, the building of which commenced after the 28th day of August, 1846, and every steamship built of iron of less burden than 100 tons, the building of which commenced after the 7th August, 1851 (except ships used solely as steam tugs), shall be divided by substantial transverse watertight partitions, so that the fore part of the ship shall be separated from the engine-room by one of such partitions, and so that the after part of such ship shall be separated from the engine-room by another of such partitions.

"2. Every steamship built of iron, the building of which commences after the passing of this Act, shall be divided by such partitions as aforesaid into not less than three equal parts, or as nearly so as circumstances permit.

"3. In such last-mentioned ships each such partition as aforesaid shall be of equal strength with the side plates of the ship with which it is in contact.

"4. Every screw steamship built of iron, the building of which commences after the passing of this Act, shall, in addition to the above partitions, be fitted with a small watertight compartment inclosing the after extremity of the shaft."

The above law was repealed by the Act dated 29th July, 1862, and on the 28th August, 1863, the Admiralty applied to the Board of Trade to know whether the Board of Trade officers were empowered under any circumstances to insist on iron vessels having watertight compartments when employed in conveyance of mails and passengers, observing that the Admiralty were still of opinion that the regulations in force prior to the Amendment Act of 1862 in respect of contract packets should not have been relaxed. They considered such vessels should have compartments so arranged that if any one of them became filled with water the loss of buoyancy thereby occasioned should not endanger the safety of the ships, as recommended by them in their communication of the 17th December, 1860. To this the Board of Trade replied (3d September, 1863) that their surveyors no longer had any power to require given watertight partitions to be fitted in passenger steamships—though they agreed with the Admiralty in thinking that steam vessels carrying passengers and mails should be provided with a sufficient number of watertight partitions,—and had no reason to suppose that the Admiralty would not insist on such partitions being fitted in all steamships employed in conveyance of mails. They further say that the enactments in the Act of 1854 were repealed, not because of any doubts as to the necessity of proper and sufficient watertight partitions, but because those enactments which required only two of such partitions for all sizes and classes of ships had become practically useless or mischievous. It was found that in large vessels more partitions than the Act required were necessary to secure the safety of the ship, and it was thought better to leave builders and designers unfettered in providing extra strength and security to meet the various forms, sizes, and descriptions of ships than to tie them down by general statutory regulations which could not be so framed as to meet the varying wants and circumstances of the shipbuilding trade.

In a return by the Board of Trade to the House of Commons, dated 11th August, 1875, setting forth the instructions issued to their surveyors under the Merchant Shipping Acts, 1854 to 1873, clause 26 reads:

"Surveyors should not refuse to grant a declaration for a vessel solely on the ground that bulkheads are not fitted, that the ordinary bulkheads are not watertight, or that the bulkheads fitted are otherwise defective, unless they are of opinion that the want of, or the defective state of, the bulkheads renders the ship unseaworthy, in which case they are fully justified in refusing to grant a declaration. They should, in all cases in which they refuse to grant a declaration for a vessel in consequence of defects relative to bulkheads, forward to the Board of Trade a full statement of their reasons for thinking that those defects render the hull of the vessel unseaworthy. Collision watertight bulkheads, at least, must be fitted in all seagoing steamers. The surveyors are also to see that an after watertight compartment is fitted to cover the stern-tube of the screw-shaft, both in old and in new vessels."

This regulation has been reissued in the latest instructions to Board of Trade surveyors, dated 1884.

Inefficient subdivision of iron and steel ships.

It thus comes about that the number of bulkheads forming watertight compartments, the number of doors in them, and how they are fastened, are made the subject of consideration by the Board of Trade at their inspections; but the fact is that the great majority of ocean-going steamers are not divided into watertight compartments in any efficient manner, and many losses in collision, grounding, and swamping are due to this. Although all steamships have some bulkheads, and some have many bulkheads, they are

as a rule distributed in such a way, or are so stopped below the water-level, that for flotation purposes after perforation those lying between the foremost collision bulkhead and the after bulkhead through which the screw-shaft passes are practically useless.

With the exception of some four hundred ships, there are no iron steamships afloat which would continue to float were a hole made in the bottom plating anywhere abaft the collision bulkhead and outside the engine-room, or which would not founder were water admitted through breaches made by the sea in weak superstructures and deck openings. Of the four hundred ships referred to as having properly designed bulkheads two hundred are essentially cargo-carriers. They are generally built with five subdivisions, the machinery space being one. *Iron sailing ships are without exception undivided into compartments.* They have by law a collision bulkhead near the bow, and that is all. Between June, 1881, and February, 1883, there were about one hundred and twenty iron steamships lost, of speeds of nine to twelve knots, not one of which was well constructed according to the opinion of the council of the Institution of Naval Architects.

It may be said that wooden ships were not divided into watertight compartments, but it must be remembered that in a wooden ship there is far more local resistance to a blow either in collision or by grounding, and that a wooden ship takes a much longer time to settle down in the water and sink. Also, when wood was employed for passenger and trading ships speeds were much lower and traffic and risks of collision very much less.

The shipbuilding registries prescribe rules for the government of the builder who desires to have their certificate, and these rules have been so carefully framed and so honestly enforced that English-built ships are as a rule well and solidly constructed. The recent (8th June, 1882) rule of the London Lloyd's register as to the important subject of division into compartments is as follows, and it may be hoped that it will be effective:

"Screw-propelled vessels, in addition to the engine room bulkheads, to have a watertight bulkhead built at a reasonable distance from each end of the vessel. In steamers 280 feet long and above an additional bulkhead is to be fitted in the main hold, extending to the main or upper deck, about midway between the collision and engine-room bulkheads; and in steamers of 330 feet long and above an additional bulkhead is to be fitted in the afterhold, extending to the same height."

"The foremost or collision bulkhead in all cases to extend from the floor plates to the upper deck. . . . The engine-room bulkheads to extend from the floor plates to the upper deck in vessels with one, two, or three decks, and to the main deck in spar- and awning-decked vessels. The aftermost bulkhead will be required to extend to the upper deck unless the arrangement of bulkheads be submitted to and approved by the committee. . . . In sailing vessels the foremost or collision bulkhead only will be required."

It is not intended by the foregoing remarks, serious as they are, to blot the splendid record of shipbuilding achievement in Great Britain during the last twenty years. The shipowners, shipbuilders, marine engineers, Lloyd's surveyors, and the Board of Trade have all shared in a development of shipping which, in amount and in general efficiency, is not only without parallel in the history of the world, but, as it still appears to us who have witnessed it, almost incredible. It still is to be regretted that expansion has been thought of and sought more ardently than greater security and efficiency. The men who have studied to improve their structural arrangements because of their love of true and good work, and with no prospect of recognition or reward, have been comparatively very few.

Strains to which ships are subject.

There is, perhaps, no structure exposed to a greater variety of strains than a ship, and none in which greater risks of life and property are incurred. A thorough practical knowledge of the disturbing forces in action either to injure or destroy the several combinations embraced in its structure is therefore most important. Some of these forces always act, whether the ship be at rest or in motion. She may be at rest floating in still water, and will be at rest if cast on shore; and, when there, she may be resting on her keel as a continuous bearing, with a support from a portion of her side, or she may be supported in the middle only, with both ends for a greater or less length of her body left wholly unsupported, or she may be resting on the ends with the middle unsupported, or under any other modification of these circumstances; and under all these the strains will vary in their direction and in their intensity.

If the ship be in motion the same disturbing forces may still be in action, with others in addition which are produced by a state of motion. When a ship is at rest in still water, although the upward pressure of the water upon its body is equal to the total weight of the ship, it does not necessarily follow that the weight of every portion of the vessel will be equal to the upward pressure of that portion of the water directly beneath it, and acting upon it; on the contrary, the shape of the body is such that their weights and pressures are very unequal.

If the vessel be supposed to be divided into a number of laminæ of equal thickness, and all perpendicular to the vertical longitudinal section, it is evident that the after laminæ comprised in the overhanging stern above water, and the fore laminæ comprised in the projecting head also above water, cannot be supported by any upward pressure from the fluid, but their weight must be wholly sustained by their connection with the supported parts of the ship. The laminæ towards each extremity immediately contiguous to these can evidently derive only a very small portion of their support from the water, whilst towards the middle of the ship's length a greater proportionate bulk is immersed, and the upward pressure of the water is increased.

A ship floating at rest under the view just taken of the relative displacement of different portions of the body, if the weights on board are not distributed so that the different laminæ may be supported by the upward pressure beneath then as equally as possible, may be supposed to be in the position of a beam supported at two points in its length at some distance from the centre, and with an excess of weight at each extremity. At sea it would be exposed to the same strain; and if supported on two waves whose crests were so far apart that they left the centre and ends comparatively unsupported, the degree of this strain would be much increased. The more these two points of support approach each other, or if they come so near each other that the vessel may be looked upon as supported on one wave, or on one point only in the middle of her length, the greater will be the tensile strain on the upper portion, and the crushing strain on the lower portion of the fabric of the ship. A vessel whose weights and displacements are so disposed as to render her subject to a strain of this kind beyond what the strength of her upper works will enable her to bear, will tend to assume a curved form.

The centre may curve upwards by the excess of the pressure beneath it, and the ends drop, producing what is called "hoggiug." The main remedy for these evils is in the strength of the deck and upperworks, and their power to resist a tensile strain. There is seldom a want of sufficient strength in the lower parts of the vessel to resist the crushing or compressing force to which it is subjected. The decks of vessels should not, therefore, be too much cut up by broad hatchways; and care should be taken to preserve entire as many strakes of the deck as possible. The tensile strength of iron can be brought to bear most beneficially in this respect.

Though these are the strains to which a ship is most likely to be exposed, it by no means follows that there are no circumstances under which strains of the directly opposite tendency, when pitching, or otherwise, may be brought by recoil to act upon the parts. The weights themselves in the centre of the ship may be so great that they may have a tendency to give a hollow curvature to the form, and it is therefore equally necessary to guard against this evil. When this occurs, the vessel is technically said to be "sagged," in distinction to the contrary or opposite change of form by being hogged. The weight of machinery in a wooden steam-vessel, or the weight or undue setting up of the main-mast, will sometimes produce sagging. The introduction of additional keelsons tended to lessen this evil, by giving great additional strength to the bottom, enabling it to resist extension, to which, under such circumstances, it became liable; and, as the strain upon the deck and upperworks becomes changed at the same time, they are then called upon to resist compression.

When the ship is on a wind, the lee-side is subjected to a series of shocks from the waves, the violence of which may be imagined from the effects they sometimes produce in destroying the bulwarks, tearing away the channels, etc. The lee-side is also subjected to an excess of hydrostatic pressure over that upon the weather side, resulting from the accumulation of the waves as they rise against the obstruction offered to their free passage. These forces tend in part to produce lateral curvature. When in this inclined position, the forces which tend to produce hogging when she is upright also contribute to produce this lateral curvature.

The strain from the tension of the rigging on the weather side when the ship is much inclined is so great as frequently to cause working in the topsides, and sometimes even to break the timbers on which the channels are placed. Additional strength ought therefore to be given to the sides of the ship at this place; and, in order to keep them apart, the beams ought to be increased in strength in comparison with the beams at other parts of the ship.

The foregoing are the principal disturbing forces to which the fabric of a ship is subjected; and it must be borne in

mind that some of these are in almost constant activity to destroy the connection between the several parts. Whenever any motion or working is produced by their operation between two parts, which ought to be united in a fixed or firm manner, the evil will soon increase, because the disruption of the close connection between these parts admits an increased momentum in their action on each other, and the destruction proceeds with an accelerated progression. This is soon followed by the admission of damp, and the unavoidable accumulation of dirt, and these then generate fermentation and decay. To make a ship strong, therefore, is at the same time to make her durable, both in reference to the wear and tear of service and the decay of materials. It is evident from the foregoing remarks that the disturbing influences which cause "hogging" are in constant operation from the moment of launching the ship. As this curvature can only take place by the compression of the materials composing the lower parts of the ship and the extension of those composing the upper parts, the importance of preparing these separate parts with an especial view to withstand the forces to which they are each to be subjected cannot be overrated by the practical builder.

Curves of strains.

In his *Manual of Naval Architecture*, Mr. W. H. White gives illustrations of the still-water strains upon two armored ships in the British navy, the "Minotaur" and the "Devastation."

H. M. S. "Minotaur."

In these diagrams the curves B represent the distribution of the buoyancy. The ordinates of the curve are proportionate to the displacement of adjacent transverse sections of the ships. The curves W represent the distribution of the weight of the ships and their lading. The curves L repre-

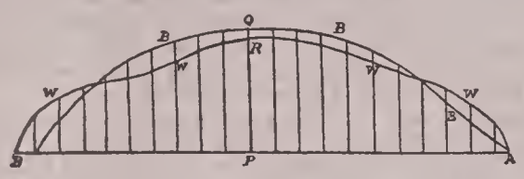


FIG. 9.

sent the excesses and defects of buoyancy obtained from the two curves B and W and set off from a new base line. The excess of buoyancy above the line is exactly equal to

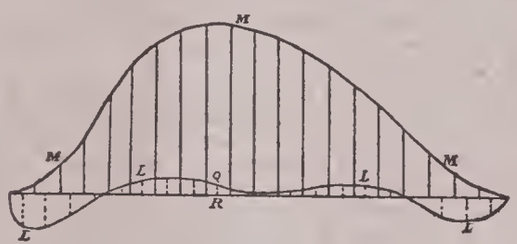


FIG. 10.

the defect of buoyancy below it. The curves M indicate the bending moments. The ordinates of the curve lying above the base are obtained by summing all the moments, whether upwards or downwards, about the point in the length of the ship where the ordinate is taken. It may happen,

H. M. S. "Devastation."

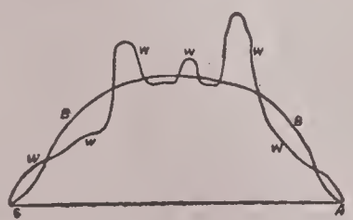


FIG. 11.

as in the case of the "Devastation," that the moments will tend to cause hogging for a portion of the length and will

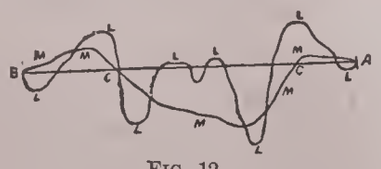


FIG. 12.

then change their character, and at other portions of the length will tend to cause sagging. Where the curve M crosses the base line there is no strain of either hogging or sagging tending to bend the ship there. In the "Minotaur" there is a hogging tendency throughout. The amount at the midship section is very great, being represented by the moment 4.5 feet × 10.690 tons. After Sir Edward Reed left the Admiralty he strongly expressed his fears that this strain was too considerable for safety in the "Minotaur" and "Agincourt."

Designing.

The principal plans of a ship are the "sheer" plan, giving in outline the longitudinal elevation of the ship; the "body" plan, giving the shape of the vertical transverse sections; and the "half-breadth" plan, giving the projections of transverse longitudinal sections. In addition to these the builder is furnished by the designer with elevations, plans, and sections of the interior parts of the ship, and of the framing and plating or planking.

The thicknesses or weights of all the component parts are specified in a detailed specification, in order that the ship when completed may have the precise weight and position of centre of gravity contemplated by the designer. In the case of ships built for the British navy all the building materials are carefully weighed by an agent of the designer before they are put into place by the builder. As each section of the work is completed, the weight is compared with the designer's estimate in the designing office. As soon as the incomplete hull is floated the actual displacement is measured, and compared with the weights recorded as having gone into the ship. It is also the practice in the Royal Navy to calculate the position of the centre of gravity of the incomplete hull, and its draught of water before it is floated, in order to avoid all risk of upsetting from deficiency in stability at that stage of construction. The ship is usually found to float in precise accordance with the estimate. When completed ships float at a deeper draught than was intended, or are found to be more or less stable than was wished, this is nearly always due to additions and alterations made after the completion of the design. Where the designer is at liberty to complete the ship in accordance with the original intention there ought to be precise correspondence between the design and the ship.

In designing a ship of novel type the designer has to pass all the building details through his mind and assign them their just weights and proportions and positions. Every plate and angle bar and plank, every bar and rod and casting and forging, and every article of equipment has to be conceived in detail and its effect estimated.

Building.

Laying off.

The term "laying off" is applied to the operation of transferring to the mould loft floor those designs and general proportions of a ship which have been drawn on paper, and from which all the preliminary calculations have been made and the form decided. The lines of the ship, and exact representations of many of the parts of which it is to be composed, are to be delineated there to their full size, or the actual or real dimensions, in order that moulds or skeleton outlines may be made from them for the guidance of the workmen.

Fore- and after-bodies.

A ship is generally spoken of as divided into fore and after bodies, and these combined constitute the whole of the ship; they are supposed to be separated by an imaginary athwartship section at the widest part of the ship, called the midship section or deadflat. The midship body is a term applied to an indefinite length of the middle part of a ship longitudinally, including a portion of the fore-body and of the after-body. It is not necessarily parallel or of the same form for its whole length.

Those portions of a wooden ship which are termed the square and cant bodies may be considered as subdivisions of the fore-bodies and after-bodies. There is a square fore-body and a square after-body towards the middle of the ship, and a cant fore-body, and a cant after-body at the two ends. In the square body the sides of the frames are square to the line of the keel, and are athwartship vertical planes. In the cant bodies the sides of the frames are not square to the line of the keel, but are inclined aft in the fore-body and forward in the after-body. The reason for the frames in these portions of a wooden ship being canted is that, in these parts of the ship, the timber would be too much cut away on account of the fineness of the angle formed between an athwartship plane and the outline or water-line of the ship. The timber is therefore turned partially round till the outside face coincides nearly with the desired outline, and it is by this movement that the side of a frame in the cant fore-body is made to point aft, and in the cant after-body is made to point forward.

In wooden ships the term "timbers" is sometimes applied to the frames only, but more generally to all large pieces of timber used in the construction. Timbers, when combiued together to form an athwartship outline of the body of a ship, are technically called frames, and sometimes ribs.

Timbers.

The keel, in the United Kingdom at least, is generally made of elm, on account of its toughness, and from its not being liable to split if the ship should take the grouud, though pierced in all dirctions by the numerous fastenings passing through it. It is generally composed of as long pieces as can be obtained, united to each other by horizontal scarfs. The rabbet of the keel is an angular recess cut into the side to receive the edge of the planks on each side of it. The keel is connected forward to the stem by a scarf, sometimes called the boxing scarf, and aft to the stern-post by mortise and tenon. The apron is fayed or fitted to the after-side of the stem, and is intended to give shift to its scarfs, the lower eud scarfs to the deadwood. The keelsou is an internal line of timbers fayed upon the inside of the floors directly over the keel, the floors being thus confined between it and the keel. Its use is to secure the frames and to give shift to the scarfs of the keel, and thus give strength to the ship to resist extension lengthways, and to prevent her hogging or sagging. The foremost end of the keelson scarfs to the stemson, which is intended to give shift to the scarfs connecting the stem and keel. The frames or ribs are composed of the strongest and most durable timber obtainable.

Keel.

The floors in the Government service were carried across the keel with a short and long arm on either side alternately, so as to break joint, and between the frames the space was filled iu solid.

Floors.

From the short outline previously given of the disturbing forces acting on the ship it will be seen that the strain on the ends of the beams to destroy their connection with the side and loosen the fastenings must be very great when the ship is under sail, either on a wind or before it—that is, either inclined or rolling. The principal action of these forces is to alter the vertical angle made by the beam and the ship's side—that is to raise or depress the beam, and so alter the angle between it and the side of the ship above or below it. On the lee-side the weight of the weather side of the ship and all connected with it, and of the decks and everything upon them, as well as the upward pressure of the water, all tend to diminish the angle made by the beam and the ship's side below it, and consequently increase the angle made between them above it. The contrary effect is produced on the weather side, where the tendency is to close the angle above the beam and open that below it. If the beam, when subjected to these strains, be considered as a lever, it will be evident that the fastenings to prevent its rising ought to be as far from the side as is consistent with the convenience or accommodation of the ship, and that, while the support should also be extended inwards, the fastening to keep down the beam-end should be as close to the end of the beam, and consequently to the ship's side, as it can be placed.

The plank, or skiu, or sheathing of a ship, both external and internal, is of various thicknesses. A strake of planking is a range of planks abutting against each other, and generally extending the whole length of the ship. A thick strake, or a combinatiou of several thick

Planking.

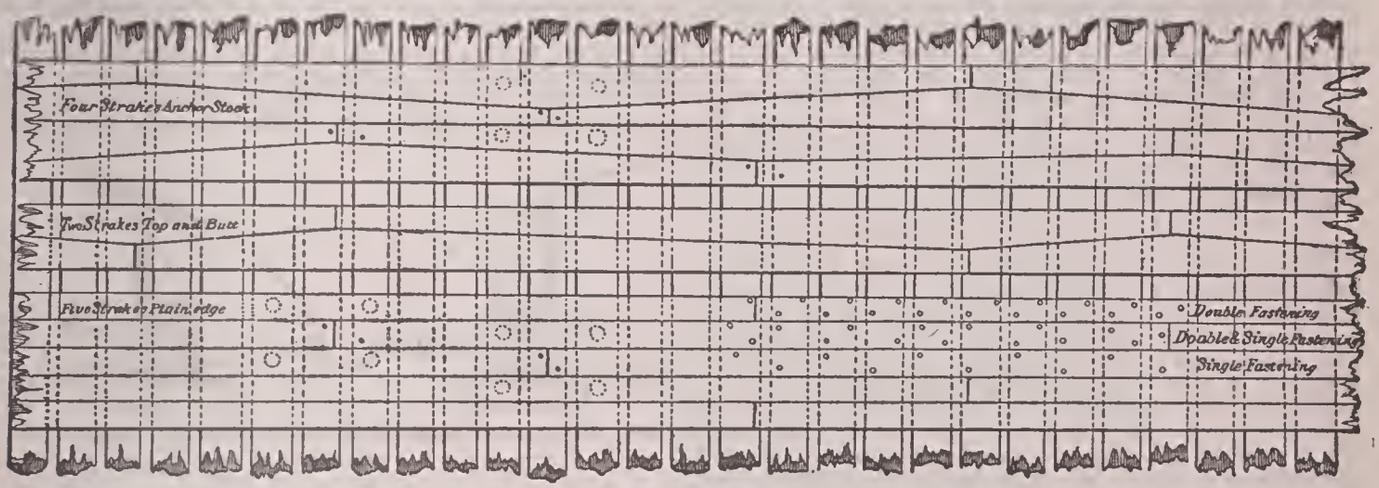


FIG. 13.

Longitudinal pieces of timber are worked round the interior of a ship for the purpose of receiving the ends of the beams of the several decks; they are called shelves, and are of the greatest importance, not only for this purpose, but also as longitudinal ties aud struts.

Shelves.

The beams of a ship prevent the sides from collapsing, and at the same time carry the decks. The beams are spaced, and their scantling settled upon according to the strength required to be given to the decks, and to suit the positions of the masts aud hatchways, and other arrangements connected with the economy of the ship. All beams have a curve upwards towards the middle of the ship, called the round-up. This is for the purpose of strength, and for the convenience of the run of the water to the scuppers. Wooden beams are single piece, two, three, or four piece beams accordiug to the number of pieces of timber of which they are composed. The several pieces are scarfed together, and dowelled and bolted, the scarfs being always vertical.

Beams.

The connectiou of the ends of the beams to the sides of the ship has been made in various ways. The points to be considered with reference to this connection, are—that the beam is required to act as a shore or strut, to prevent the sides of the ship from collapsing, and also as a tie to prevent their falling apart, that the beam shall not rise from its seat, and that it shall uot work in a fore-and-aft direction.

That the beam may be an effective shore, nothing more is necessary than that the abutment of the end against the ship's side may be perfect. In order that it may act as a tie between the two sides, it is generally dowelled to the upper surface of the shelf on which it rests; and the under surface of the waterway plank which lies upon it is sometimes dowelled into it. These dowels, therefore, connect it with the shelf and the waterway, and through this means it is thus connected with the sides of the ship.

Waterways.

The plank worked in parallel strakes, when it is called "straight-edged," or in combination of two strakes, so that alternate seams are parallel. There are two methods of working these combinations, one of which is called "anchor stock," and the other "top and butt." The differeuce will be best shown by Fig. 13. The difference in the intention is that in the method of working two strakes anchor-stock fashion, the narrowest part of one strake always occurs opposite to the widest part of the other strake, and consequently the least possible suddeu interruption of longitudinal fibre, arising from the abutment, is obtained. This description, therefore, of planking is used where strength is especially desirable. In top and butt strakes the intention is, by haviug a wide end and a narrow end in each plank, to approximate to the growth of the tree, and

strakes, is worked wherever it is supposed that the frame requires particular support—for instauce, internally over the heads and heels of the timbers, both externally and iuternally in men-of-war vessels between the ranges of ports, aud internally to support the connection of the beams with the sides and at the same time form a longitudinal tie. The upper strakes of plank, or assemblages of external planks, are called the sheer-strakes. The strakes between the several rauges of ports, beginning from under the upper-deck ports of a three-deck ship in the British navy, were called the chanuel wale, the middle wale, and the main wale. The strake immediately above the main wale was called the black strake. The strakes below the main wale diminished from the thickness of the main wale to the thickness of the plank of the bottom, and were therefore called the diminishing strakes. The lowest strake of the plank of the bottom, the edge of which fits into the rabbet of the keel, is called the garboard strake.

to diminish the difficulty of procuring the plank. When the planking is looked upon as a longitudiual tie, the advantage of these edges being, as it were, imbedded into each other is apparent, all elongation by one edge sliding upon the other being thus prevented. The shift of plank is the manner of arranging the butts of the several strakes. In the ships of the British navy the butts were not allowed to occur in the same vertical line, or on the same timber without the intervention of three whole strakes between them.

Of the internal planking the lowest strake, or combination of strakes, in the hold, is called the limber-strake. A limber is a passage for water, of which there is one throughout the length of the ship, on each side of the keelson, in order that any leakage may find its way to the pumps.

The whole of the plank in the hold is called the ceiling. Those strakes which come over the heads and heels of the timbers are worked thicker than the general thickness of the ceiling, and are distinguished as the thick strakes over the several heads. The strakes under the ends of the beams of the different decks in a man-of-war, and down to the ports of the deck below, if there were any ports, were called the clamps of the particular decks to the beams of which they are the support—as the gun-deck clamps, the middle-deck clamps, etc. The strakes which work up to the sills of the ports of the several decks were called the spirketting of those decks—as gun-deck spirketting, upper-deck spirketting, etc.

Fastening. The fastening of the plank is either "single," by which is meant one fastening only in each strake as it passes each timber or frame; or it may be "double," that is, with two fastenings into each frame which it crosses; or, again, the fastenings may be "double and single," meaning that the fastenings are double and single alternately in the frames as they cross them. The fastenings of planks consist generally either of nails or treenails, excepting at the butts, which are secured by bolts. Several other bolts ought to be driven in each shift of plank as additional security. Bolts which are required to pass through the timbers as securities to the shelf, waterway, knees, etc., should be taken advantage of to supply the place of the regular fastening of the plank, not only for the sake of economy, but also for the sake of avoiding unnecessarily wounding the timbers.

Decks. The decks of a wooden ship must not be considered merely as platforms, but must be regarded as performing an important part towards the general strength of the whole fabric. They are generally laid in a longitudinal direction only, and are then useful as a tie to resist extension, or as a strut to resist compression. The outer strakes of decks at the sides of the ship are generally of hard wood, and of greater thickness than the deck itself; they are called the waterway planks, and are sometimes dowelled to the upper surface of each beam. Their rigidity and strength is of great importance, and great attention should be paid to them, and care taken that their scarfs are well secured by through-bolts, and that there is a proper shift between their scarfs and the scarfs of the shelf.

When the decks are considered as a tie, the importance of keeping as many strakes as possible entire for the whole length of the ship must be evident; and a continuous strake of iron or steel plates beneath the decks is of great value in this respect. The straighter the deck, or the less the sheer or upward curvature at the ends that may be given to it, the less liable will it be to any alteration of length, and the stronger will it be. The ends of the different planks forming one strake were made to butt on one beam, and, as the fastenings are driven close to the ends, they did not possess much strength to resist being torn out. The shifts of the butts, therefore, of the different strakes required great attention, because the transference of the longitudinal strength of the deck from one plank to another was thus made by means of the fastenings to the beams, the strakes not being united to each other sideways. The introduction of iron decks or partial decks under the wood has modified this.

Caulking. These fastenings have also to withstand the strain during the process of caulking, which has a tendency to force the planks sideways from the seam; and, as the edges of planks of hard wood will be less crushed or compressed than those of soft wood when acted on by the caulking-iron, the strain to open the seam between them to receive the caulking will be greater than with planks of softer wood, and will require more secure fastenings to resist it. It may also be remarked that the quantity of fastenings should increase with the thickness of the plank which is to be secured, for the set of the oakum in caulking will have the greater mechanical effect the thicker the edge.

When the planks are fastened, the seams or the intervals between the edges of the strakes are filled with oakum, and this is beaten in or caulked with such care and force that the oakum, while undisturbed, is almost as hard as the plank itself. If the openings of the seam were of equal widths throughout their depth between the planks, it would be impossible to make the caulking sufficiently compact to resist the water. At the bottom edges of the seams the planks should be in contact throughout their length, and from this contact they should gradually open upwards, so that, at the outer edge of a plank 10 inches thick, the space should be about $\frac{1}{16}$ of an inch, that is, about $\frac{1}{160}$ of an inch open for every inch of thickness. It will hence be seen that, if the edges of the planks are so prepared that when laid they fit closely for their whole thickness, the force required to compress the outer edge by driving the caulking-iron into the seams, to open them sufficiently, must be very great, and the fastenings of the planks must be such as to be able to resist it. Bad caulking is very injurious in every way, as leading to leakage and to the rotting of the planks themselves at their edges.

Launching. Ships are generally built on blocks which are laid at a declivity of about $\frac{5}{8}$ inch to a foot. This is for the facility of launching them. The inclined plane or sliding plank on which they are launched has rather more inclination, or about $\frac{7}{8}$ inch to the foot for large ships, and a slight increase for smaller vessels. This inclination will, however, in some measure, depend upon the depth of water into which the ship is to be launched.

While a ship is in progress of being built her weight is partly supported by her keel on the blocks and partly by shores. In order to launch her the weight must be taken off these supports and transferred to a movable base; and a platform must be erected for the movable base to slide on. This platform must not only be laid at the necessary inclination, but must be of sufficient height to enable the ship to be water-borne and to preserve her from striking the ground when she arrives at the end of the ways. For this purpose an inclined plane *a*, *a* (Fig. 14), purposely left unplaned to diminish the adhesion, is laid on each side the keel, and at about one-sixth the breadth of the vessel distant from it, and firmly secured on blocks fastened in the slip-

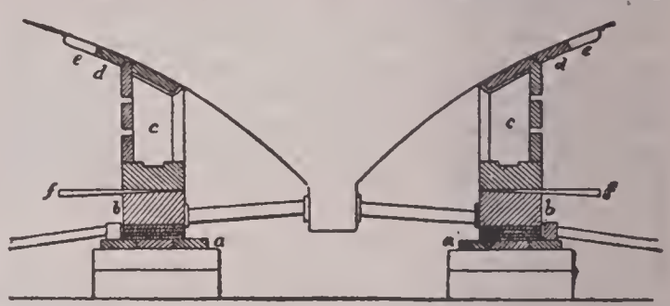


FIG. 14.

way. This inclined plane is called the sliding-plank. A long timber, called a bilgeway *b*, *b*, with a smooth under-surface, is laid upon this plane; and upon this timber, as a base, a temporary frame-work of shores *c*, *c*, called "poppets," is erected to reach from the bilgeway to the ship. The upper part of this frame-work abuts against a plank *d*, temporarily fastened to the bottom of the ship, and firmly cleated by cleats *e*, *e*, also temporarily secured to the bottom. When it is all in place, and the sliding-plank and under side of the bilgeway finally greased with tallow, soft soap, and oil, the whole framing is set close up to the bottom, and down on the sliding plank, by wedges *f*, *f*, called slivers or slices, by which means the ship's weight is brought upon the "launch" or cradle.

When the launch is thus fitted, the ship may be said to have three keels, two of which are temporary, and are secured under her bilge. In consequence of this width of support, all the shores may be safely taken away. This being done, the blocks on which the ship was built, excepting a few, according to the size of the ship, under the foremost end of the keel, are gradually taken from under her as the tide rises, and her weight is then transferred to the two temporary keels, or the launch, the bottom of which launch is formed by the bilgeways, resting on the well-greased inclined planes. The only preventive now to the launching of the ship is a short shore, called a dog-shore on each side, with its heel firmly cleated on the immovable platform or sliding-plank, and its head abutting against a cleat secured to the bilgeway, or base of the movable part of the launch. Consequently, when this shore is removed, the ship is free to move, and her weight forces her down the inclined plane to the water. To prevent her running out of her straight course, two ribands are secured on the sliding-plank, and strongly shored. Should the ship not move when the dog-shore is knocked down, the blocks re-

maining under the forepart of her keel must be consecutively removed, until her weight overcomes the adhesion, or until the action of a screw against her fore-foot forces her off.

A different mode of launching is sometimes practiced in British merchant-yards, and has been long in use in the

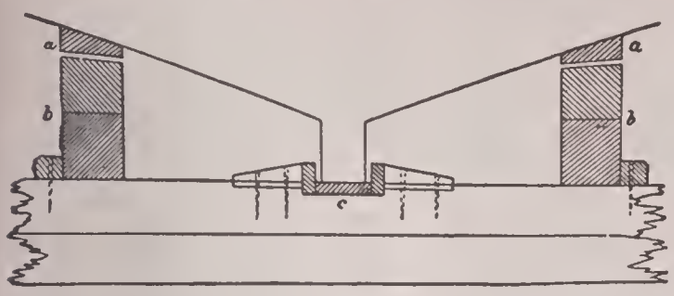


FIG. 15.

French dockyards, allowing the keel to take the entire weight of the vessel. The two pieces *a*, *a*, which are shown in Fig. 15 as being secured to the ship's bottom, are the only pieces which need be prepared according to this system for each ship, the whole of the remainder being available for every launch. A space of about half an inch is left between them and the balk timber placed beneath them, as it is not intended that the ship should bear on these balk timbers in launching, but merely be supported by them in the event of her heeling over. The ship, therefore, is launched wholly on the sliding-plank *c*, fitted under the keel.

If a ship is coppered before launching, so that putting her into a dry-dock for that purpose becomes unnecessary, it is then desirable that she should be launched without any cleats attached to her bottom. The two sides of the cradle are prevented from being forced apart when the weight of the ship is brought upon them by chains passing under the keel. Each portion of frame-work composing the launch has two of these chains attached to it, and brought under the keel to a bolt which passes slackly through one of the poppets, and is secured by a long forelock, with an iron handle, reaching above the water-line, so that when the ship is afloat it may be drawn out of the bolt. The chain then draws the bolt, and in falling trips the cradle from under the bottom. There should be at least two chains on each side secured to the fore-poppets, two on each side secured to the after-poppets, and two on each side to the stopping-up, and this only for the launch of a small ship; in larger ships the number will necessarily be increased according to the weight of the vessel and the tendency that she may have, according to her form, to separate the bilgeways. This tendency on the part of a sharp ship by a rising floor, or by her wedge-shaped form in the fore and after bodies, is great, but there is not much probability of a ship heeling over to one side or the other.

The importance of the work of the designer cannot be too highly estimated. Unfortunately there is, as has been said, "slop work" in designing as well as in putting the structure together. There is often an absence of any attempt at precautions where multiplied accidents have shown them to be necessary, as well as inconceivable carelessness in the details rendering provisions for security, where they exist in principle, useless in practice.

Slop work.

In the *Report* of the Royal Commission on Unseaworthy Ships, dated September 22, 1873, we read as follows: "Competent witnesses state that many merchant ships are built with bad iron, that they are ill put together, and sent to sea in a defective condition. It is also said that they are frequently lengthened without additional strength, and are consequently weak ships. The number of iron steamers which have been lost in the last few years, many of them having been surveyed and classed under the London or Liverpool registers, raises a question whether the regulations of these registers are sufficiently stringent to insure good shipbuilding. The directors of the Bureau Veritas have deemed it necessary to revise the rules of their register, and to increase the scantling. In the race of competition among shipbuilders it is probable that inferior materials and bad workmanship are admitted into ships."

The Commissioners on Unseaworthy Ships, referring to the proposal that the Board of Trade should superintend the construction, the periodical inspection, the repair, and the loading of all British merchant ships, said: "We consider it to be a question worthy of serious consideration, whether, in the case of passenger ships, the certificate of the Board of Trade, so far as regards specific approval, should not be expressly confined to the number of passengers to be allowed and to the accommodation for their health, comfort, and general security,—all questions of unseaworthiness of hull, machinery, and equipment being left to the owners, subject only to a general power of interference in case of danger sufficiently apparent to justify special intervention."

Where ships have to meet the stress of battle as well as that of the sea faithfulness of work is even more imperative. It is not only necessary to have perfect work, but there must also be multiplied safeguards and provisions against damage by shot, shell, ram, and torpedo as well as against the enemies which are common to all ships. In the article NAVY the peculiarities of the ship of war are described. Regarding them here simply as ships, they may be said to be distinguished neither by size nor speed. They have been far outstripped in size, the longest English ship of war built within the last twenty years being only 325 feet in length, while there are Atlantic passenger ships 200 feet longer. They have also been outstripped in speed. The highest speed ever attained in a vessel of war is that of the "Iris" and "Mercury"; and as they are only 300 feet long it is easier in vessels of greater length to get higher speeds with less engine power, and easy also to maintain it in a seaway both as a question of form and power, and also as a matter of coal endurance. The following table gives the relative dimensions of large 14-knot ships:

Ship's Name.	Length divided by Breadth (on Water Line).	I. H. P.	Dispt. in Tons.	(Dispt.)$^{\frac{2}{3}}$
"Adriatic" (White Star Line)	ft. in. 435 7 / 41 8 = 10.45	3,600	8,250	408.3
H.M.S. "Dreadnought"	333 3 / 61 6 = 5.42	8,000	10,886	491.2
H.M.S. "Sultan"	330 0 / 58 6 = 5.64	8,600	9,286	441.8
H.M.S. "Inflexible"	324 0 / 75 0 = 4.32	8,000	11,500	509.5
H.M.S. "Neptune" late "Independencia"	304 0 / 60 10 = 5.01	8,500	9,063	434.7

The differences between the amount and complexity of fitting in the ship of war and the merchant ship are represented by the greatly increased cost per ton weight of hull. It must, however, be premised that the war ship has the weight of hull kept down to a very low standard to enable her to carry her offensive and defensive equipment,—far lower than is usual in the merchant ship. The first-class merchant ship costs £28 [$136.08] per ton weight of hull and about £13 [$63.18] per indicated horse-power for the engines. The ship of war built by the same builders under contract with the Government costs from £60 [$291.60] to £65 [$315.90] per ton weight of hull for unarmored ships, and from £70 [$340.20] to £75 [$364.50] or more for armored ships. In the case of an unarmored vessel, having a protecting deck over machinery and magazines, recently ordered, the prices were as follows:

Cost.

General average	£60 10 0	[$294.03]	per ton weight of hull.	
Average of three London firms	66 0 0	[320.76]	"	"
Accepted tender	57 6 0	[278.48]	"	"

The engines for the same vessel were:

General average	£15 8 0	[$74.84]	per I.H.P.
Average of three London firms	17 5 0	[83.83]	"
Accepted tender	11 8 0	[55.40]	"

In the case of a larger armored ship the rates were:

Average price per ton weight of hull	£81 2 0	[$394.15]
Accepted tender	71 5 0	[346.27]
Average price per I. H. P. of engines[1]	11 1 0	[53.70]
Accepted tender	10 7 0	[50.30]

The use of heavy ordnance in recent times as the sole weapon for naval warfare brought about a marked distinction between the merchant vessel and the war ship, which had not previously existed. The revival of the ram and the adoption of the torpedo tend to abolish this distinction and to bring about an approximation again.

It is difficult to say what, in the very near future, will be the distinguishing characteristics of the ship of war. They will not be speed or size or coal endurance, or the power of striking with the ram, the torpedo, or the gun. It will be quite easy to arm merchant ships with these weapons, and some of

Characteristics of war ships.

[1] The indicated horse-power referred to here is that obtained by natural draft.

these ships already outstrip the war vessel in the important advantages of size and fleetness and carrying power. It is apparently in protective advantages that the essential difference will lie.

main body of the committee was to associate such a raft-deck for the protection of the buoyancy and stability of the ship against artillery with a central armored citadel. That of the minority was to suppress the armor in the re-

Distribution of Materials and Cost in Various Types of Ships.

	First-Class Passenger Steamers.	Cargo Steamers.	Armored Battle Ships (Barbette).	Protected 17-Knot Ships. Unarmored, Unmasted, and Unsheathed.	Protected 13-Knot Ships, Unarmored, Masted, and Sheathed.	Protected 10 to 12 Knots, Unarmored, Masted, and Sheathed.	Torpedo Boats, 19 to 20 Knots.
Length in feet	450	390	325	300	225	170	86
Displacement at load draft (in tons)	9550	6800	10,000	3630	2420	1153	31.3
Weight (in tons) of hull, excluding armor	3800	1960	3,520	2000	1270	616	11.6
" " armor	...	...	3,100[1]	218	152	...	...
" " propelling machinery	1310	240	1,060	485	342	135	11.0
" " guns, mounting, and ammunition	...	...	840	285	154	77	2.75
" " fuel, at usual draft	1500	600	900	500	270	130	3.
Cost of hull per ton of its weight	£32	£20	£81.2	£56	£67.25[2]	£60	£280
" propelling machinery, per ton of its weight	£60	£50–55	£105	£111	£85[2]	£90	£373

The merchant ship is badly provided against fatal damage by collision, or by a blow delivered in any manner by which water is admitted into the ship. The propelling machinery of these ships and their steering apparatus are also dangeronsly exposed to artillery fire. Excepting torpedo boats, the ship of war of any size has its propelling machinery either under water or under cover of armor, and in a great number of cases there is either protection for the steering apparatus or there are two propellers. The approximation towards war-ship arrangements which is needed in the merchant ship is the adoption of more than one screw and of greater breadth of ship, so that defences ronnd machinery may be created in time of war. Both these changes in merchant-ship practice are demanded also by mercantile interests. The increase in breadth amidships would greatly reduce the risk of foundering in collisions and give more spacious accommodation amidships. Such increase when accompanied by fine ends is also favorable to speed.

Changes needed in merchant ships.

The nse of two screws is economical of power, and is a much-needed security against the evil results of an accident to an engine, a shaft, or a propeller. The time will doubtless come when a single propeller in a large passenger ship will be regarded as an unpardonable fault, and when the division into compartments now common will be held to be no better than a delusion and a snare.

The protection given to the regnlar ships-of-war by side armor, or by a protecting deck, at or near the water-line, will probably become a definite and indispensable feature in them, and may, perhaps, be their only distinguishing characteristic, apart from their outfit and equipment.

Armor.

If this should prove to be the issue of events, their course will have been very indirect. In the ships-of-war of the last century no attempt was made to employ armor on the sides or to prevent the passage of projectiles and water into the holds by means of a protecting deck. There was a deck just below the water-line, but it had no protective qualities. It served, among other things, to furnish passage ways in action for the carpenter and his crew to get at the inner side of the wooden walls of the ship at and near the water-line, so that when shot entered there the holes might be immediately plugged. When screw propulsion was introduced into these ships, and it was found practicable to keep the engines and boilers under water, it would have been possible to place a deck over the machinery and beneath the water, which would have greatly added to the security of the engines, boilers, and magazines. The space above this deck might also have been so subdivided into compartments as to have protected the buoyancy and stability of the ship against the immediately fatal results of the invasion of water. The protection of the buoyancy and stability by these means would not have been absolute, in the sense of making the ship safe, but it would have been of the utmost value as compared with ships, otherwise similar, but having no such protection.

Thirty years passed between the date when screw-propeller engines were placed beneath the water-level in ships of war and that at which a committee on designs, under the presidency of Lord Dufferin, proposed to place such a covering deck over them or to construct a water-line raft-body. The proposal of the

Committee on designs.

gion of the water-line entirely, and to protect buoyancy, stability, machinery, and magazines by a raft-deck alone. In 1873 the plan as indicated by the main body of the committee was put into practice nearly simnltaneonsly in the "Duilio" and "Dandolo" in Italy and in the "Inflexible" in England. In 1878 the system as conceived in principle by the minority of the committee of 1871, although not in the manner they recommended, was adopted in much smaller vessels in the British navy. A raft-deck was introdnced into the "Comus" class of corvettes of 2380 tons displacement, a class which was regarded as nnarmored. Since that date the raft-deck has been adopted in a more or less complete form in nearly all classes of nnarmored ships in the English navy. So it has come about that, out of some 850 nnarmored ships of war built and building in Europe, 47 have such protecting raft-decks. Of these 32 are English. There can be no donbt that all unarmored ships of war will eventually be protected in this manner. The nnmber of so-called iron-clads built and building in Europe is 270. Of these, 34 are based on the recommendation of the committee on designs; 18 of them are English. There are six other English ships with central citadels and underwater protecting decks, built more than twenty years ago, bnt the raft-body principle is absent in them.

If the passage from the steam line-of-battle ship of 1840–1860 to the "Admiral" class of 1884 had been made nnder the guidance of the principles of the committee of 1871, European nations would not find themselves possessed of large fighting ships covered from end to end, or over large areas of their sides, with thin armor, penetrable to a very large proportion of the guns brought against them. But the sailors of 1854–1860 did not take the view that buoyancy and stability, and machinery and magazines, were the vital parts, needing defence by armor or by a raft-deck. They dreaded the effects of shell exploding between decks, setting fire to the ships, and converting the decks, crowded with men, into slanghter-houses. Their demand was, "Keep out the shell." So it came abont that iron armor-plates, thick enough to keep ont the most powerful shell of the time, were worked npon the sides of the ships, and the gnns were fought through ports cut in this armor. This feeling was so strong that the English Admiralty built the "Hector" and "Valiant" with armored batteries overlapping by many feet at each end the armor beneath them, which protected the bnoyancy, stability, machinery, and magazines. Gnns increased in power, and the armor was gradually thickened to resist them, until from 4½ inches of armor, through which broadside ports were cut, 9 inches and 10 inches were reached. But this thickening of the armor had so reduced the possible number of the guns in a ship of moderate size, and the guns reqnired for breaching such armor had so increased in weight, that the broadside ship had to give way to the turret or barbette ship, in which about four such guns were all that could be carried, and these had to be worked on turn-tables in or near the central line of the ship.

The point now reached in all navies is that the broadside iron-clad with ports cut through an armored side, as invented in France by M. Dupuy de Lôme, and copied by

[1] Of this the vertical armor (costing before it is worked up £70 [$340.20] to £90 [$437.40] per ton) is nearly 2000 tons.

[2] Average of six vessels built by Elder.

every power, is obsolete. Guns must be worked singly or in pairs on revolviug turn-tables, each turn-table being surrounded by an armored tower, forming the loading chamber or protecting the mechanism. The side armor protecting the buoyancy, stability, machinery, aud magazines, although not introduced for that purpose origiually, is retained in France for very large ships, is given up in Italy in favor of a raft-body, and is retained partially iu England and Germany in conjunction with a raft-body.

The use of armor has arrested the development of the shell. But it is uot inconceivable that its abandonment in front of the long batteries of guns in the French and Italian ships will invite shell attack, and make existence iu such batteries, if they are at all crowded, once more intolerable. It remains to be seen whether in that case exposure will be accepted, or a new demanc made for armor, at least against the magazine gun and the quick-firing guu. If exposure is accepted, it will be on the ground that the uumber of men at the guns is now very few, that the gun positions are uumerous and the fire rapid, and that, if the guns had once more to be fought through ports in armor, the number of gun positious would be reduced, and the fragments of their own walls, when struck by heavy projectiles, would be more damagiug than the projectiles of the enemy.

Internal armor for the protection of the heavy armor-breaching guns must be retained so long as such guns are used, and if they were abandoned an enemy could cover himself with armor invulnerable to light artillery. This the French attempted to do in iuaugurating the system. They have been driven from it by the growth of the gun. Abandon the heavy guu, and complete armor-plating might again be adopted.

We must conclude that the buoyancy, stability, machinery, and magazines must be protected as far as possible against fatal damage from a single blow of these armor-breaching guus. The teudeney will be to come to the lightest form of such protection. That lightest form appears to be a protecting deck a little above the water-level throughout the greatest part of its surface, but sloping down at the sides and at the euds, so as to meet the side walls of the ship under the water-line. However the armor is arranged (apart from a complete covering with invulnerable plating),—whether as a belt with its upper edge 3 feet out of the water, as in the French ships; as a central armored citadel and a raft-body at the ends, like English and Germau ships; or as a raft-body throughout, like the Italian ships,—shot holes in actiou will admit water aud gradually reduce the necessary stability of the ship. In the French ships the assistance of the unarmored upper parts is as uecessary to prevent them from upsetting iu anything but smooth water as is the assistance of the unarmored raft ends iu the English and German ships. In the intact condition the English ships have far greater stability thau those of France. In the English ships a reserve of stability is provided, against the contingency of loss by injuries in action. In the French ships no more is provided than is required for the intact condition. The French have not accepted the position taken up in England that much greater initial stability may be given to heavily armored broad ships thau is usually given, without causing heavy rolling. Nor have they accepted the further incontrovertible truth that the free passage of water in the raft-body from side to side of the ship in rolling is rapidly effective in quelling the motion aud bringing the ship to rest in the upright position.

Propulsion.

Sails.

The propulsion of ships by sails differs from the drifting of bodies in the air before the wind in a most important respect. Ships may drift or sail in the direct course of the wiud, and they will then differ from air-borue bodies only in the comparative slowness imposed by the resistance of the water. Ships having the same length as breadth or rather opposing the same form and area to side progress as to forward progress could never do other than sail before the wind. No disposition of cauvas could make them deviate to the right or left of their course to leeward. But by an alteration of form giving them greater length than breadth, and greater resistance to motion sideways thau to motion endwise, they came to possess the power of being able not only to sail to the right or left of the course of the wind, before the wind, but also to sail towards the wind. The wind can be made to impel them towards the point from which it is blowing by means of the lengthened form acted on by the resistance of the water.

Motion directly towards the wind cannot be maintained, but by sailing obliquely towards it first to one side and then to the other progress is made in advance, and the vessel "beats to windward." The action is like that which would be required to blow a railway car to the eastward by the actiou of an easterly wind. If the line of rails were due east and west, and the wind were always direct from the east, the thing could not be done. But with a wind to the south or north of east, by setting a sail in the car so that its surface lies between the course of the wind and the direction of the rails, it would then receive the impulse of the wind on its back and would drive the car forwards. There would be a large part of the force of the wind ineffective because of the obliquity of the sail; and of the part which is effective a large portiou would be tending to force the car agaiust the rails sideways, but there would be progression to windward. In the case of the ship the resistance to side motion is due to the unsuitability of the proportions and form for progress in that direction as compared with progress ahead, but still there is motion transversely to the liue of keel. This motiou is called leeway. As the ship moves to leeward and ahead simultaneously there is a point of balance of the forces of the fluid against the immersed body—a centre of fluid pressure. The object of the constructor is to place the masts in the ship in such positions that the centre of pressure of wind upon the sails shall fall a little behind or astern of this centre of resistance of the fluid. In that case there is a tendency in the ship to turn round under the action of these two forces, and to turn with her head towards the wind. This teudency is corrected by the action of the rudder. If the tendency to turn were the other way, although that could also be corrected by the rudder, yet there would be danger of the wind overcoming the rudder action in squalls, and the ship would then come broadside to the wind. In that case, while she might have been quite capable of bearing the pressure of the wind blowing obliquely upon her sails, she might have her sails blown away, or her masts broken, or be herself capsized by the direct impulsion of the wind upon the sail aud upon the hull of the ship.

Many examples of disposition of sails might be given. Their disposition is always made to satisfy the conditions that as much sail as possible is required, but if the vessel is small it must be capable of being instantly let go in a squall, or when the wind is gusty. Otherwise, where it cannot be readily let go, its area should be capable of reduction in squally weather, still retaining its efficiency, so that no pressure of the wind should be capable of upsetting the ship. If a sudden violent squall should strike the ship she should find relief, not by a large inclination, but by the blowing away of the sails out of the bolt-ropes, or the carrying away of the masts. One or other of these must of course happen if the area of canvas and the strength of the sails and of the spars are so proportioued at the moment the squall strikes the ship as to be less than the resistance offered by the stability of the ship to a large inclination. Ships are sometimes, when struck by a squall, blown over on to their sides, the sails being in the water. If the sails or spars are then cut away or otherwise got rid of the ship may right herself.

In the *Transactions* of the Institution of Naval Architects for 1881, Mr. W. H. White says:

"Any investigation of the behavior of sailing ships at sea must take account of the conditions belonging to the discussion of their rolling when no sail is set, and must superpose upon those conditions the other and no less difficult conditions relating to the action of the wind upon the sails, the influence of heaving motions upon the stability, and the steadying effect of sail-spread.

"It may fairly be assumed that the labors of the late Mr. W. Froude have made it possible to predict, with close approximation to truth, the behavior of a ship whose qualities are known and which has no sails set, when rolling among waves of any assumed dimeusions. By a happy combination of experimental investigation and mathematical procedure, Mr. Froude succeeded in tracing the motion from instant to instant, and checked the results thus obtained by comparison with the actual observations made in a sea-way on the behavior of the 'Devastation.' The details of his method, and examples of its application, will be found in the *Transactions* for 1875, and in the appendix to the report of the 'Inflexible' committee.

"The conclusion I have reached, after a careful study of the subject, is that we need very considerable extensions of our knowledge of the laws of wind-pressure before more exact investigations will be possible so as to enable us to pronounce upon the safety or danger of a sailing ship. Nor must it be overlooked that sailing ships are not to be treated as machines worked under certain fixed conditions. Their safety depends at least as much upon seamanship and skilful management as upon the qualities with which they are endowed by their designers. Moreover, it is idle to pretend that, in determining what sail-spread can be safely given to a ship, the naval architect proceeds in accordance with exact or purely scientific methods. He is largely influenced by the results of experience with other ships, and thus proceeds by comparison rather than by direct investigation from first principles. Certain scientific methods are employed, of course, in making these comparisons. For example, the righting moment at different angles of inclination is usually compared with the corresponding 'sail-moment'; but even here certain assumptions have to be made as to the amount of sail to be reckoned in the

calculation, and as to the effective wind-pressure per unit of sail-area. Between ship and ship these assumptions are unobjectionable, but they are not therefore to be regarded as strictly true.

"The calculations of curves of stability and the determination of the ranges of stability for ships form important extensions of earlier practice. But, even when possessed of this additional information, the naval architect must resort to experience in order to appreciate fairly the influence of seamanship and the relative manageability of ships and sails of different sizes. There can be no question but that a good range and large area of a curve of stability denote conditions very favorable to the safety of a ship against capsizing. But, in practice, it frequently happens that such favorable conditions can scarcely be secured in association with other important qualities, and a comparatively moderate range and area of the curve of stability have to be considered when the designer attempts to decide whether sufficient stability has been provided. Under these circumstances experience is of the greatest value; *a priori* reasoning cannot take the place of experience, because (as remarked above) the worst combination of circumstances cannot be fixed, and because some important conditions in the problem are yet unsettled. Certain arbitrary standards may be set up, and ships may be pronounced safe or unsafe; but this is no solution of the problem. There are classes of ships in existence which have been navigated in all weathers, under sail, and in all parts of the world, which might be pronounced unsafe if tested by some of the standards that have been proposed; but the fact that not a single vessel of that class has been capsized or lost at sea during many years will probably be accepted, in most quarters, as sufficient evidence of the seaworthiness of these classes, and as an indication of the doubtful authority of the proposed standards."

For the different kinds of sails, and for sailmaking, see SAIL.

Steam.

The "Comet" was the first steam-vessel built in Europe that plied with success in any river or open sea. She was built in Scotland in 1811–12 for Mr. Henry Bell, of Helensburgh, having been designed as well as built by Mr. John Wood, at Port-Glasgow. The little vessel was 42 feet long and 11 feet wide. Her engine was of about four horse-power, with a single vertical cylinder. She made her first voyage in January, 1812, and plied regularly between Glasgow and Greenock at about 5 miles an hour. There had been an earlier commercial success than this with a steam vessel in the United States, for a steamer called the "Clermont" was built in 1807, and plied successfully on the Hudson River. This boat, built for Fulton, was engined by the English firm of Boulton & Watt. The reason for this choice of engineers by Fulton appears to have been that Fulton had seen a still earlier steamboat for towing in canals, also built in Scotland, in 1801, for Lord Dundas, and having an engine on Watt's double-acting principle, working by means of a connecting rod and crank and single stern wheel. This vessel, the "Charlotte Dundas," was successful so far as propulsion was concerned, but was not regularly employed because of the destructive effects of the propeller upon the banks of the canals. The engine of the canal boat was made by Mr. William Symington, and he had previously made a marine engine for Mr. Patrick Miller, of Dalswinton, Dumfriesshire. This last-named engine, made in Edinburgh, in 1788, marks, it is said, the first really satisfactory attempt at steam navigation in the world. It was employed to drive two central paddle-wheels in a twin pleasure-boat (a sort of "Castalia") on Dalswinton Loch. The cylinders were only 4 inches in diameter, but a speed of 5 miles an hour was attained in a boat 25 feet long and 7 feet broad. The first steam vessel built in a royal dockyard was also called the "Comet." She appears to have been built about the year 1822 and was engined by Boulton & Watt. This ship had two engines of forty horse-power each, to be worked in pairs on the plan understood to have been introduced by the same firm in 1814. In 1838 the "Sirius" and "Great Western" commenced the regular Atlantic passage under steam. The latter vessel, proposed by I. K. Brunel, and engined by Maudslay Sons & Field, made the passage at about 8 or 9 knots per hour. One year earlier (1837) Captain Ericsson, a scientific veteran who is still among us (1886), towed the Admiralty barge with their lordships on board from Somerset House to Blackwall and back at the rate of 10 miles an hour in a small steam vessel driven by a screw.

Screw propellers.

The screw did not come rapidly into favor with the Admiralty, and it was not until 1842 that they first became possessed of a screw vessel. This vessel, first called the "Mermaid" and afterwards the "Dwarf," was designed and built by the late Mr. Ditchburn, and engined by Messrs. Reunie. In 1841–3 the "Rattler," the first ship-of-war propelled by a screw, was built for and by the Admiralty under the general superintendence of Brunel, who was also superintending at the same time the construction of the "Great Britain," built of iron. The engines of the "Rattler," of 200 nominal horse-power, were made by Messrs. Maudslay. They were constructed, like the paddle-wheel engines of that day, with vertical cylinders and overhead crank-shaft, with wheel gearing to give the required speed to the screw. The next screw engines made for the Royal Navy were those of the "Amphion," 300 nominal horse-power, made in 1844 by Miller and Ravenhill. In these the cylinders took the horizontal position, and they became the type of screw engines in general use. This ship had a screw-well and hoisting gear for the screw. In 1845 the importance of the screw propeller for ships of war became fully recognized, and designs and tenders were invited from all the principal marine engineers in the kingdom. The Government of that day then took the bold step of ordering at once nineteen sets of screw engines. Six of these had wheel gearing; in all the rest the engines were direct-acting. The steam pressure in the boilers was from 5 to 10 lb only above the atmosphere, and if the engines indicated twice the nominal power it was considered a good performance. The most successful engines were those of the "Arrogant" and "Encounter" of Messrs. Penn. They had a higher speed of piston than the others, and the air-pumps were worked direct from the pistons, and had the same length of stroke. These engines developed more power for a given amount of weight than other engines of their day, and were the forerunners of the many excellent engines on the double-trunk plan made by this firm for the navy. The engines with wheel-gearing for the screws were heavier, occupied more space, and were not so successful as the others, and no more of that description were ordered for the British navy.

Economical engines.

Up to 1860 neither surface-condensers nor superheaters were used in the navy. The consumption of fuel was about 4½ lb per one horse-power per hour. In that year (1860) three ships, the "Arethusa," "Octavia," and "Constance," were fitted respectively by Messrs. Penn, Messrs. Maudslay, and Messrs. Elder, with engines of large cylinder capacity to admit of great expansion, with surface-condensers and superheaters to the boilers. Those of the "Arethusa" were double-trunk, with two cylinders; those of the "Octavia" were three-cylinder engines; and those of the "Constance" were compound engines with six cylinders; the first two were worked with steam of 25 lb pressure per square inch, and the last with steam of 32 lb pressure. All these engines gave good results as to economy of fuel, but those of the "Constance" were the best, giving one indicated horse-power with 2½ lb of fuel. But the engines of the "Constance" were excessively complicated and heavy. They weighed, including water in boilers and fittings, about 5½ cwts. per maximum indicated horse-power, whereas ordinary engines varied between 3½ and 4¾ cwts.

For the next ten years engines with low-pressure steam, surface-condensers, and large cylinder capacity were employed almost exclusively in the ships of the Royal Navy. A few compound engines, with steam of 30 lb pressure, were used in this period with good results as to economy, but they gave trouble in some of the working parts. Compound engines, with high-pressure steam (55 lb), were first used in the Royal Navy in 1867, on Messrs. Maudslay's plan, in the "Sirius." These have been very successful. In the Royal Navy as well as in the mercantile marine, the compound engine is now generally adopted. They have been made rather heavier than the engines which immediately preceded them, but they are about 25 per cent. more economical in fuel, and, taking a total weight of machinery and fuel together, there is from 15 to 20 per cent. gain in the distance run with a given weight.

Reduction in weight of engines.

Wrought-iron is largely used in the framing in the place of cast-iron, and hollow propeller shafts made of Whitworth steel. By these means the weight is being reduced, and it is to be hoped that a still further reduction may yet be made by the use of high-class materials in the engines and steel in the boilers.

Mr. Thornycroft, of Chiswick, and others, by means of high rate of revolution, forced combustion, and the judicious use of steel, have obtained as much as 455 indicated horse-power with a total weight of machinery of 11¾ tons, including water in boilers. The ordinary weight of a sea-going marine engine of large size, with economical consumption of fuel, excepting a few of very recent construction, would be six or seven times as great. By closing in the stoke-holes and employing fans to create a pressure of air in them capable of sustaining from one to two inches of water in the gauges the consumption of coal per square foot of fire-grate per hour may be raised to 130 lb and upwards. The indicated horse-power which can be obtained in ordinary cases with the steam-blast in the chimney to quicken consumption does not exceed ten. But by the forced draft above described it can be raised with ordinary boilers to 17 to 18 indicated horse-power per square foot of fire-grate. In torpedo boats with locomotive boilers over 28 horse-power per foot of fire-grate is attainable.

Efficiency.

The following observations on efficiency are taken from the work of Mr. Sennett on *The Marine Steam Engine:*

"In every machine there are always certain causes acting that produce waste of work, so that the whole work done by the machine is not usefully employed, some of it being exerted in overcoming the friction of the mechanism, and some wasted in various other ways. The fraction representing the ratio that the useful work done bears to the total power expended by the machine is called the efficiency of the machine; or—

$$\text{Efficiency} = \frac{\text{Useful work done.}}{\text{Total power expended.}}$$

In the marine steam engine, in which the useful work is measured by its propelling effect on the ship, there are four successive stages, in each of which a portion of the initial energy is wasted, and these four causes all tend to decreasc the efficiency of the engine as a whole.

"In the first place, only a portion of the heat yielded by the combustion of the coal in the furnaces is communicated to the water in the boiler, the remainder being wasted in various ways. The fraction of the total heat evolved by the combustion of the coal, that is, transmitted to the water in the boiler, is in ordinary cases not more than from $\frac{5}{10}$ to $\frac{7}{10}$. This fraction is called the efficiency of the boiler.

"Secondly, the steam, after leaving the boiler, has to perform mechanical work on the piston of the engine; but this work, in consequence of the narrow limits of temperature between which the engine is worked, is only a small fraction of the total heat contained in the steam—say from $\frac{1}{5}$ to $\frac{1}{20}$, according to the kind of engine and rate of expansion employed. This fraction, representing the ratio of the mechanical work done by the steam to the total amount of heat contained in it, is called the efficiency of the steam.

"Thirdly, in the engine itself a part of the work actually performed by the steam on the pistons is wasted in overcoming the friction of the working parts of the machinery and in working the pumps, etc. The remainder is turned into useful work in driving the propeller. The fraction representing the ratio that this useful work bears to the total power exerted by the pistons is called the efficiency of the mechanism.

"Fourthly, the propeller, in addition to driving the ship ahead, expends some of the power transmitted to it in agitating and churning the water in which it acts, and the work thus performed is wasted,—the only useful work being that employed in overcoming the resistance of the ship and driving her ahead. The ratio of this useful work to the total power expended by the propeller is called the efficiency of the propeller.

"The resultant efficiency of the marine steam engine is made up of the four efficiencies just stated, and is given by the product of the four factors representing respectively the efficiencies of the boiler, the steam, the mecbanism, and the propeller. Any improvement in the efficiency of the marine steam engine, and, consequently, in the economy of its performance, is, therefore, due to an increase in one or more of these elements."

Under Steam Engine will be found a discussion of the first three of the efficiencies enumerated above. Propulsion and propellers have to be considered here.

Propellers.

"The principle upon which nearly all marine propellers work," says Mr. Sydney Barnaby, "is the projection of a mass of water in a direction opposite to that of the required motion of the vessel. When a vessel is in motion at a regular speed the reaction of the mass of water projected backwards by the propeller is exactly equal to the resistance experienced by the vessel. When it is clearly understood that propulsion is obtained by the reaction of a mass of water projected sternwards with a velocity relative to smooth water, the absurdity is at once seen of attempting to get a propeller to work without slip. If there is no slip there is no resultant propelling reaction except in the limiting case where the mass of water acted upon is infinite. The whole problem, therefore, resolves itself into this—What is the best proportion between the mass of water thrown astern and the velocity with which it is projected, that is, if the screw propeller is under consideration, the ratio between its diameter and its pitch?"

"There are four different kinds of propellers apart from sails—the oar, the paddle-wheel, the screw, and the water jet.

"The first and oldest of them—the oar—may be used in two ways. The action may be intermittent, as in rowing, when the water is driven astern during half the stroke and the instrument brought back above the water; or its action may be continuous, as in sculling. When used as in rowing is is exactly analogous to a paddle-wheel, while the action of the scull closely resembles that of the screw. It is supposed that in the ancient galleys, which were propelled by a large number of oars in several tiers or banks, the oars hung vertically and worked inwards and outwards with a sculling action. They were not removed from the water, but served as props when the vessel was aground. The oars were always propelling the vessel, in both parts of the stroke. The rowers generally sat with their faces outwards and forwards. There was great overhang of the sides to allow of several tiers of rowers one above another. The oar as used for rowing is a very efficient instrument. To obtain the maximum efficiency out of it a constant pressure should be maintained upon the oar, so that the water is started gradually from rest, and the acceleration uniformly increased throughout the whole of the stroke. A glance at a university crew will show that the stroke is kept up with a uniform pressure and without any jerk."

Speaking of the screw propeller, Mr. S. Barnaby says: "The speed with which water can follow up the blades of a screw depends upon the head of water over it, but when the immersion is sufficient to exclude air a head of water equivalent to 30 feet is supplied by the atmosphere, as has been pointed out by Prof. Osborne Reynolds. Experiments on the model of the Thornycroft screw have shown that the efficiency, which is as much as 70 per cent. when properly immersed, falls to about 50 per cent. when breaking the surface of the water. As a result of a change from a diameter of 5 feet 10 inches to 4 feet 6 inches the speed of the first-class torpedo boat was raised from 18 to 20 knots, other conditions remaining the same.

"There is no doubt that the stern is the best position for the screw. As a vessel passes through the water the friction imparts motion to the layer of water rubbing against the side. This layer increases in thickness towards the stern so that after the vessel has passed through, a considerable quantity of water is left with a motion in the same direction as the vessel. If the screw works in this water it is able to recover some of the energy which has been expended by the ship in giving it motion. The speed of this water, which Rankine estimates may be as much as one-tenth of the speed of the vessel, does not depend upon the form but upon the nature and extent of the surface. As it is a necessity that there should be such a wake, it is a distinct advantage to place the propeller in it and allow it to utilize as much as possible of the energy it finds there. It is important not to confound this water, which has had motion given to it by the side and bottom of the ship, with the wave of replacement, that is the water filling in behind the ship. It should be the aim to interfere as little as possible with this motion, as such interference augments the resistance of the ship very considerably, even in well-formed ships. The propeller should, therefore, be kept as far away from the stern as possible.

"In the small high-speed stern launches the propeller has been kept outside the rudder with advantage to the speed. What is required is that before reaching the screw the water shall have given out upon the stern of the ship the energy put into it by the bow. If a screw propeller is placed behind a bluff stern so that its supply of water is imperfect it will draw in water at the centre of the driving face and throw it off round the tips of the blades, like a centrifugal pump, thus producing a loss of pressure upon the stern of the vessel. For very high speed vessels several propellers would enable the weight of the machinery to be kept down. The weight of an engine of a given type per indicated horse-power varies inversely as the number of revolutions per minute; that is, the greater the number of revolutions the less the weight per indicated horse-power.

"There is a certain quantity of work which must be lost with any propeller, and it is equal to the actual energy of the discharged water moving astern of the propeller with a velocity relative to still water. As this energy varies as the weight multiplied by the square of the velocity, if we double the quantity of water acted upon we double the loss from this cause, but if we double the velocity with which the water is discharged we increase the loss fourfold. This shows the advantage of acting upon a large column of water, and leaving it with as small a speed as possible relative to still water. For this reason the screw is a more efficient instrument than a paddle-wheel, and the jet propeller, with its small area of jet, is so much inferior to the screw. From the above considerations it would appear that the larger the diameter of a screw and the smaller the slip the greater the efficiency would be. There is, however, another element of loss which has to be considered, which imposes a limit to the size of a screw in order to obtain the best efficiency. This element is the friction of the screw blades. How large the effect of this element may be is shown by the case of H.M.S. 'Iris.' This ship was originally fitted with two four-bladed propellers, 18 feet in diameter, and with 18 feet pitch or velocity of ad-

vance per revolution. She obtained a speed with these propellers of 15¾ knots with an expenditure of 6369 horse-power. Two blades were then taken from each propeller, reducing the total number from eight to four. The indicated horse-power then required for the same speed was 4369, or two thousand less horse-power. This amount had been lost in driving the four aditional blades."

"The causes of loss of work incidental to propellers of different kinds may be summed up as follows: (1) Suddenness of change from velocity of feed to velocity of discharge. Propellers which suffer from this cause are the radial paddle-wheel and the common uniform pitch screw; while those which in varying degree avoid it are the gaining pitch screw, the feathering paddle-wheel, Ruthven's form of centrifugal pump, and the oar. (2) Transverse motion impressed on the water. Propellers which lose in efficiency from this cause are ordinary screw-propellers, which impart rotary motion, radial wheels, which give both downward and upward motion on entering and leaving the water, and oars, which impart outward and inward motion at the commencement and end of the stroke respectively. This loss is greatly reduced in the guide propeller, as the guides take the rotary motion out of the water and utilize it in so doing. (3) Waste of energy of the feed water. This is experienced in the jet propeller as generally applied."

Causes of inefficiency.

The present condition of the case of screw steamship propulsion appears, according to Mr. Froude's estimate, to be that, calling the effective horse-power (that is, the power due to the net resistance) 100, then at the highest speeds the horse-power required to overcome the induced negative pressure under the stern consequent on the thrust of the screw is 40 more; the friction of the screw in the water is 10 more; the friction in the machinery 67 more; and air-pump resistance perhaps 18 more; add to this 23 for slip of screw, and we find that in addition to the power required to overcome the net resistance=100, we need 40+10+67+18+23, making in all 258; *i.e.*, at maximum speeds the indicated power of the engines needs to be more than two-and-a-half times that which is directly effective in propulsion.

(N. B.)

Boatbuilding.

The foregoing article may be supplemented by a brief account of boatbuilding. The distinction between this and shipbuilding is not of a marked character and cannot be sharply defined. But for all practical purposes the builder of a vessel without a deck, or but partially decked, and propelled partly by sails and partly by oars, or wholly by oars, may be defined as a boatbuilder.

The boats in general use at present may be classified as racing boats, pleasure boats, or boats used for commercial purposes. Racing boats (compare ROWING) are generally built of mahogany, and are the most perfect specimens of the boatbuilder's art. The outrigger sculling boat measures from 30 to 35 feet long, 12 to 14 inches in breadth, and 9 inches in depth, weighing only from 35 to 45 lb, and the eight-oared outrigger, being from 55 to 65 feet long by 2 feet 2 inches to 2 feet 5 inches in breadth, weighs about 300 lb. Pleasure boats vary in form and dimensions from the 15-feet rowing boat used on the sea-coast to the gondola type found principally on the canals of Venice and used occasionally on the Thames, etc., for ceremonial pageants. Boats used for commercial purposes embrace fishing, canal, and ships' boats. Fishing boats (compare FISHERIES) are gradually passing from the sphere of the boatbuilder to that of the shipbuilder,—the open boats of former years being in many cases replaced by large, strong, decked craft more able to withstand the gales of the British coasts. Canal boats are generally long, narrow, and shallow, from 50 to 70 feet long by 8 to 10 feet in breadth, and from 4 to 5 feet in depth. All sea-going vessels are required by statute to be provided with boats fully equipped for use, not fewer in number nor less in their cubical contents than what is specified for the class to which the ship belongs. The boats vary considerably in form and dimensions as well as in material and construction, according to the service intended. The number of boats a passenger steamer of 1000 tons and upwards is required to carry is six or seven, according to the dimensions of the boats. In either case two of the largest boats must be fitted as lifeboats. If the smaller number is carried, the set will consist of two lifeboats, one launch, two cutters or pinnaces, and one gig.

Lifeboats are built both ends alike, having a sheer or rise from midships towards stem and stern of ½ inch to ¾ inch per foot of length. They have air cases of copper or yellow metal fitted in the ends and along the sides of the boat, of sufficient capacity to give each person carried in the boat one and a half cubic feet of strong enclosed air-space (compare vol. xiv. p. 574). Cutters are similar in form, but of smaller dimensions than lifeboats; pinnaces are about the same dimensions as cutters, but have square sterns. Gigs are of lighter construction and finer form than pinnaces. A service boat called a dingy is also carried, for the conveyance of light stores between the shore and the vessel. Boats, when carried so close to the funnel of a steamer as to be injuriously affected by the heat therefrom, have of late years been built of zinc, iron, or steel. Those built of steel have plates $\frac{1}{16}$ inch thick and galvanized, the keel, stem, stern, and deadwood knees being of wood, to which the plating is attached.

The following is an outline of the method of construction. The designer lays down on paper the lines and body-plan of the craft, which are afterwards traced full size on the floor of the drawing-loft. From these full-sized sections moulds are made. The stem and stern posts, having been cut out to the shape designed, are tenoned into mortises in the keel. Two knees overlap, and bind the stem and stern posts to the keel, and are bolted with through bolts and clenched outside over a ring or washer. A stout batten of wood is then nailed between the stem and sternpost heads to connect them together, and a line is then stretched from stem to sternpost to represent the water line. The keel, stem, and sternposts being in position on the stocks, the stem and stern posts are then plumbed and secured by stays of wood. The rabbets in the keel, stem, and stern posts are then cut out with a chisel, after which the moulds are put into their proper places, plumbed with the water-line, and kept in position by stays. The planking is then proceeded with, strake after strake, and when the boat is planked up to the top strake, the floors and timbers are put in. The floor extends across the keel and up to the turn of the bilge. They are fastened through the keel with copper or yellow metal bolts and to the planking with copper nails.

The timbers generally are about 1 inch by ¾ inch, and are sawn out of a clean piece of American elm, then planed and rounded. After being steamed they are fitted into the boat, and as soon as each is in position, and before it cools, it is nailed fast with copper nails. The gunwale is next fitted, a piece of American elm about 2 inches square; a breast-hook is fitted forward, binding the gunwale, top strake, stern and apron together; and aft the gunwale and top strake are secured to the transom by either a wooden or iron knee. A waring or stringer, about 3 inches by ¾ inch, of American elm, is then fitted on both sides of the boat, about 8 to 9 inches below the gunwale, on the top of which the thwarts or seats rest. The thwarts are secured by knees, which are fastened with clench bolts through the gunwale and top strake and also through the thwart and knee. The boat generally receives three coats of paint and is then ready for service.

The following are the dimensions of boats in the British merchant service:

	Length.	Breadth.	Depth.
Lifeboat	28 ft. 6 in.	8 ft. 6 in.	3 ft. 6 in.
Cutter	26 ft.	7 ft.	3 ft.
Pinnace	24 ft.	6 ft. 6 in.	2 ft. 8 in.
Gig	18 ft.	5 ft. 6 in.	2 ft. 3 in.
Dingy	16 ft.	5 ft. 6 in.	2 ft. 3 in.

SHIPLEY, a town of England, in the West Riding of Yorkshire, is situated on the south bank of the Aire, in the neighborhood of a picturesque pastoral country, at the junction of the Leeds and Bradford Railway with the Bradford, Skipton, and Colne line, 3 miles north of Bradford. The church of St. Paul, an elegant structure in the Gothic style erected in 1820, was altered and improved in 1876. The manufacture of worsted is the principal industry, and there are large stone quarries in the neighborhood. A local board was established in 1853. The population of the urban sanitary district (area 1406 acres) in 1871 was 11,757, and in 1881 it was 15,093.

SHIPPING. The island of Britain (to the shipping of which the present historical notice is mainly restricted) is well fitted to serve as a commercial depôt,

THE UNSEEN HEROES ON A WAR-SHIP

both by the number of its natural harbors and the variety of its products. There is evidence that Phœnician traders visited it for tin, and in after times it served as one of the granaries of the Roman empire. On the other hand raw wool was a staple article of commerce in the Middle Ages, while the supremacy of English manufactures in modern days has contributed to the development of British shipping till it has grown out of all comparison with anything in ancient or mediæval times.

Britain must have been one of the most distant points that was visited by Phœnician or Carthaginian ships. Adventurous as their sailors were when compared with those of other races, and ready as they were to carry on trading on behalf of neighboring states, it is not clear that they ever sailed across the Indian Ocean or ventured beyond the Persian Gulf, even in the service of the Egyptians (Brugsch). Their coasting habits led to the settlement of a chain of colonies along the Mediterranean shores, and that sea was wide enough to form a convenient barrier between the Greek and the Carthaginian settlements. When their empire was at length destroyed the Romans became the heirs of their enterprise, but do not appear to have pushed maritime adventure much further or opened out many new commercial connections.

Though the Angle and Saxon tribes were doubtless skilled both in shipbuilding and in the management of their vessels at the time when they conquered Britain, these arts had greatly decayed during the four centuries that elapsed before the time of Alfred, who endeavored to improve on existing models (*Eng. Chron.*, 897). Hence the necessity of resisting the Danes, with the subsequent fusion of Danish and other elements in our nationality, may be taken as marking the period when English shipping had its rise. Apart from incidental notices of communication with other lands, there is clear evidence, from the early English laws, of efforts to encourage commerce, particularly in the status which was accorded to traders and the protection afforded to merchant ships. The whole of these arrangements seem to imply that the merchant was the owner of the vessel, who "adventured" with his cargo, and sailed in his ship himself; but these voyages were probably undertaken for the most part to ports on the other side of the Channel, as it does not appear that English ships penetrated to the Mediterranean till the time of the crusades.

The steady development of English shipping during the Norman and early Plantagenet reigns may be inferred from the more frequent intercommunication with the Continent and the many evidences of the increasing importance of the commercial classes and trading towns. In the time of Edward III. the shipping interest suffered a temporary check from the removal of the staple to England, a step which was taken with a view of attracting foreign merchants to visit England (1353). This policy, however, was soon reversed, and the reign of that monarch was on the whole favorable to the development of shipping. He was himself fond of the sea, and commanded in person in naval engagements, and by taking possession of Calais and enforcing his sovereignty over the narrow seas he rendered the times more favorable for the development of commerce. More than one of the noble families of England have descended from the merchant princes of the 14th century. By this time also the compass, which had been introduced in a rude form as early as the 12th century, had been improved and had come into common use. But many years were to elapse before the enterprise of the 15th and 16th centuries made the most of the new facilities for undertaking long voyages; and the fortunes of English shipping, as depicted by a contemporary (*Libell of Englishe Policy*, 1436), continued to vary according to the state of political connections with the Continent and the success of English monarchs in "keeping the narrow seas" free from the ravages of pirates. During this century, too, we hear far more of organizations of merchants to foreign parts, and of struggles between different bodies of traders. The "Merchants of the Staple" dealt in raw wool and the other staple commodities of the realm, which they exported to Calais; the "Merchant Adventurers," a powerful association which had developed out of a religious guild, dealt chiefly in woollen cloths, but they traded with any port where they could get a footing. This brought them into frequent collision with the "Merchants of the House," who had had a footing in London since before the Conquest. The chief attempt at accommodation took place in the time of Edward IV. (1474), but the quarrels and reprisals continued till the discovery of the New World had revolutionized trade, and the Hanse League, expelled by Elizabeth, were unable either to injure or to compete with English shipping.

Considering the interest which all the Tudor monarchs showed in developing shipping,[1] and the proverbial boldness and enterprise of the Cabots, Raleigh, Drake, and other sailors, it is remarkable that England obtained so little footing at first in the new lands which were discovered by Columbus (1492) or along the route that was opened up by Vasco da Gama (1496). Eventually she inherited much of the commercial empires of Spain, Portugal, Holland, and France, but there was still comparatively little permanent acquisition, or establishment of trading factories, at the close of the 16th century. The fact was that such undertakings were beyond the power of private traders, and that Elizabeth was too penurious to make an attempt on such a scale as to command success. It was by the formation of companies that the difficulty was at length overcome, and that associated traders, or traders working on a joint stock, were able to establish factories in foreign parts, and thus give a new impetus to English shipping. The African Company and others were failures, but there were many which had a long and successful career. The Levant Company was established in 1581 and had factories at Smyrna. The Eastland Company traded with the Baltic; it was established in 1579 and had factories in Prussia. The Hudson's Bay Company is much more recent and only dates from 1670. But by far the greatest of these undertakings was the East India Company, which was founded in 1600, and which, after a long struggle with commercial rivals at home and Dutch competitors abroad, attained at length to the sovereignty of a large empire. The chief cause of complaint against this company in the early stages of its existence lay in the fact that it was a joint-stock company, and that therefore the proprietors had a monopoly of a valuable trade; the greater part of the other companies were regulated companies, and membership was open to any British subject who liked to pay the entrance fees and join with other merchants. The merchants thus associated agreed to abide by certain specified conditions, so as not to spoil the markets for one another, but develop the trade in which all were interested in a manner which should be advantageous to all. The Levant Company and Merchant Adventurers were regulated companies, and they led the attack on the East India Company as the monopoly of a few which injured the trade of other merchants. The controversy raged during the reigns of James I. and Charles I., and many of the leading merchants of the time—Mun, Malynes, Misselden, as well as Wheeler, the secretary of the Merchant Adventurers—took part in it. The advocates of the East India trade argued that, owing to the immense distance of their factories and the special difficulties of maintaining their position abroad, it was impossible to carry on their trade except on the joint-stock principle, and their plea prevailed in the long run.

[1] The establishment of Trinity House by Henry VIII. for looking after pilots, buoys, etc., in 1512, is the most important result of his care for shipping.

The Merchant Adventurers and the whole system of regulated companies is less familiar to us in the present day, and it may be worth while to indicate the sort of regulations which were imposed on the members. One series of rules was directed at regulating the total export trade of certain classes of goods to the chief Continental ports, so that the markets abroad might not be overstocked, and that they might always be able to get remunerative prices. Other regulations allotted the proportion of goods which each member of the company should export, and the terms as to credit and so forth on which he should deal. Each factory was carefully regulated so as to secure a respectable and orderly life among the merchants resident abroad; none of them were to do business during the times of public preaching or on fast-days; and there was a curious administrative system by which the compliance of the members with these regulations was enforced.[1]

Those English merchants who traded to towns where the Adventurers had a factory, but did not comply with their regulations, were stigmatized as "interlopers," and they were greatly disliked by the regular traders, as they were accused of spoiling the market in various ways and, generally speaking, trading on any terms for an immediate advantage without regard to the steady and regular development of commerce. At a later time there were interlopers within the East India Company's territories also.

The formation of these large companies for the purpose of undertaking long voyages marks a great revolution in the shipping of the country. The differentiation of the mercantile and defensive navy became more complete. There had of course been a certain number of royal ships from a very early time (see Navy), but the fleet had not been regularly maintained in the 15th century, and the defence of the realm was practically left to individuals or associations. As late as the time of Elizabeth we find that the same thing was the case, and that the fleet which harassed the Armada consisted very largely of merchant ships. In the time of the naval wars with Holland, however, this is greatly changed, and the navy was much more effectively organized and regularly maintained. But even when the royal navy was thus organized it was felt that its continued effectiveness must depend on the maintenance of merchant shipping. The two were still interconnected, and just because special importance was attached to this arm as a means of defence there was a great deal of legislation for the purpose of indirectly promoting shipping and providing seamen. This was one of the aspects in which the prosperity of British fisheries was specially attended to; the consumption of fish was stimulated by insisting on the observance of Lent and of weekly fasts on Wednesdays and Fridays, when "the eating of fish was required politically and not spiritually" (5 Eliz. c. 5, § 13, 1 Jas. I. c. 29), and this was principally done as a means of inducing men to take to a seafaring life, and so to fit themselves for the defence of the country and for the manning of our merchant ships.

Considerable progress had also been made both in the art of sailing and in the building of ships. The vessels which composed the fleets of the crusaders appear to have been for the most part galleys, provided with a double row of oars; the huge prows which gave a superiority in hand-to-hand fighting with a grappled vessel were of no advantage when the use of cannon had revolutionized naval warfare. We thus find that the ships of this period were built on a different model, and many inducements were held out to those who built large ships. Both Elizabeth and Charles offered bounties for the building of larger craft (100 and 200 tons); in 1597 800 tons was the largest vessel that an English yard turned out. The legislature also was most assiduous in endeavoring to encourage this industry. The importation of naval stores of all kinds, the growth of hemp for cordage and of timber, were matters of constant care, both in England itself and in the policy which was dictated to her colonies.

It is easy enough to see that in these cases the encouragement of shipping was undertaken as an indirect means of increasing the power of the country, and the same thing is true of the complicated arrangements that were made for giving special inducements to trade in particular articles or with particular countries. Every one is of course familiar with the fact that during the 17th and 18th centuries efforts were made to regulate trade so that gold and silver might be brought into England. It is unnecessary to enumerate the expedients that were adopted at different times, or to discuss the vexed question as to how far those who advocated the system were in error. There can be no doubt that the possession of a treasure was vastly important for political purposes, and that trade was the only means by which a state which possessed no mines could procure treasure; and it is of course possible that some of the mercantilists laid too much stress on the desirability for political purposes of amassing wealth in this form. But the fundamental principle of this system of commercial policy lay in the connection which was felt to exist between trade and industry. Trade, it was said, stimulated industry by providing a new market for its products. If two countries trade together, each will stimulate the trade of the other to some extent, but, if England buys raw products from Portugal and Portugal buys manufactured cloth from England, then the operation of trade between them is such that Portugal stimulates English industry and sets English labor in motion to a far larger extent than English consumption stimulates that of Portugal; it was believed that this relative stimulus might be detected by examining the balance of trade, and that, if by an ingenious adjustment of duties the balance could be kept in her favor, the trade would be benefiting England more than it stimulated the progress of her possible rivals. In the present day we look at the volume of trade and trust that both are gainers; in those centuries they looked at the kind of gain that accrued and tried to ensure that England gained more than her possible enemies. Thus it was generally held that by commercial intercourse between England and France the French gained relatively more than the English; to the legislators of the time it seemed desirable to impose such conditions as should alter this state of affairs, or, if no agreement could be come to on the terms of a treaty, the trade should be stopped altogether, lest by continuing to overbalance England in trade the French should be enabled to overbalance her in power. These ideas of commercial policy dominated the whole of British legislation for shipping[2] from the beginning of the 17th century till after the Napoleonic wars; the preference which was given to English ships, English built and English manned, was enforced in a manner that was prejudicial to the development of the colonies by the Navigation Act of 1651, and was subsequently embodied in the orders in council. But these ideas are expressed most clearly in such discussions as those regarding the Methven treaty with Portugal. Without attempting to advocate a system of which the unwisdom has become patent in our own day, it may yet be worth while to note that it was during this régime that England acquired her position as the great shipping nation of the world, and passed the Dutch and French in the struggle for naval supremacy. Napoleon gave unconscious testimony to the effectiveness of the commercial policy for building up the strength of the nation when he sought to humble England, not by direct attack, but by destroying the trade and shipping by means of which she had raised herself to power.

This policy of subordinating the interests of shipping as a trade and means by which merchants acquired wealth to the policy and power of the nation as a whole had another side. Revenue for war expenses was furnished almost entirely by the mother country: neither Ireland nor the colonies contributed at all largely to the burden of maintaining the national struggle with Continental rivals. Hence it was undesirable that these dependencies should develop at the expense of the mother country, as by so doing they would reduce the fund from which parliament drew for the expenses of the realm. Hence, while England was always willing to develop resources or industries—like the linen trade in Ireland—which did not compete with and could not undersell existing English manufactures, her politicians were unwilling to allow her dependencies to become her competitors in trade so long as they did not coöperate in

[1] Wheeler in Brit. Mus. Add. MS. 18,913.

[2] It was pursued, but less systematically, all through the Tudor reigns or even earlier. Compare 1 H. VII. c. 8, 32 H. VIII. c. 14, 1 El. c. 13, also the Assize of Arms in 1181.

maintaining power. Hence the galling restrictions to which the Irish and the colonists were subjected, both with regard to the development of some of their resources and the carrying on of profitable trade with other colonies or foreign countries. But it must not be forgotten that English merchants suffered in the same sort of way, as changes of political relations at once brought about changes in the conditions of trade, and that, in at least one case the interests of enterprising farmers at home were set aside in favor of protecting an established industry in the colonies. The subordination of the craftsman and trader interest to the public policy of the realm brought about a system of galling regulations which pressed hardly on many persons, though they were most obviously baneful to Ireland and the colonists, who had not so much interest in the political objects for which their wealth was sacrificed.

It is unnecessary to attempt to illustrate in detail the application of these principles; it only remains to add that, whether, in spite of these regulations or because of them, the shipping of England increased vastly during the 18th century. This was partly due to the greater facilities which were granted for procuring capital for trading ventures. In mediæval times a merchant could hardly obtain the command of additional capital, unless by means of a temporary partnership, or loans on bottomry; but the objection to usury was fast giving way, and the public were willing to lend capital and to share in the profits of trading. The practice of trading on borrowed capital, and of obtaining temporary loans from goldsmiths, was common enough all through the 17th century, but the development of the banking system and the new forms of credit which thus became available gave still greater scope to the enterprising shipper. The full fruits of the new power were only shown, however, in the beginning of the 18th century, when the rivalry of the Old and New East India Companies and the story of the Darien Expedition and the South Sea Bubble show how willing the British public were to pour their capital into trading undertakings. Among the companies which were started about this period there were two which have exercised a most salutary influence on British shipping. The Royal Exchange Assurance (6 Geo. I. c. 18) and the London Assurance revolutionized the whole system of marine assurance, and did so much to relieve skippers from the losses they suffered through the risks of commerce as to give considerable encouragement to the business. The plantations were developing into important settlements; the British merchant had outdone his Dutch rivals; and the East India Company was pursuing its course of progress in the East. There can be no wonder that, with so many opportunities for trading, and such new facilities for obtaining capital and assuring against risk, the shipping of the country developed during the 18th century. It is unnecessary to dwell on the shocks it received at the time when the American colonies asserted their independence (27 and 28 Geo. III.) or in the life and death struggle of the Napoleonic wars. The difficulty of recasting the restrictive system under which English merchants plied their trade was very great, and when it broke down in regard to America and Ireland 20 Geo. III. cc. 6, 10) it was becoming apparent that its days were numbered. The doctrines preached by Adam Smith soon began to bear fruit; the practical difficulty of regulating commerce rendered politicians more willing to let it regulate itself; and the controversy between the exclusive companies and the interlopers or independent merchants once more came to the front. It was during the reign of George IV. that the old system was practically abandoned and that the greater part of the old companies were dissolved, and trade to all parts of Africa, to the Levant, and to China became open to all British subjects. The East India Company maintained its position in part despite its many critics for another half century, and the peculiar conditions of the trade of the Hudson's Bay Company have made it desirable to maintain that privileged corporation till the present time.

It became still more obvious that the old policy of regulating the commerce of the country in the supposed interests of its power was being abandoned when Huskisson reformed the tariff in 1825. The measure he succeeded in carrying was not so thoroughgoing as the one he proposed, but its principle was that the customs duties should be levied for revenue objects only, and not with the view of maintaining British merchants in one particular employment of their capital. Later the repeal of the corn laws (1846) and navigation laws (1849) removed the last vestiges of the old commercial policy which had ruled over the development of British shipping almost from the earliest times, but which had been steadily and systematically pursued for three hundred years.

It was thus that Adam Smith's criticisms worked so effectively as to realize his dreams at no great interval of time. His deeper reasons for objecting to the commercial system of the 18th century lay in the fact that the colonial trade and shipping altogether seemed to him to have received an unhealthy stimulus, and that the country would be in a sounder economic position if capital were employed at home in developing native resources, and foreign trade built upon a foundation of highly developed native industry. But the removal of the stimulus did not have the effect he anticipated, or restore the "balance" between industry and shipping. England is far more dependent than ever before on her relations with foreign countries, and therefore on her shipping, for the materials of her manufacture and her food, as well as for markets for her products. She is further removed than ever from that condition of "opulence" which has, according to Adam Smith, the greatest promise of stability and progress.

This has undoubtedly been due to the immense developments in manufacturing in which England, with her wealth of coal and iron, led the way. This reacted on shipping in many ways. England came to be the workshop of the world, and her shipping was freighted with soft goods from Lancashire and Yorkshire, and with hardware and machinery, to be conveyed to the most distant parts of the globe. But not only were the opportunities for trading immensely increased; the application of the steam engine to transit by water has accelerated communication, and rendered it so regular and certain as to give an extraordinary stimulus to foreign trade. The first steamboat that was more than a mere toy made its trial in 1807, and since that time steam shipping has been more and more substituted for the old sailing vessels. Still more recently there has been a considerable change in the construction of ships, from the success which has attended iron shipbuilding. The first experiment, which was generally deemed exceedingly rash, was made in 1851.

It is impossible to get satisfactory data for a comparison of the relative importance of English and foreign shipping for a long period; but it may be assumed that the shipping of the Italian republics and of the Hanse League excelled that of England during the Middle Ages, that in the 16th century Spain was far ahead of her when she could send such fleets to the West and fit out a Spanish Armada, and that in the 17th and 18th centuries respectively England was much in the same position as the great rivals—Holland and France—with which she had to compete so keenly. We may compare the present position and the relative growth of tonnage during the last century, so far as figures are available for the purpose:

	1790.	1880.		1790.	1880.
England[2]	1,511,411	6,574,513	France	...	989,128
Spain	...	557,320	Holland	...	349,000
Italy	...	1,000,000	United States	502,146	4,000,000
Germany	...	1,300,000			

The following aggregates show the growth of the tonnage of British shipping: in 1588, 12,500 tons (excluding fishing boats); in 1770, 682,811 (England and Scotland); in 1791, 1,511,401 (including colonies); in 1830, 2,199,959 (excluding colonies); in 1840, 2,768,262; in 1850, 3,565,133; in 1860, 4,658,687; in 1870, 5,690,789; in 1880, 6,574,513.

See Macpherson, *Annals of Commerce;* Lindsay, *History of Merchant Shipping.* For earlier periods see Schanz, *Englische Handels-Politik*, and for later periods Leone Levi, *History of British Commerce.* (W. CU.)

SHÍRÁZ, a celebrated city in Persia, capital of Fars, from its site and thoroughly Iranian population may be considered the central point, as it were, of Farsi or Parsi (otherwise Persian) nationality. Owing to the pasture land in its vicinity some derive the name from the native word *shir*, "milk;" others again, asserting the number and physical powers of its inhabitants, accept the same word in its sense of "lion," or take the whole dissyllable as an obsolete word meaning the "lion's paunch." To this effect is cited a local saying to the effect that, "like the lion, it devours all they bring into it." Shíráz is situated in 29° 36′ 30″ N. lat. and 52° 32′ 9″ E. long., in a high plain or valley more than 20 miles long and less than half as broad, and is approached on the south from the sea—a distance of 170 miles[1]—through lofty mountain passes

[1] As the crow flies, it is only 115 miles N.E. by E. of Bushahr.

[2] [For another estimate of British tonnage, see Vol. XVII, p. 299.—AM. ED.]

reaching some 7000 feet above the level of the waters of the Persian Gulf. On the north the approach is also through chains of mountains separating the plains of Shíráz from the valley of the Marv Dasht, intersecting which is the Band Amír river, more poetically than accurately described in *Lalla Rookh*. At Kodiyan, a few miles to the northwest of Shíráz, is the source of another river, which, crossing the high road south of the town under the name of the "Kára Agatch," falls into the sea about 70 miles below Bushahr (Bushire), after a tortuous course of 300 miles. The city has a handsome bazaar and some good private residences; but its unattractive streets are narrow, and, though not so crowded with beggars as Ispahan, contain many living objects distressing to the eye. The mosques and minarets, albeit of local repute, look more picturesque to the stranger in the distance than under close inspection. One fine view of the town is that on the north, at the pass between the mountains called "Allah Hu Akbar"—so named, it is conceived, because this would be the traveller's exclamation of delight when the landscape first opened out upon him. The country in this direction is studded with pleasant gardens. Besides these there are the tombs of the poets Hafiz and Sa'di—both within easy reach of the city. The first—a fine marble monument with a beautifully inscribed ode and other writings upon it—is not a mile from the gate, and is situated in an enclosure bearing the name Háfiziya. The most noted product of Shíráz is its wine, on the merits of which, however, there is much difference of opinion from outside judges. Dr. Wills gives an original account of an experiment of his own in making the wine of Shíráz. Its cost in the production was 5½d. [11 cts.] a bottle, and it sold a year after at more than three times that amount. Shíráz is moreover famous for inlaid work (wood and metal) called *khátam bandi* (from *khátam*, a seal). The population of the city is estimated under 30,000. The ordinary diseases are intermittent fever, diarrhœa, dysentery, typhoid, guinea-worm, cholera, diphtheria, small-pox, and ophthalmia.

Although the praises of Shíráz, its produce, inhabitants, climate, and surroundings of every kind, have been sung by poets for centuries, and are never disputed by Persians who are not Shírázis, yet it is impossible for the sober European traveller to deny that the reality falls far below the picture. We may feel thankful for the wine and the water, the gardens and the monuments, the fruits and the flowers (abundant here as in many other an oasis in the Shah's dominions); we may sympathize with the national pride in the possession of a Hafiz and a Sa'di; we may believe that the ladies of yore had "eyes brighter than the antelope's, hair clustering like their own dark grapes, and forms fairer and sweeter than the virgin rose," and that those of the present day would, if unveiled, strike the spectator with wonder; but one fact remains,—the modern town of Shíráz is not a paradise for those whose personal experience enables them to compare it with the ordinary cities of Europe.

According to Eastern authorities, Shíráz was founded (or refounded, for some accounts ascribe to it a fabulous antiquity) by a brother of the famous Ḥajjáj about the beginning of the 8th century, or rather by a cousin of Ḥajjáj called Mohammed b. Ḳasim b. Abú 'Oḳail. Six hundred years later it was the capital of the Muẓaffar dynasty of princes, when it fell to the arms of Timur. But it attained its greatest reputation in the reign of Karim Khan, who embellished the city greatly and made it the special object of his care. On the downfall of this monarch it was sacked and laid waste by the cruel Agha Mohammed.

Shíráz has been often described by native geographers and European writers of travel. Among the latter may be mentioned Pietro della Valle, Herbert, Tavernier, Deslandes, and Chardin, in the 17th century, and in the present century Ouseley, Porter, Morier, Scott-Waring, Forster, Binning, and many quite recent travellers. Neither in his serious history nor lighter sketches does Sir John Malcolm give any detailed account of Shíráz as a city, but his notes on its climate may be cited. On one of the hottest days of June, 1800, the thermometer registered 94° F. in the house and 100° in a tent. In May, 1810, it never rose at noon above 88° nor fell below 74°. In the morning, at eight o'clock, it generally stood about 60°. In autumn the heat continued, but in winter it was seen to fall considerably below the freezing point. As late as March there is often a hoar frost on the ground. April, he adds, is a delightful month, the thermometer at sunrise being generally from 50° to 55°, at two P.M. 80° to 84°, and at nine P.M. about 64°.

SHIRE. See COUNTY.

SHIRLEY, a town of Hampshire, consists chiefly of comfortable houses occupied by persons in business in Southampton (2 miles southeast), of which it is practically a suburb. Within its limits are the Barlow home (1840), the Ellyet home (1879), and the children's hospital and dispensary for women (1884). The urban sanitary district of Shirley, formed in 1853, was extended by an Act which came into operation 29th September, 1881, the name being also changed to Shirley and Freemantle. The population of the old district (area 1198 acres) in 1871 was 5339 and in 1881 it was 7856. The population of the new district (area 1392 acres) in 1871 was 9909 and in 1881 it was 12,939.

SHIRLEY, JAMES (1596–1666), dramatist, belonged to the great period of our dramatic literature, but, in Lamb's words, he "claims a place among the worthies of this period, not so much for any transcendent genius in himself, as that he was the last of a great race, all of whom spoke nearly the same language and had a set of moral feelings and notions in common." His career of playwriting extended from 1625 to the suppression of stage plays by parliament in 1642. Born in London in 1596, he had been educated for a profession—at Merchant Taylors' school, St. John's College, Oxford, and Catherine Hall, Cambridge. The church was his destination, but he turned Roman Catholic, and made a living for two years as a schoolmaster. His first play, *Love Tricks*, seems to have been accepted while he was teaching at St. Albans, and for eighteen years from that time he was a prolific writer for the stage, producing more than thirty regular plays, tragedies, and comedies, and showing no sign of exhaustion when a stop was put to his occupation by the Puritan edict. He turned again to teaching for a livelihood and prospered, publishing some educational works under the Commonwealth. Besides these he published during the period of dramatic eclipse three small volumes of poems and masques, in 1646, 1653, and 1659. He survived into the reign of Charles II., but, though some of his comedies were revived, he did not again attempt to write for the stage. It is said that he and his second wife died of the fright caused by the great fire of 1666.

There is little original force but much stage-craft and manipulative dexterity in Shirley's plays. He was born to great dramatic wealth, and he handled it freely. It has been remarked that he did not, like some of his great predecessors, take his plots from narrative fiction or history, but constructed them for himself. This is true; but he constructed them out of the abundance of materials that had been accumulated by more originative men during thirty years of unexampled dramatic activity. He did not strain after novelty of situation or character, but worked with confident ease and buoyant copiousness on the familiar lines, contriving situations and exhibiting characters after types whose effectiveness on the stage had been proved by ample experience. He spoke the same language with the great dramatists, it is true, but this grand style appears in him as the mechanical knack of an able and clever workman. It is often employed for the artificial elevation of commonplace thought. "Clear as day" becomes in this manner "day is not more conspicuous than this cunning;" while the proverb "Still waters run deep" is ennobled into:

> The shallow rivers glide away with noise—
> The deep are silent.

But it cannot be denied that he uses the poetic diction of his predecessors with ease, spirit and judgment. His scenes are ingeniously conceived, his characters boldly and clearly drawn; and he never falls beneath a high level of stage effect.

His chief plays were: *Love Tricks*, a comedy, 1625; *The Maid's Revenge*, a tragedy, 1626; *The Brothers*, a comedy, 1626; *The Witty Fair One*, a comedy, 1628; *The Wedding*, a comedy, 1628; *The Grateful Servant*, a tragi-comedy, 1629; *The Changes, or Love in a Maze*, 1632; *The Gamester*, a comedy, 1633; *The Example*, (containing an imitation of Ben Jonson's *Humours*), 1634; *The Opportunity*, 1634; *The Traitor*, a tragedy (perhaps Shirley's best), 1635; *The Lady of Pleasure* (perhaps the best of his comedies), 1635; *The Cardinal*, a tragedy, (an attempt to compete with Webster's *Duchess of Malfi*), 1641. An edition of his works in six volumes, with notes by Dyce and Gifford, was published in 1833.

SHODDY. See Wool.

SHOEMAKING. The simplest foot-protector is the sandal, which consists merely of a sole attached to the foot, usually by leather thongs. The use of this the archæologist can trace back to a very early period; and the sandal of plaited grass, palm fronds, leather, or other material still continues to be the most common foot-covering among Oriental races. Where climate demanded greater protection for the foot, the primitive races shaped a rude shoe out of a single piece of untanned hide; this was laced with a thong, and so made a complete covering. Out of these two elements—sole without upper and upper without sole—arose the perfected shoe and boot, which consist of a combination of both. A collection illustrating the numerous forms and varieties of foot-covering, formed by M. Jules Jacquemart, is now in the Cluny Museum in Paris. It embraces upwards of 300 specimens of ancient, mediæval, and modern times, with a special series illustrating the artistic and historical side of the subject in France from the 15th century, and contains examples of the many varieties of foot-covering in use, especially in the East, at the present day. (Compare Costume.)

Wooden Shoes.—The simplest foot-covering, largely used throughout Europe, is the wooden shoe, made from a single piece of wood roughly cut into shoe form. The towns of Mende and Villefort (dep. Lozère) are the headquarters of the wooden shoe trade in France, about 1700 persons there finding employment in the manufacture. Analogous to this industry is the clog-making trade of the midland counties of England. Clogs, known also as pattens, are wooden soles to which shoe or boot uppers are attached. Sole and heel are made of one piece from a block of maple or ash two inches thick, and a little longer and broader than the desired size of shoe. The outer side of the sole and heel is fashioned with a long chisel-edged implement, called the clogger's knife or stock; a second implement, called the groover, makes a groove about one-eighth of an inch deep and wide round the side of the sole; and by means of a hollower the contour of the inner face of the sole is adapted to the shape of the foot. The uppers of heavy leather, machine sewed or riveted, are fitted closely to the groove around the sole, and a thin piece of leather-binding is nailed on all around the edges, the nails being placed very close, so as to give a firm durable fastening. These clogs are of great advantage to all who work in damp, sloppy places, keeping the feet dry and comfortable in a manner impossible with either leather or india-rubber. They are consequently largely used on the Continent by agricultural and forest laborers, and in England and the United States by dyers, bleachers, tanners, workers in sugar-factories, chemical works, provision packing warehouses, etc. There is also a considerable demand for expensive clogs, with finely trimmed soles and fancy uppers, for use by clog-dancers and others on the stage.

Manufacture of Leather Shoes.—There are two main divisions of work comprised in ordinary shoemaking. The minor division—the making of "turn shoes"—embraces all work in which there is only one thin flexible sole, which is sewed to the upper while outside in and turned over when completed. Slippers and ladies' thin house boots are examples of this class of work. In the other division the upper is united to an insole and at least one outsole, with a raised heel. In this are comprised all classes, shapes, and qualities of goods, from shoes up to long-top or riding boots which reach to the knee, with all their variations of lacing, buttoning, elastic-web side gussets, etc. The accompanying cuts (Figs. 1 and 2) show the parts and trade names of a riding boot, which is the supreme product of the craft.

Till within recent times shoemaking was a pure handicraft; but now machinery effects almost every operation in the art. On the factory system all human feet are treated alike; in the handicraft, the shoemaker deals with the individual foot, and he should produce a boot which for fit, comfort, flexibility, and strength cannot be approached by the product of machinery.

The shoemaker, after measuring the feet, cuts out upper leathers according to the size and pattern. These parts are fitted and stitched together by the "boot-closers;" but little

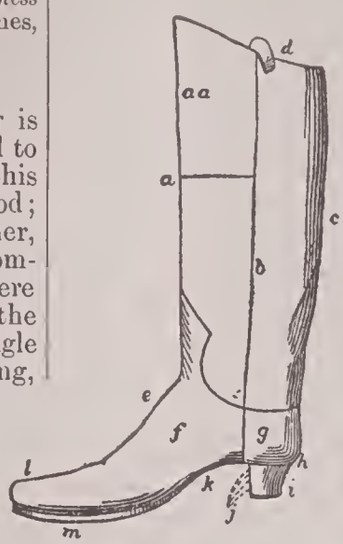


Fig. 1.

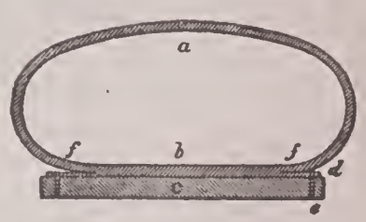


Fig. 2.

Fig. 1.—Parts of a boot. *aa*, the extension; *a*, the front; *b*, the side seam; *c*, the back; *d*, the strap; *e*, the instep; *f*, the vamp or front; *g*, the quarter or counter; *h*, the rand; *i*, the heel,—the front is the breast, the bottom the face; *j*, the lifts of the heel; *k*, the shank or waist; *l*, the welt; *m*, the sole.

Fig. 2.—Section of boot. *a*, the upper; *b*, the insole; *c*, the outsole; *d*, the welt; *e*, the stitching of the sole to the welt; *f*, the stitching of the upper to the welt.

of this closing is now done by hand. The sole "stuff" is next cut out and assembled, consisting of a pair of inner soles of soft leather, a pair of outer soles of firmer texture, a pair of welts or bands about one inch broad, of flexible leather, and lifts and top-pieces for the heels. These the "maker" mellows by steeping in water. He attaches the insoles to the bottom of a pair of wooden lasts, which are blocks the form and size of the boots to be made, fastens the leather down with lasting tacks, and, when dried, draws it out with pincers till it takes the exact form of the last bottom. Then he "rounds the soles," by paring down the edges close to the last, and forms round these edges a small channel or feather cut about one-eighth of an inch in the leather. Next he pierces the insoles all round with a bent awl, which bites into, but not through, the leather, and comes out at the channel or feather. The boots are then "lasted," by placing the uppers on the lasts, drawing their edges tightly round the edge of the insoles, and fastening them in position with lasting tacks. Lasting is a crucial operation, for, unless the upper is drawn smoothly and equally over the last, leaving neither crease nor wrinkle, the form of the boot will be bad. The welt, having one edge pared or chamfered, is put in position round the sides up to the heel or "seat," and the maker proceeds to "inseam," by passing his awl through the holes already made in the insole, catching with it the edge of the upper and the thin edge of the welt, and sewing all three together in one flat seam, with a waxed thread. He then pares off inequalities and "levels the bottom," by filling up the depressed part in the centre with a piece of tarred felt; and, that done, the boots are ready for the outsoles. After the leather for them has been thoroughly condensed by hammering on the "lap-stone," they are fastened through the insole with steel tacks, their sides are pared, and a narrow channel is cut round their edges; and through this channel they are stitched to the welt, about twelve stitches of strong waxed thread being made to the inch. The soles are now hammered into shape; the heel lifts are put on and attached with wooden pegs, then sewed through the stitches of the insole; and the top-pieces, similar to the outsoles, are put on and nailed down to the lifts. The finishing operations embrace paring up the edge of the heel, paring, rasping, scraping, smoothing, blacking, and burnishing the edges of soles and heels, scraping, sand-papering, and burnishing the soles, withdrawing the lasts, and cleaning out any pegs which may have pierced through the inner sole. Of course, there are numerous minor operations connected with for-

warding and finishing in various materials, such as punching lace-holes, inserting eyelets, applying heel and toe irons, hob-nailing, etc. To make a pair of common stout lacing boots occupies an expert workman from fourteen to eighteen hours.

The principal difficulties to overcome in applying machinery to shoemaking were encountered in the operation of fastening together the soles and uppers. The first success in this important operation was effected when means other than sewing were devised. In 1809 David Meade Randolph obtained a patent for fastening the soles and heels to the inner soles by means of little nails, etc. The lasts he used were covered at the bottom with plates of metal, and the nails, when driven through the inner soles, were turned and clinched by coming against the metal plates. To fix the soles to the lasts during the operation the metal plates were each perforated with three holes, in which wooden plugs were inserted, and to these the insoles were nailed. This invention may be said to have laid the foundation of machine boot-making. In the following year (1810) the inventor M. I. Brunel patented a range of machinery for fastening soles to uppers by means of metallic pins or nails, and the use of screws and staples was patented by Richard Woodman in the same year.

Apart from sewing by machine or hand, three principal methods of attaching soles to uppers are in use at present. The first is "pegging" with small wooden pins or pegs driven through outsole and insole, catching between them the edges of the upper. The points of the pegs which project through the insole are cut away and smoothed level with the leather either by hand or by a machine pegging rasp. The second is the system of "rivcting or clinching" with iron or brass nails, the points of the nails being turned or clinched by coming in contact with the iron last used. The third method, screwing, has come into extensive use since the standard screwing machine was introduced in America by the Mackay Association of Boston, Massachusetts, and in Europe by the Blake & Goodyear Company of London. The standard screw machine, which is an American invention, is provided with a reel of stout screw-threaded brass wire, which by the revolution of the reel is inserted into and screwed through outsole, upper edge and insole. Within the upper a head presses against the insole directly opposite the point of the screw, and the instant screw and head touch the wire is cut level with the outsole. The screw, making its own hole, fits tightly in the leather, and the two soles, being both compressed and screwed firmly together, make a perfectly water-tight and solid shoe. The surface of the insole is quite level and even, and as the work is really screwed the screws are steady in their position, and they add materially to the durability of the soles. The principal disadvantage in the use of standard screwed soles is the great difficulty met with in removing and levelling down the remains of an old sole when repairs are necessary.

The various forms of sewing-machine by which uppers are closed, and their important modifications for uniting soles and uppers, are also principally of American origin. But the first suggestion of machine sewing was an English idea. The patent secured by Thomas Saint in the English Patent Office in 1790, while it foreshadowed the most important features of the modern sewing-machine, indicated more particularly the devices now adopted in the sewing of leather. After the introduction of the sewing-machine for cloth work its adaptation to stitching leather both with plain thread and with heated waxed thread was a comparatively simple task. The first important step in the more difficult problem of sewing together soles and uppers by a machine was taken in the United States by Lyman R. Blake in 1858. Blake's machine was ultimately perfected as the Mackay sole-sewing machine,—one of the most successful and lucrative inventions of modern times. Blake secured his first English patent in 1859, his invention being thus described: "This machine is a chain-stitch sewing-machine. The hooked needle works through a rest or supporting surface of the upper part of a long curved arm which projects upwards from the table of the machine. This arm should have such a form as to be capable of entering a shoe so as to carry the rest into the toe part as well as any other part of the interior of it; it carries at its front end and directly under the rest a looper, which is supported within the end of the arm so as to be capable of rotating or partially rotating round the needle, while the said needle may extend into and through the eye of the looper, such eye being placed in the path of the needle. The thread is led from a bobbin by suitable guides along in the curved arm, thence through a tension spring applied to the arm, and thence upwards through the notch of the looper. The needle carrier extends upwards with a cylindrical block which can be turned around concentrically with it by means of a handle. The feed wheel by which the shoe is moved along the curved arm during the process of sewing is supported by a slider extending downwards from the block, and applied thereto so as to be capable of sliding up and down therein. The shoe is placed on the arm with the sole upwards. The feed wheel is made to rest on the sole." Blake's original machine was very imperfect and was incapable of sewing round the toe of a shoe; but a principal interest in it coming into the hands of Gordon Mackay, he in conjunction with Blake effected most important improvements in the mechanism, and they jointly in 1860 procured United States patents which secured to them the monopoly of wholly machine-made boots and shoes for twenty-one years. On the outbreak of the Civil War in America a great demand arose for boots, and, there being simultaneously much labor withdrawn from the market, a profitable field was opened for the use of the machine, which was now capable of sewing a sole right around. Machines were leased out to manufacturers by the Mackay Company at a royalty of from ½ to 3 cents on every pair of soles sewed, the machines themselves registering the work done. The income of the association from royalties in the United States alone increased from $38,746 in 1863 to $589,973 in 1873, and continued to rise till the main patents expired in 1881, when there were in use in the United States about 1800 Blake-Mackay machines sewing 50,000,000 pairs of boots and shoes yearly. The monopoly secured by the Mackay Company barred for the time the progress of invention, notwithstanding which many other sole-sewing machines were patented. Among the most important of these is the Goodyear & Mackay machines for welted shoes, —the first mechanism adapted for sewing soles on lasted boots and shoes. These machines originated in a patent obtained in 1862 in the United States by August Destory for a curved-needle machine for sewing outsoles to welts, but the mechanism was not successful till taken in hand by Charles Goodyear, son of the well-known inventor in india-rubber fabrics. The Goodyear & Mackay Company make two machines for welted goods, one for sewing the inseam and the second for stitching on the outsole. A large number of the latter form of machine are in use, many manufacturers preferring to secure the welt or a midsole by the standard screw machine, sewing to that the outsole with the Goodyear-Mackay machine. The same company adapt a circular-needle machine to the sewing of turn shoes, and this, with other similar machines, is in extensive use.

The range of machinery used in a well-equipped shoe-factory is very extensive, embracing machines for cutting leather, pressing rollers for sole leather, and presses with cutting-dies for stamping out sole and heel pieces. There are also, in addition to many kinds of sewing-machine, blocking or crimping appliances for moulding uppers or vamps, vamp-folding machines, eyeleting machines, lasting machines, trimming and paring machines for planing and smoothing the edges of soles and heels. For finishing there are scouring, sand-papering, and burnishing machines for the soles, and stamping machines for marks and monograms, with peg-cutting and nail-rasping machines for smoothing, cleaning out, and dressing the surface of the insole. In short there is not a single operation necessary in shoemaking, however insignificant, for which machinery has not been devised.

The manufacture of india-rubber goloshes, shoes, and fishing-boots, etc., forms an important branch of the india-rubber industry rather than a department of shoemaking (see INDIA-RUBBER, vol. xii. p. 883). A very considerable trade exists in boots and shoes with outer soles of gutta-percha (see vol. xi. p. 303) in place of leather, the headquarters of that trade being in Glasgow. (J. PA.)

SHOES, HORSE. The horny casing of the foot of the horse and other Solidungulates, while quite sufficient to protect the extremity of the limb under natural conditions, is found to wear away and break, especially in moist climates, when the animal is subject to hard work of any kind. This, however, can be obviated by attaching to the hoof a rim of iron—a simple device which has been probably not surpassed in its beneficial effects by the introduction of steam-power locomotion. The animal itself has been in a very marked manner modified by shoeing, for without this we could have had neither the fleet racers nor the heavy and powerful cart-horses of the present day. Shoeing does not appear to have been practiced by either Greeks or Romans; but there is evidence that the art was known to the Celts, and that the practice became common after the overthrow of the Western

empire towards the close of the 5th century. It is only recently that horse-shoeing was introduced in Japan, where the former practice was to attach to the horse's feet slippers of straw, which were renewed when necessary. In modern times much attention has been devoted to horse-shoeing, with the result of showing that methods formerly adopted caused cruel injury to horses and serious loss to their owners. The evils as summarized by Mr. George Fleming, army (British) veterinary inspector, were caused by (1) paring the sole and frog; (2) applying shoes too heavy and of faulty shape; (3) employing too many and too large nails; (4) applying shoes too small and removing the wall of the hoof to make the feet fit the shoes; and (5) rasping the front of the hoof. According to modern principles (1) shoes should be as light as compatible with the wear demanded of them; (2) the ground face of the shoe should be concave, and the face applied to the foot plain; (3) heavy draught horses alone should have toe and heel calks on their shoes to increase foothold; (4) the excess growth of the wall or outer portion of horny matter should only be removed in re-shoeing, care being taken to keep both sides of the hoof of equal height; (5) the shoe should fit accurately to the circumference of the hoof, and project slightly beyond the heel; (6) the shoes should be fixed with as few nails as possible, six or seven in fore-shoes and eight in hind-shoes; and (7) the nails should take a short thick hold of the wall, so that old nail-holes may be removed with the natural growth and paring of the horny matter. Horse-shoes and nails are now made with great economy by machinery. In the rural districts, where the art of the farrier is sometimes combined with blacksmith work, too little attention is, in general, given to considerations which have an important bearing on the comfort, usefulness, and life of the horse.

SHOLAPUR, a British district of India, in the Deccan division of the Bombay presidency, with an area of 4521 square miles, lying between 17° 13′ and 18° 35′ N. lat. and 74° 39′ and 76° 11′ E. long. It is bounded on the N. by Ahmadnagar district, on the E. by the nizam's territory and Akalkot state, on the S. by Kaládgi district and some of the Patvardhan states, and on the W. by Sátára and Poona districts and the states of Phaltan and Panth Pratinidhi. Except in Karmala and Barsi subdivisions, situated in the north and east, where there is a good deal of hilly ground, the district is generally flat or undulating; but it is very bare of vegetation, and presents everywhere a bleak treeless appearance. The chief rivers are the Bhima and its tributaries—the Mán, the Nira, and the Sina—all flowing towards the southeast. Besides these there are several smaller streams. Lying in a tract of uncertain rainfall, Sholapur is peculiarly liable to seasons of scarcity; much, however, has been done by the opening of canals and ponds, such as the Ekrúk and Ashti tanks, to secure a better water-supply. The Great Indian Peninsular Railway enters the district at Pomalvádi in the northwest corner and crosses it in a southeasterly direction, a distance of nearly 150 miles. Sholapur has recently been connected with a branch of the Southern Mahratta Railway.

The population of Sholapur district in 1881 was 582,487 (294,814 males and 287,673 females). Hindus numbered 530,121, Mohammedans 43,967, and Christians 625. There are three towns with populations exceeding 10,000 each, viz., SHOLAPUR (*q.v.*), Pandharpur (16,910), Barsi (16,126). In 1883–84 there were 1,763,340 acres under cultivation, of which 22,282 were twice cropped, besides 325,987 acres of fallow or grass land. Joár, which forms the staple food of the people, occupied 923,706 acres, bajri 298,239, wheat 55,504, rice 25,027, pulses 185,528, and oil-seeds 147,914 acres. The produce of the district finds an easy outlet by the railway to Poona and Bombay. The chief exports are cotton, which comes from the nizam's dominions, oil, oil-seeds, ghi, turmeric, and cotton cloth; imports include salt, piece-goods, yarn, gunny bags, and iron ware. The chief industries are spinning, weaving, and dyeing. The silks and finer sorts of cotton cloth prepared in Sholapur bear a good name; blankets are also woven in large numbers. The gross revenue of the district in 1883–84 amounted to £129,429 [$629,024.94], of which the land-tax yielded £98,963 [$480,960.18].

Sholapur district passed from the Bahmani to the Bijápur kings and from them to the Maráthás. In 1818, on the fall of the Peshwa, it was ceded to the British, when it formed part of the Poona collectorate, but in 1838 it was made a separate collectorate. Since then its progress has been rapid.

SHOLAPUR, chief town and administrative headquarters of the above district, is situated in 17° 40′ 18″ N. lat. and 75° 56′ 38″ E. long., on the plain of the Sina. Its convenient situation between Poona and Haidarábád (Hyderabad), with a station on the Great Indian Peninsular Railway, has made it the centre for the collection and distribution of goods over a large extent of country. The town contained in 1881 a population of 59,890 (males 30,410, females 29,480).

SHOOTING for sporting purposes requires in the use of firearms two fundamental principles on which rests the attainment of dexterity. These are, first, that the weight of the weapon be such that the sportsman can carry and wield it with ease; and, secondly—of still greater importance—that the weapon be so adapted to his chest, arm, and eye that when it is raised and levelled in the act of taking aim it may be as part of his own body. An over-heavy gun may be virtually lightened by being carried by an attendant and only handed to the sportsman when required; but a gun not exactly "fitting the shoulder," cannot possibly serve its uses with accuracy. The reason is plain. The slight divergence of his line of aim from the axis of the barrel, due to the shape of the gun not permitting the coincidence of the two when the weapon is used rapidly, creates a far from slight divergence of the pellets at any range beyond a few yards, and the object fired at, if struck at all, is only struck by the outer and weaker pellets. The increasing wildness of game-birds, in Great Britain at least, especially of partridges, through the modern system of cutting grain close to the ground and so leaving no sheltering stubble, demands rapid aim and discharge of the gun, and in consequence the efforts of gunmakers have been directed to the production of weapons of great lightness combined with power and precision. How different were the conceptions of our immediate predecessors is exemplified in such statements as "a few additional pounds in the weight of a gun makes a deal of difference," and "the most approved guns" are those "weighing, according to the fancy of the shooter, from six to nine pounds." The most approved guns now vary in weight by a few ounces only, and their configuration not by inches, but by eighths and even sixteenths of an inch. There are also fine lines in their modelling which, while of great consequence, are imperceptible to the eye, and can only be demonstrated by the application of exact and delicate instruments. Yet each of these lines has an important purpose, and their combination produces the perfect weapon. An experienced gunsmith who has studied this branch of his business can catch the salient lines of a sportsman's figure with the eye of an artist, and by the further aid of tests and measurements can construct for him a proper gun, and thus lay the foundation of a correct style of shooting. On the other hand, an unsuitable gun can only be aimed correctly with slowness, and by some straining of the muscles of the neck. Under such conditions correct and rapid shooting is at least improbable; the spread of the shot alone prevents a complete miss. It is the correct configuration of the gun which brings into full effect the elaborate boring of the barrel, and gives those long shots of which sportsmen are so proud, and which are due to the central pellets flying straight to a very considerable distance, much beyond that of the outer pellets.

Weight of gun.

The next point in a gun is balance; that is, the metal in the barrels must be so apportioned and the general construction be so arranged that there is no tendency in the muzzle to droop at

Balance.

the moment of discharge, just when the faculties of the sportsman are absorbed in taking aim and his muscular energies are in abeyance. The gun should balance at a point a little in front of the trigger-guard. The centre of gravity should also be low, so that there may be nothing of what may be called "top-hamper," —in other words, that his gun may not roll in his hand, but may keep on an even keel, as it were, while he is taking aim. If he weigh in the scales two guns of nearly the same weight, the one well the other ill balanced, the former, although feeling quite light in the hand, will generally be found to be really heavier than the latter,—a fact which is frequently the cause of much surprise to sportsmen. When properly balanced, a gun can be carried with much less fatigue.

Calibre. The calibre—a much disputed point—is, within the bounds commonly used, a question more of the capability of the sportsman to carry weight than one touching his effectiveness in the field. It has been plausibly argued that it matters little how narrow the calibre of a fowling-piece is, and that even gauge "35" (.510 inch) is wide enough. It certainly would throw a few pellets of swan-shot effectively, especially if the barrel was not less than 40 inches long. But for all common purposes the most useful calibre is the twelve-bore, if the weight is not under 6¼lb, or somewhat less for hammerless guns. When a less weight is required, "16" gauge (which in breech-loaders is really "15") is preferable. Calibre "20" belongs to toy-weapons, such guns being also uncertain in their delivery; and, as strong and effective "16" double-barrelled guns can now be made weighing only 6lb, a smaller calibre can hardly be required, except under peculiar conditions. Against the advantage of less weight has to be set the important matter of recoil, and one cause of recoil is the elongation of the body of the shot (and especially of the small-sized shot used in such guns) when placed in the barrel or cartridge. The longer that body, and the smaller the shot, the greater the difficulty in starting it; hence, to bring a "20" as regards recoil to an equality with a "12," the weight of the charge of shot must be unduly reduced, with a more than proportionate reduction of the probability of killing, save in the exceptional cases where the size is not larger than snipe shot. The shot in a "12" has no part at any appreciable distance from the wadding over the powder, and every pellet may fairly be said to receive a direct impetus from the explosion. An exceedingly light gun has also the fault of causing unsteadiness when the sportsman takes aim.

Length of barrel. The length of the barrels need not exceed 30 inches. If a sportsman possesses a remarkably correct eye he may safely go down to 26 inches or even less; but it must be borne in mind that the shorter the barrel the greater the necessity for a perfectly correct aim. Any divergence on a barrel under 26 inches is vastly increased at 30 or 40 yards. On the other hand, aim is more quickly taken with short barrels. Thirty inches is a sound medium.

Bore. Of late years there has been a run on what are termed "choke-bores" (see GUNMAKING, vol. xi., p. 248–9). But unless the choking is most mathematically true the flight of the shot will not be coincident with the axis of the barrel or the line of aim, but will "train off" in some oblique direction; and this obliquity will also be more or less affected by any required modification of the charge. A choke-bore, therefore, restricts its user to narrow conditions in loading it. The velocity of the shot is also considerably reduced, the killing power depending less on that than on the object aimed at being struck with a greater number of pellets. Neither do all the pellets fly with equal velocity, so that, as was proved several years ago by ingenious experimentation (first announced by the present writer), these advance, as it were, in a narrow and prolonged column, whereas a properly bored "friction and relief" barrel throws its shot in the figure of a broad disk, with all the pellets travelling practically at the same rate,—the inner or central ones having, however, more sustained killing power, their "quality of motion" being of a higher degree and greatly prolonging the range. A weapon bored on the friction and relief method certainly puts the sportsman in a better position for all kinds of common game at fair sporting ranges; but since the introduction of breech-loaders barrels so bored have (undeservedly) fallen so greatly into disuse that the delicate art of friction and relief boring has nearly been lost. A purely cylindrical barrel only shoots well when perfectly clean,—a condition that every discharge impairs.

Aiming. With a weapon that suits him, the sportsman will find that, on lifting it quickly to his shoulder, keeping both eyes open, and fixing them on any small object at some distance off, the barrels will be directly pointed towards that object without his having taken any slow or exact aim. To verify this, let him keep the gun in position and shut his left eye, when he will find still more plainly that his aim is true. The gun has been so constructed as to bring the rib between the barrels (for double-barrelled guns are always understood) right in front of his line of vision. In other words, the barrels and stock have been so constructed, inclusive of the fine lines already referred to, that, so far as the required purpose is concerned, the whole piece may be said to form an integral part of his own body. A few minutes' daily practice in so pointing a gun at any small object, although in a room, will give the sportsman dexterity in its use even before he has burned powder in it. How the shutting of one eye (unknown in billiards and similar games) in taking aim came to be practiced in using firearms seems inexplicable to those who know how detrimental it is. The keeping of both eyes open was formerly not quite unknown, but was so little practiced that, when the present writer took the matter up some thirty years ago and publicly advocated it, he was looked upon as being quite in error; but now his correctness is acknowledged, and what is termed the "two-eye" system is coming more and more into use. There are still many uncertain "shots" who are not aware that their frequently unaccountable misses are caused by the scientific fact that shutting one eye deprives them of the power of measuring distances, and also of watching the movement of a running or flying object. As a rule, whilst the right eye is actually taking aim, the left is acting subsidiarily and showing the right whether or not it is taking it correctly. It may be noted that almost all exceptionally good shots have the eyes set wide apart, and so take their observation from a broader base.

The attitude in taking aim should be free and upright, with the left foot somewhat advanced. The right elbow should never be raised to a horizontal level with the shoulder,—a common but bad practice. The gun should be lifted directly upwards, the butt-end just grazing the right front of the chest when reaching its final position, the eyes all the while looking fixedly upon the object. To illustrate this by way of contrast, there is another bad style of throwing the gun forward, the shooter all the while trying to look along the rib (which cranes the neck), and then bringing it back against the shoulder before firing. This, however, is a waste of muscular power and quite throws out the adaptation of the stock to the shoulder, because it is impossible to bring back the gun quite correctly, and it has therefore to be readjusted (which can hardly be accomplished) before firing. Besides, all this consumes time, for which game will not tarry. In military phrase, three "motions" are required; with the proper style there is only one.

Use of left hand. The question how far the left hand should be extended in taking aim is much disputed, but is really of secondary consequence. Pigeon-shooters extend it as far as they well can, because their great object is to prevent the muzzle from drooping at the moment of discharge; but from this, and also from their custom of planting their feet firmly and squarely upon the ground, so as to stand with their full front to their probable line of aim, no lesson in shooting game need be taken. Good game shots are not unfrequently poor shots at pigeons, and *vice versa;* to be expert at the former depends upon the acquisition of a certain knack, and above all of calculation in time, *i.e.*, of the power of estimating the average time from the shooter's cry of the word "pull" to the opening of the trap and flight of the bird. This is so much the case that not unfrequently the gun is fired solely by calculation of time, and before a sluggish bird has flown. In game-shooting the bird may rise in front or at either side of the

shooter, or even behiud him. Very rapid lateral movement of the gun may therefore be required, and it appears not only probable iu itself but experimentally true that this can best be made by the left arm when it has to describe a circle of the shortest diameter. For this the best and safest position is when the left hand grasps the gun immediately iu front of the trigger-guard. In pulling the trigger the finger should be well crooked, so that the pressure may be directly backwards, and no lateral disturbance may interfere with the aim at the most critical moment.

Stock of gun.

If the eye takes in all the rib of the gun when raised to the shoulder in position for firing, so that the full length of its surface is seen, the stock is too straight. If the rib is not seen at all, the stock is too crooked. When a stock is of the proper curve, the eye will catch the rib about one-third of its length from the muzzle, *i.e.*, all the rib in front of that point will be visible, and all behind it out of sight. A straight stock is, however, preferable to a crooked one, which makes the gun shoot low,—a bad fault. It is of first-rate importance that the delicate lateral setting of the stock, as distinguished from the perpendicular curve, should bring the centre of the rib exactly into the line of sight. This fine desideratum may be arrived at conjointly by the sportsman and the maker of the gun; the latter can be guided by information as to the sportsman's height, length of arm, and breadth of chest. If this point is satisfactory it is immaterial whether a bird flies to the right hand or to the left, and the neglect of it is the reason why some sportsmen are good shots in only one of these directions.

Treatment of guns.

In cleaning breechloaders, including the inside of the barrels, neither oil nor water should be used, but solely spirits of turpentine. The gun should never be laid aside on full-cock, as this weakens the mainsprings. As hammerless guns are necessarily on full-cock when taken down, the triggers should be drawn, but with the careful proviso that the points of the hammers strike upon a block of hard wood held firmly in front of them. The lock should never be snapped unless there is a discharged or a "dummy" cartridge in the barrel. No hammer can be made, of any metal or form of construction, that will not probably crack if it falls without something in front less trying than the hard and impassive breech. On sea voyages and in damp climates the barrels should be kept from the atmosphere by inserting into them wooden rods covered with woollen cloth, and in such cases the free application of turpentine will be found invaluable. Failing these rods, each end may be closed with wadding or corks. For oiling the locks the finest chronometer oil should be used, and only applied in minute quantities to the points of friction, not over all: oil dries up and if applied copiously frustrates the desired purpose. Raw linseed oil, frequently rubbed into a stock, hardens and preserves it. Explorers and travellers, whose lives may depend on their firearms, may usefully strengthen the weakest part of every gun, the handle of the stock, by wrapping it tightly round with whip-cord.

Shooting Game.—Space forbids entering at length on the modes of shooting the several varieties of game. All that is here possible is briefly to touch upon some of the salient points in the pursuit of the more common varieties.

Rabbits.

Rabbits, on which young sportsmen generally first essay their "'prentice hand," dash off for the nearest shelter with great rapidity, and should be instantaneously fired at, the aim being taken slightly in advance. If a rabbit has disappeared among brushwood, it may be not unavailing to fire right in front of the line it was seen to take. In "ferreting" the sportsman should stand clear of the burrow (over which he should never tread), and never fire at a rabbit until it is well away from the "bolt-hole." Hares are less tenacious of life than rabbits, and, as it is an object not to mangle the body and so cause an effusion of blood, the eyes of the sportsman should be fixed solely on the tips of the ears in whatever direction the animal is going, when the shot is instantaneously fatal. A hare coming straight towards a sportsman should not be fired at; he should stand quite motionless until it comes within 30 yards, when on his making a slight sound or movement it will turn aside and give an easy shot. No other direction need be given on this head (save possibly that the shot is more easy when a hare is ascending a ridge across which it may be running than when it is descending from the crown to the furrow), seeing that the one principle of firing solely at the ears involves everything.

Hares.

Roedeer.

Roedeer are usually killed with buckshot—although a small rifle is preferable—the "guns" being posted at the likely passes. The neck or shoulder should be fired at. They are easily killed when within fair distance, but are exceedingly clever in keeping out of range and in detecting the presence of the lurking sportsman. They also have the trick, in common with the elephant, of doubling back and passing round any knoll, coming out on its other side and then continuing their intended course. Of this instinctive habit the sportsman should avail himself.

Grouse.

Success in grouse-shooting, probably the finest of all sports from every point of view, depends mainly on vigilance and careful attention to the movements of the dogs, and following them well up as soon as there are indications of game being in front. Save that a cunning old cock will after rising immediately dip down to nearly the level of the heather and go off with wondrously baffling speed, there is no peculiarity in the flight of grouse calling for special remark. Like partridges, they generally fly straight and nearly horizontally. As the season advances, their wariness and the matured strength of the young birds make their pursuit more difficult, but otherwise they afford fair shots. "Driving" is now quite a recognized branch of grouse-shooting. The "guns" being posted in artificial places of concealment in the line of flight known to be usually taken by the birds on being disturbed by beaters, the shots are taken as the birds are coming overhead. Their speed is so great that it is needless to fire if they have once passed the shooter, seeing that the aim must be taken some feet in front.[1] It has been found useful for the sportsman to crouch without motion until the birds are coming within distance, when, suddenly showing himself, they are startled and throw their heads up, thus breaking their flight and giving the gun a fair chance. Perhaps the easiest and most fatal shots are at single birds coming straight towards the sportsman, taken at about 30 yards. The aim should be high, and it is aided by the recoil of a gun when fired, which throws the muzzle up in the line of flight. The pellets also strike the head and neck, and with such force that, when meeting the bird, No. 7 shot is most deadly when so discharged. The recoil of a gun when fired "high" is also useful in shooting with a rifle any large bird passing overhead; the shooter should face the bird. Driving is severe work if thoroughly carried out, as the sportsmen, as soon as one beat is over, have to find their way rapidly to the next position. It is therefore not an effeminate sport, and it probably indirectly maintains the number of the stock-birds by killing off the old leading cocks (which virtually are vermin). Setters are the proper dogs for grouse-shooting, their hairy feet being well protected from the heather; hence to maintain vigor they require to drink water frequently and even to squat in shallow pools. Pointers are preferable for dry moors, particularly in hot weather.

Partridges.

Partridge-shooting is akin to grouse-shooting in respect of the mode of pursuit, the difference lying in its being carried on mostly upon cultivated or enclosed land. Both in partridge-shooting and in grouse-shooting one bird only ought to be singled out and shot at; no success will follow firing into the "brown" of a covey. Old sportsmen regret that shooting over dogs (pointers being preferable to the swifter and more dashing setters) is going out of practice; but the close cutting of the grain crops now in vogue leaves so little stubble that the approach of the dogs is seen by the birds, which, generally rising wild, afford few "shots to points." Hence the system of sportsmen walking in line (with no dogs save retrievers) and taking what birds rise before them, and so driving them into turnips or other covert, or of having them "driven" by beaters, is almost enforced. When driven into such coverts the birds are apt to run before the shooters and take their flight from the far end of the field. This may be prevented by the sportsman not advancing directly, but in a series of circuits; then the birds, becoming uncertain as to which way they should run, sit close and only rise on his very near approach. Of course this excellent but almost unknown system can only be well carried out by a single shooter, or by two at the most. In "driving" the "guns" are posted in a line at some distance from each other, under the concealment of a hedge some 20 yards in their front. Towards this the beaters (with a fugleman on horseback, if necessary) drive the birds. The shots are generally very difficult, the birds flying with remarkable speed, and the shooter being also often bewildered by the number of smaller birds, such as the various kinds of thrushes, which precede or accompany the partridges; their sudden appearance on coming over the

[1] A carrier pigeon can fly a little over 4 miles 5 furlongs in four minutes,—an average of nearly 102 feet a second. Assuming the distance to be 40 yards (a long shot), the aim taken at a bird flying across the shooter at that speed should be more than 5 feet in advance, the flight of the shot to a distance of 40 yards requiring one-nineteenth of a second.

hedge is also trying, whereas the approach of grouse can be seen. These two systems—"driving" and the circular progression in covert—are of recent introduction. The former has developed greater skill in shooting.

Pheasants.

The art of shooting pheasants depends upon the fact that, unlike partridges or grouse, the birds generally steadily ascend in their flight; hence the tendency is to shoot under them. This upward flight is greatest in coverts, until it sometimes becomes almost perpendicular, birds rising in this way being called "rocketers." The inexperienced shooter is also misled by the manner in which the tail is spread out like a fan, concealing the body, and thus diverting the aim from the body upon the tail feathers. To aim high, therefore, is the golden rule. The shooter should face birds which fly rapidly overhead, in the way described above.

Snipe.

To kill snipe well one must hunt down the wind—an exceptional practice—and on the bird rising fire at once, or, failing that, give it time to change its few preliminary zigzag motions into a steady flight. As the least touch of shot brings a snipe down, it is very unlikely to have passed out of range before the direct line of flight is assumed. This is the only sport followed on land "down wind." Shot No. 9 or 10 should be used.

Black cock and woodcock.

Although greatly different in character, black-game and woodcock may be well coupled together as being eccentric in their movements. The former are most easily shot very early in the season, especially over a steady old pointer, when the broods are yet on the more open ground, under the maternal charge, like so many domestic chickens; but, when they have broken up the family ties, congregated, and betaken themselves to the coppices, they become so irregular in their habits and uncertain in their mode of taking flight that no exact rules can be laid down for their pursuit. The sportsman, using one steady old pointer and a retriever, had best be guided by an experienced attendant, who should take care to beat out any bird lurking in a thick bush from the opposite side and towards the gun. A few shots may also be got at the dawn of day on the edges of stubble-fields; but black-game shooting is generally disappointing. The female birds, "gray hens," are not shot at; the young males, which greatly resemble them, are distinguished from them by the white feathers in the tail. A solitary blackcock may often be seen to take up a prominent position, usually in the centre of one of the small fields to be found on the side of hilly ground, where he maintains a vigilant watch. With some experience in shooting matters, the present writer knows no pursuit more interesting and invigorating than stalking such a bird: without causing undue fatigue, it exercises one's patience, vigilance, and coolness of nerve. Shot for this purpose should not be of a smaller size than No. 4. Woodcock newly arrived may be readily killed, especially near the sea-coast. After recruiting, they frequently betake themselves to heathery moors if there are such near at hand, where they frequent the sides of rivulets and gorges. There they may be readily brought down; but in the woods they have a knack of twisting, as it were, round the younger trees, in the branches of which they are mostly found, and so disconcert the aim. Being of nocturnal habits, their eyes are weak in the full glare of day, and they are fond of the sheltering shade of thickly foliaged trees such as the holly. The only advice that can be given on this sport is to risk the shot at the merest glimpse of the bird through the branches, and trust to the spread of the pellets to kill, for the woodcock, like its congener the snipe, will fall with a touch, and even (apparently) through mere fright on being fired at, without being touched at all. The best shot to use is No. 8.

Ammunition.

Ammunition.—In former times sportsmen carefully adjusted their charges of powder and shot to suit the weather (which affected the strength of the former) and the sport in hand. Now, almost everything is left to the purveyor of cartridges, which are usually charged on average proportions. The sportsman should be careful, therefore, to ascertain the charge best suited to his weapon, and to have his cartridges so loaded. When a gun recoils the charge of shot—not of powder, as is generally supposed—should be reduced; and it is always safer to use a light charge of shot. Breech-loaders require large-grained powder, Messrs. Curtis & Harvey's No. 6 being the typical size. Pyroxyline explosives, of which Schultze powder[1] is the normal type, are now largely used, especially in the first barrel, the other being charged with black powder. For almost all regular sport No. 6 shot is the best size; and it is better to use No. 7 in a smaller quantity than No. 5 for grouse and partridges. For pheasants and black-game use No. 5, but of 1¼ oz. in weight, with a somewhat reduced charge of powder. One oz. or at most 1⅛ oz. of No. 6 is ample; the former will travel with marvellous and far-reaching velocity. Any excess of shot merely falls to the ground, as may be seen by firing over a sheet of smooth water. For duck-shooting (for which the barrels should be of "10" gauge and 32 inches long) No. 4 shot is a good size; and for this sport it is well to reduce the weight of the shot and increase very considerably that of the powder, velocity being everything.

Rifle-shooting.

Rifle-shooting.—The propriety of shooting with both eyes open is, if possible, more imperative in rifle-shooting than in shooting game, if rapidity is valued, as it must be. Firearms immediately followed the long bow and the cross-bow, and it has never been supposed that the archer discharged these with one eye closed. With both eyes open the "back sight" virtually becomes transparent, and forms no obstacle to the aim, while with one eye closed it certainly does, for, as the head and eyes must be kept fairly up in firing a shot gun, they must be kept well down in firing a rifle. The "express" rifle is the *chef-d'œuvre* of modern weapons, and when properly made will throw its bullet up to 200 yards without perceptible curve from one sight. This result is attained mostly by an inordinately large charge of powder to a light and partly hollow bullet (see GUNMAKING, vol. xi. p. 249). The "pull" on the trigger should rather be a pinch than a direct backward pull, *i.e.*, the trigger should be pinched between the forefinger and the thumb, which grasps the handle of the stock. If the sportsman has the presence of mind to inflate his chest with a long inhalation he will shoot all the better. There is a popular opinion that a single-barrelled "express" shoots more truly than a double-barrelled one. This is quite a mistake, unless the barrel of the former is made so thick and heavy at the muzzle (to prevent the metal quivering when the bullet leaves it) as to destroy the balance. In double-barrelled rifles the one barrel braces up the other, and they are also so adjusted as to shoot parallel. This common error has probably arisen from confounding "express" with long-range match rifles, which are quite another thing. The .450 calibre is best adapted for deer and antelopes, .500 for mixed shooting, and .577 for dangerous animals. But for these and the great pachyderms a "12" gauge throwing an explosive shell, is the most effective of all firearms, the larger "area" of the wound telling at once.

All really useful information on the subject of shooting is contained in J. D. Dougall's *Shooting, its appliances, etc.*, (London, 2d. ed., 1881); General W. N. Hutchinson's *Dog-breaking* (London, 1876); and W. Scrope's *Deer-stalking* (London, 1846). (J. D. D.)

SHORE, JANE, mistress of King Edward IV., would have been unknown by name even to the studious antiquary but for the events which took place after the death of her royal paramour. She was the first of three concubines whom he described respectively as the merriest, the wilyest, and the holiest harlot in his realm. A handsome woman of moderate stature, round face, and fair complexion, she was more captivating by her wit and conversation than by her beauty; yet Sir Thomas More, writing when she was still alive, but old, lean, and withered, declares that even then an attentive observer might have discerned in her shrivelled countenance some traces of its lost charms. She was born in London, and married before she was quite out of girlhood to a citizen named William Shore, who, though young, handsome, and well-to-do, never really won her affections; and thus she yielded more readily to the solicitations of King Edward. Her husband on this abandoned her, and after Edward's death she became the mistress of Lord Hastings, whom Richard III., then duke of Gloucester, as protector during the minority of Edward V., suddenly ordered to be beheaded on 13th June, 1483. According to the report given by More, Richard had accused Hastings at the council table of conspiring against him along with the queen-dowager and Shore's wife, who by sorcery and witchcraft had given him a withered arm. So having got rid of

[1] This explosive is the invention of Colonel J. F. E. Schultze, of the Prussian artillery service, and was introduced about 1866 into the United Kingdom, by Mr. J. D. Dougall. It is now being manufactured in Great Britain as well as on the Continent. The advantages claimed for it are that it does not require any special loading, such as hard ramming, there is a smaller recoil than with black gunpowder, and it has a great propulsive power, with little or no fouling of the firearm.

Hastings he caused Jane Shore to be committed to prison and spoiled her house, containing property to the value of 2000 or 3000 marks, equivalent to a sum of £20,000 or £30,000 [$97,200 or $145,800] at the present day. But having sought in the first place to charge her with conspiracy—a charge which apparently he could not substantiate—he thought better afterwards to get the bishop of London to put her to open penance at Paul's Cross for her vicious life. She accordingly went in her kirtle through the streets one Sunday with a taper in her hand, her beauty really enhanced by the blush which her humiliation called up in her usually pale cheeks; and many who detested her mode of life could not but pity her as the victim of a hypocritical tyranny. The penance certainly did not induce her to reform, for she immediately afterwards became the mistress of the marquis of Dorset; and, what is still more extraordinary, next year, having been taken again into custody, and her husband, it may be presumed, being by that time dead, she so captivated the king's solicitor, Thomas Lynom, that he actually entered into a contract of marriage with her. This we know from a letter of King Richard to his chancellor on the occasion, desiring him to dissuade Lynom from the match, as far as he could, by argument, but, if he found him determined, then, provided it was not against the laws of the church, he might convey the king's consent and meanwhile deliver Jane out of prison to her father's custody. Conduct so unlike his previous severity shows that Richard knew how to be gracious as well as despotic. Whether the marriage actually took place is not known. Jane certainly lived to the year 1513, when More wrote his history of Richard III., but how much later we cannot tell.

SHORTHAND, or STENOGRAPHY, TACHYGRAPHY, etc., is a term applied to all systems of brief handwriting which are intended to enable a person to write legibly at the rate of speech. (For the ancient Latin and Greek tachygraphy, see the last part of the article on PALÆOGRAPHY.) In the 10th century all practical acquaintance with the shorthand systems of Greece and Rome faded completely away, and not till the beginning of the 17th can the art be said to have revived. But even during that interval systems of writing seem to have been practiced which for speed approximated to modern shorthand.[1]

Shorthand in English-speaking Countries.—England was the birthplace of modern shorthand, and at the present time there is no country in Europe, except, perhaps, Germany and German Switzerland, where the art is so extensively practiced as in England. The first impulse to its cultivation may possibly be traced to the Reformation. When the principles of that movement were being promulgated from the pulpit, a desire to preserve the discourses of the preacher naturally suggested the idea of accelerated writing. It is certainly striking that in the early systems so many brief arbitrary signs are provided to denote phrases common in the New Testament and Protestant theology. Up to the present time (1886) not less than 483 professedly distinct systems of English shorthand have been published, and doubtless many more have been invented for private use. It is impossible here to notice even by name more than a very few of them. Indeed, if we reject all those systems which are imitations or reproductions of earlier ones, and systems which are so unpractical as to be little better than elegant toys, and a multitude of utterly worthless catchpenny publications, only a few remain. In Dr. Timothy Bright's[2] *Characterie* (1588) and Peter Bales's[3] *Arte of Brachygraphie*, contained in his *Writing Schoolemaster* (1590), almost every word in the language is provided with an arbitrary sign. Only with gigantic memory and by unremitting labor could one acquire a practical knowledge of such methods. The first shorthand system worthy of the name which, so far as is known, appeared in England is that of John Willis, whose *Art of Stenographie* (London, 13 editions[4] from 1602 to 1644) is substantially based on the common alphabet; but the clumsiness of his alphabetic signs, and the confused laborious contrivances by which he denotes prefixes and terminations, involving the continual lifting of the pen, would seem to render his method almost as slow as longhand. Of the 201 systems which intervene between J. Willis's and Isaac Pitman's phonography (1837) nearly all are based, like Willis's, on the alphabet, and may be called a, b, c systems. But seven are, like phonography, strictly phonetic, viz., those by Tiffin (1750), Lyle (1762), Holdsworth and Aldridge (1766), Roe (1802), Phineas Bailey (1819), Towndrow (1831), and De Stains (1839). Of the 281 systems which have appeared since phonography a very large proportion are merely imitations of that system, or proceed on the same lines.

A few general remarks apply largely to all the a, b, c systems. Each letter is designated by a straight line or curve (vertical, horizontal, or sloping), sometimes with the addition of a hook or loop. *C* and *q* are rejected, *k* being substituted for hard *c* and *q*, *s* for soft *c*. Signs are provided for *ch*, *sh*, *th*. *G* and *j* are classed under one sign, because in some words *g* is pronounced as *j*, as in *giant*, *gem*. Similarly each of the pairs *f*, *v* and *s*, *z* has only one sign. A few authors make the signs for *j*, *v*, *z* heavier than those for *g*, *f*, *s*. Some class *p* and *b*, *t* and *d*, each under one sign. The stenographic alphabet is, therefore.—*a*, *b*, *d*, *e*, *f* (*v*), *g* (*j*), *h*, *i*, *k*, *l*, *m*, *n*, *o*, *p*, *r*, *s* (*z*), *t*, *u*, *w*, *x*, *y*, *ch*, *sh*, *th*. Letters which are not sounded may be omitted. *Gh*, *ph* may be counted as *f* in such words as *cough*, *Philip*; but the *th* in *thing* is never distinguished from the *th* in *them*. Thus the a, b, c systems are largely phonetic with respect to consonant-sounds; it is rather with regard to the vowels that they disregard the phonetic principle. No attempt is made to provide adequately for the many vowel-sounds of the language. Thus the signs for *like* and *lick*, for *rate* and *rat*, etc., are the same. In the case of vowel-sounds denoted by two letters, that vowel is to be written which best represents the sound. Thus in *meat* the *e* is selected, but in *great* the *a*. In some a, b, c systems, including the best of them (Taylor's), a dot placed anywhere does duty for all the vowels. This practice is, of course, a fruitful source of error, for *pauper* and *paper*, *gas* and *goose*, and hundreds of other pairs of words would according to this plan be written alike. In the early systems of Willis and his imitators the vowels are mostly written either by joined characters or by lifting

A, b, c systems.

[1] For instances, see Zeibig's *Geschichte u. Lit. der Geschwindschreibkunst* (Dresden, 1878), pp. 67–79. For John of Tilbury's system (*c.* 1175), see especially *Shorthand*, No. 5, and *Hermes*, viii. p. 303.

[2] The Bodleian Library contains the only known copy of Bright's book. For a description of the system, see *Phonetic Journal*, 1884, p. 86; *Circulars of Information of the Bureau of Education* (Washington), No. 2, 1884, p. 8; and *Notes and Queries*, 2d ser., vol. ii. p. 394. *A* is represented by a straight line, the other letters of the alphabet by a straight line with a hook, circle, or tick added at the beginning. Each alphabetic sign placed in various positions, and having some additional mark at the end, was used to indicate arbitrarily chosen words beginning with *a*, *b*, *c*, *d*, etc. There were four slopes given to each letter and twelve ways of varying the base, so that forty-eight words could be written under each letter of the alphabet if necessary. Thus the sign for *b* with different terminal marks and written in four different directions signified a number of words commencing with *b*; 537 such signs had to be learned by heart. By adding certain external marks these signs were applied to other words: thus by writing a dot in one of two positions with respect to a sign the latter was made to represent either a synonym or a word of opposite meaning. Under *air* are given as synonyms *breath*, *exhalation*, *mist*, *reek*, *steam*, *vapor*. The best account of Bright is given in the *Dictionary of National Biography*, vol. vi. (1886).

[3] Bales's method was to group the words in dozens, each dozen headed by a Roman letter, with certain commas, periods, and other marks to be placed about each letter in their appropriate situations, so as to distinguish the words from each other. For an account of Bales, see Wood's *Athen. Oxon.*, vol. i. col. 655, and the *Dict. of Nat. Biog.*, vol. iii. (1885).

[4] The first edition, published anonymously, is entitled *The Art of Stenographie . . . whereunto is annexed a very easie Direction for Steganographie, or Secret Writing*, printed at London in 1602 for Cuthbert Burbie. The only known copy is in the Bodleian Library.

the pen and writing the next consonant in a certain position with respect to the preceding one. Both these plans are bad; for lifting the pen involves expenditure of time, and vowels expressed by joined signs and not by marks external to the word cannot be omitted, as is often necessary in swift writing, without changing the general appearance of the word and forcing the eye and the hand to accustom themselves to two sets of outlines, vocalized and unvocalized. In the better a, b, c systems the alphabetic signs, besides combining to denote words, may also stand alone to designate certain short common words, prefixes, and suffixes. Thus in Harding's edition of Taylor's system the sign for *d*, when written alone, denotes *do*, *did*, the prefixes *de-*, *des-*, and the terminations *-dom*, *-end*, *-ened*, *-ed*. This is a good practice if the words are well chosen and precautions taken to avoid ambiguities. Numbers of symbolical signs and rough word-pictures, and even wholly arbitrary marks, are employed to denote words and entire phrases. Symbolical or pictorial signs, if sufficiently suggestive and not very numerous, may be effective; but the use of "arbitraries" is objectionable because they are so difficult to remember. In many shorthand books the student is recommended to form additional ones for himself, and so, of course, make his writing illegible to others. The *raison d'être* of such signs is not far to seek. The proper shorthand signs for many common words were so clumsy or ambiguous that this method was resorted to in order to provide them with clearer and easier outlines. For the purpose of verbatim reporting the student is recommended to omit as a rule all vowels, and decipher his writing with the aid of the context. But, when vowels are omitted, hundreds of pairs of words having the same consonant skeleton (such as *minister* and *monastery*, *frontier* and *furniture*, *libel* and *label*) are written exactly alike. This is one of the gravest defects of the a, b, c systems.

John Willis's system was largely imitated but hardly improved by Edmond Willis (1618), T. Shelton (1620), Witt (1630), Dix (1633), Mawd (1635), and Theophilus Metcalfe (1635). T. Shelton's system, republished a great many times down to 1687, was the one which Samuel Pepys used in writing his diary.[1] It was adapted to German, Dutch, and Latin.[2] An advertisement of Shelton's work in the *Mercurius Politicus* of 3d October, 1650, is one of the earliest business advertisements known. The book of Psalms in metre (206 pages, $2\frac{3}{8}\times1\frac{1}{2}$ inches) was engraved according to Shelton's system by Thomas Cross. Metcalfe's *Radio-Stenography*, or *Short-Writing*, was republished again and again for about a hundred years. The 35th "edition" is dated 1693, and a 55th is known to exist. The inefficiency of the early systems seems to have brought the art into some contempt. Thus Thomas Heywood, a contemporary of Shakespeare, says in a prologue[3] that his play of *Queen Elizabeth*

John Willis.

> "Did throng the seats, the boxes and the stage
> So much that some by stenography drew
> A plot, put it in print, scarce one word true."

Shakespeare critics would in this manner explain the badness of the text in the earliest editions of *Hamlet*, *Romeo and Juliet*, *Taming of the Shrew*, *Merry Wives of Windsor*, and *Henry V.* Perhaps a study of J. Willis's system and of E. Willis's (which, though not published till after Shakespeare's death, was practiced long before) may shed light on corrupt readings of the text of these plays.[4] Rich's system (1646, 20th edition 1792) was reproduced with slight alterations by many other persons, including W. Addy, Stringer, and Dr. Philip Doddridge (1799 and three times since). The New Testament and Psalms were engraved in Rich's characters (1659, 596 pages, $2\frac{1}{2}\times1\frac{1}{2}$ inches, 2 vols.), and Addy brought out the whole Bible engraved in shorthand[5] (London, 1687, 396 pp.). Locke, in his *Treatise on Education*, recommends Rich's system; but it is encumbered with more than 300 symbolical and arbitrary signs. In 1847 it was still used by Mr. Plowman, a most accomplished Oxford reporter.

Rich.

In 1672 William Mason, the best shorthand author of the 17th century, published his *Pen pluck'd from an Eagle's Wing*. The alphabet was largely taken from Rich's. But in his *Art's Advancement* (1682) only six of Rich's letters are retained, and in his *Plume Volante* (1707) further changes are made. Initial vowels are written by their alphabetic signs, final vowels by dots in certain positions (*a*, *e* at the beginning; *i*, *y* at the middle; *o*, *u* at the end), and medial vowels by lifting the pen and writing the next consonant in those same three positions with respect to the preceding one. Mason employed 423 symbols and arbitraries. He was the first to discover the value of a small circle for *s* in addition to its proper alphabetic sign. Mason's system was republished by Thomas Gurney in 1740, a circumstance which has perpetuated its use to the present day, for in 1737 Gurney was appointed shorthand-writer to the Old Bailey, and early in the 19th century W. B. Gurney was appointed shorthand-writer to both Houses of Parliament. Gurney reduced Mason's arbitraries to about a hundred, inventing a few specially suitable for parliamentary reporting. The Gurneys were excellent writers of a cumbrous system. Thomas Gurney's *Brachygraphy* passed through at least eighteen editions, but the sale of the book has now almost ceased.

Mason.

In 1767 was published at Manchester a work by John Byrom, sometime fellow of Trinity College, Cambridge, entitled *The Universal English Shorthand*, distinguished for its precision, elegance, and systematic construction. Byrom had died in 1763. Having lost his fellowship by failing to take orders, he made a living by teaching shorthand in London and Manchester, and among his pupils were Horace Walpole, Lord Conway, Charles Wesley, Lord Chesterfield, the duke of Devonshire, and Lord Camden. Shorthand, it is said, procured him admission to the Royal Society. He founded a stenographic club, to the proceedings of which his journal,[6] written in shorthand, is largely devoted. In the strangers' gallery of the House of Commons in 1728, Byrom dared to write shorthand from Sir R. Walpole and others. In 1731, when called upon to give evidence before a parliamentary committee, he took shorthand notes, and, complaints being made, he said that if those attacks on the liberties of shorthand men went on he "must have a petition from all counties where our disciples dwell, and Manchester must lead the way." Thomas Molyneux popularized the system by publishing seven cheap editions between 1793 and 1825. Modifications of Byrom's system were issued by Palmer (1774), Nightingale (1811), Adams (1814), Longmans (1816), Gawtress (1819), Kelly (1820), Jones (1832), and Roffe (1833). Byrom's method received the distinction of a special Act of Parliament for its protection (15 Geo. II. c. 23, for twenty-one years from 24th June, 1742). To secure lineality in the writing and facility in consonantal joinings he provided two forms for *b*, *h*, *j*, *w*, *x*, *sh*, *th*, and three for *l*. *A*, *e*, *i*, *o*, *u*, he represented by a dot in five positions with respect to a consonant. Practically it is impossible to observe more than three (beginning, middle, and end). With all its merits, the system lacks rapidity, the continual recurrence of the loop seriously retarding the pen.

Byrom.

[1] See a paper by J. E. Bailey, "On the Cipher of Pepys' Diary," in *Papers of the Manchester Literary Club*, vol. ii. (1876).
[2] See Zeibig's *Gesch. u. Lit. d. Geschwindschreibkunst*, p. 195.
[3] *Pleasant Dialogues and Drammas* (London, 1637), p. 249.
[4] See M. Levy's *Shakspere and Shorthand* (London), and *Phonetic Journal*, 1885, p. 34.
[5] This curiosity is described in the *Phonetic Journal*, 1885, pp. 158, 196. The Bodleian Library has a copy.
[6] Byrom's private journal and literary remains have been published by the Chetham Society of Manchester. See, too, a paper by J. E. Bailey in the *Phonetic Journal*, 1875, pp. 109, 121.

In 1786 was published *An Essay intended to establish a Standard for a Universal System of Stenography*, by Samuel Taylor (London). This system did more than any of its predecessors to establish the art in England and abroad. Equal to Byrom's in brevity, it is simpler in construction. No letter has more than one sign, except *w*, which has two. Considering that five vowel places about a consonant were too many, Taylor went to the other extreme and expressed all the vowels alike by a dot placed in any position. He directs that vowels are not to be expressed except when they sound strong at the beginning and end of a word. Arbitraries he discarded altogether; but Harding, who re-edited his system in 1823, introduced a few. Each letter when standing alone represents two or three common short words, prefixes and suffixes. But the list was badly chosen: thus *m* represents *my* and *many*, both of them adjectives, and therefore liable to be confounded in many sentences. To denote *in* and *on* by the same sign is evidently absurd. Taylor's system was republished again and again. The latest editions are those of J. H. Cooke (London, 1865), and A. Janes (London, 1882). In Harding's edition (1823 and at least twelve times since) the vowels are written on an improved plan, the dot in three positions representing *a*, *e*, *i*, and a tick in two positions *o*, *u*. Several other persons brought out Taylor's system, in particular G. Odell, whose book was re-edited or reprinted not less than sixty-four times, the later republications appearing at New York. The excellence of Taylor's method was recognized on the Continent: the system came into use in France, Italy, Holland, Sweden, Germany, Portugal, Roumania, Hungary, etc. In England at the present day no method excepting Pitman's phonography is more popular than Taylor's, although the systems which have appeared since Taylor's are far more numerous than those which preceded it.

Taylor.

The *Universal Stenography* of William Mavor (1780 and nine times since) is a very neat system, and differs from Taylor's in the alphabet and in a more definite method of marking the vowels. *A*, *e*, *i*, are indicated by commas, *o*, *u*, *y*, by dots, in three places with respect to a letter, namely beginning, middle, and end. Other systems by J. H. Lewis (1812) and Moat (1833) are still used to a small extent.

Mavor

The vast mass of a, b, c systems are strikingly devoid of originality, and are mostly imitations of the few that have been mentioned. Nearly all may be briefly described as consisting of an alphabet, a list of common words, prefixes and suffixes expressed by single letters, a list of arbitrary and symbolical signs, a table showing the best way of joining any two letters, a few general rules for writing, and a specimen plate.[1]

Pitman's phonography, on account of its enormous diffusion in Great Britain and the colonies, and in America, its highly organized and original construction, and its many inherent advantages, merits a more extended notice than has been given to the systems already mentioned. In 1837 Isaac Pitman, then teacher of a British school at Wotton-under-Edge and an excellent writer of Taylor's system, composed at the invitation of Samuel Bagster a short stenographic treatise of his own, which Bagster published under the title of *Stenographic Sound-Hand*. The price was fixed at fourpence, for the author had determined to place shorthand within the reach of everybody. He had won the friendship of the Bible publisher by voluntarily verifying the half a million references in the *Comprehensive Bible*, and Mr. Bagster for nine years published Mr. Pitman's shorthand books. In 1840 a second edition appeared in the form of a penny plate bearing the title *Phonography*, the principal feature of the system being that it was constructed on a purely phonetic basis. The name of Bagster helped the enterprise, and the author was indefatigable in spreading the knowledge of his system by lectures and gratuitous teaching through the penny post, then just established. In December, 1841, the first number of what is now known as the *Phonetic Journal* appeared at Manchester in a lithographed form. It was then called the *Phonographic Journal*, and subsequently in turn the *Phonotypic Journal*, the *Phonetic News*, and the *Phonetic Journal*. The chief instruction books issued by the author at the present time from his press at the Phonetic Institute, Bath, are the *Phonographic Teacher*, a little sixpenny book for beginners, of which 1,030,000 copies have been published; the *Manual of Phonography* (470th thousand), in which the art is sufficiently developed for the purpose of correspondence, private memoranda, and easy reporting; and the *Phonographic Reporter* (133d thousand). The weekly circulation of the *Phonetic Journal* is about 20,000 copies. A part of it is printed in the phonographic character from movable types. The system has been warmly taken up in America, where it has been republished in more or less altered forms, especially by the author's brother Benn Pitman, and by Messrs. A. J. Graham, J. E. Munson, E. Longley, and Eliza B. Burns. A large number of periodicals lithographed in phonography are published in England and America. The *Shorthand Magazine*, monthly, has existed since 1864. Of standard English books printed or lithographed in phonography may be mentioned, besides the Bible, New Testament, and Prayer Book, *The Pilgrim's Progress*, *The Vicar of Wakefield*, *Pickwick Papers*, *Tom Brown's School Days*, Macaulay's *Essays* and *Biographies*, *Gulliver's Travels*, Blackie's *Self-culture*, Bacon's *Essays*, and a long list of tales and selections. Numerous societies have been formed in all English-speaking countries for the dissemination of phonography. The largest is the Phonetic Society with 3350 members, who have all certificates of a knowledge of the art and engage to teach through the post gratuitously. Most important towns in the United Kingdom have a phonographic association. London has three. Phonography has been adapted to several foreign languages, but not so successfully as Gabelsberger's German system. Mr. T. A. Reed's *French Phonography* (1882) is intended only for English phonographers who wish to report French speeches. Other adaptations to French are by A. J. Lawson and J. R. Bruce. A society for the adaptation of phonography to Italian was organized at Rome in 1883 by G. Francini, who has published his results (Rome 1883, 1886). Phonography adapted to Spanish by Parody (Buenos Ayres, 1864) is practiced by half the stenographers employed in the senate and chamber at Buenos Ayres. It has been adapted to Welsh by R. H. Morgan (Wrexham, 1876), and to German by C. L. Driesslein (Chicago, 1884). Phonography is steadily driving all other English systems out of the field. Mr. T. A. Reed stated in the *Phonetic Journal*, 1883, p. 62, that of the 61 writers employed by the *Times*, *Standard*, *Telegraph*, *Morning Post*, and the Press Association 31 were using phonography, 18 Taylor's, 5 Gurney's (*i.e.*, Mason's), 4 Lewis's, and 3 other systems; of the 67 members composing the Institute of Shorthand Writers, chiefly practitioners in the law courts, 26 were using phonography, 29 Taylor's, 7 Gurney's (*i.e.*, Mason's), 3 Mavor's, and 2 Lewis's; while of the 80 members of the London Shorthand Writers' Association, chiefly employed in business offices, at least five-sixths were phonographers. According to a recent (1882) history of shorthand, of 291 professional stenographers in London 134 used phonography, 89 Taylor's, 35 Gurney's, 8 Lewis's, 8 Mavor's, and 17 other systems (Byrom's, Graham's, Moat's, etc.).

Pitman's phonography.

The main features of Pitman's system must now be described. The alphabet of consonant-sounds is —*p*, *b*; *t*, *d*; *ch* (as in *chip*), *j*; *k*, *g* (as in *gay*); *f*, *v*; *th* (as in *thing*), *dh* (as in *them*); *s*, *z*; *sh*, *zh* (as in *vision*); *m*, *n*, *ng* (as in *thing*); *l*, *r*; *w*, *y*, *h*. The sounds *p*, *t*, *ch*, *k* are represented respectively by the

Pitman's system.

[1] For Early English systems, see especially some careful papers by Mr. A. Paterson in *Phonetic Journal* (1886).

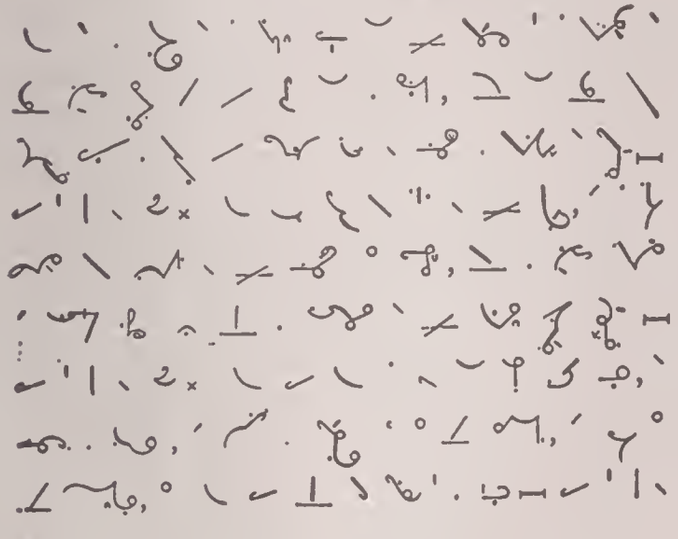
four straight strokes \ | / — ; and the corresponding voiced sounds *b, d, j, g* by exactly the same signs respectively written heavy. *F, th* (as in *thing*), *s, sh* are indicated by ( )) respectively; the same signs written heavy and tapering to the ends are used for *v, dh, z, zh* respectively. *M, n, l, r* are denoted by ~ ( ) respectively. *R* is also represented by / written upwards and in a more slanting direction than the sign for *ch*. The signs for *sh* and *l* may be written up or down when in combination, but standing alone *sh* is written downwards and *l* upwards. The signs for *w, y, h* are ✓ ✓ ✓, all written upwards. *H* has also ? down. *Ng, mp* (or *mb*), *rch* (or *rj*), *lr*, are represented by the signs for *n, m, r, l* respectively written heavy. Signs are provided for the Scotch guttural *ch* (as in *loch*), the Welsh *ll*, and the French nasal *n*. *S* is generally written by a small circle. The long-vowel sounds are thus classified—*ā* (as in *balm*), *ē* (as in *bait*), *ee* (as in *feet*), *aw* (as in *law*), *ō* (as in *coal*), *o͞o* (as in *boot*). The vowels *ā, ē, ee* are marked by a heavy dot placed respectively at the beginning, middle, and end of a consonant-sign; *aw, ō, o͞o* by a heavy dash in the same three positions, and generally struck at right angles to the direction of the consonant. The short vowels are *ă* (as in *pat*) *ĕ* (as in *pet*), *ĭ* (as in *pit*), *ŏ* (as in *pot*), *ŭ* (as in *but*), and *o͝o* (as in *put*). The signs for these are the same as for the corresponding long vowels just enumerated, except that they are written light. Signs similarly placed are provided for the diphthongs *oi* (as in *boil*), *o͝ă* or *o͝ĕ*, *o͝ĭ* (as in *Boanerges, poet, coincide*), for the series *yā, yē, yee*, etc., and for the series *wā, wē, wee*, etc. The signs for *ei* (as in *bite*) and *ou* (as in *cow*) are ∨ ∧, and may be placed in any position with respect to a consonant. A straight line may receive four hooks, one at each side of the beginning and end, but a curve only two, one at each end in the direction of the curve. Hooks applied to a straight line indicate the addition of, *r, l, n*, and *f* or *v* respectively, thus— \ *pr*, \ *pl*, \ *pf* or *pv*, and \ *pn*; — *kr*, — *kl*, — *kf*, — *kn*; / *rf* or *rv*, / *rn*. Hooks applied to a curve denote the addition of *r, n* respectively, thus— (*fr*, (*fn*; ~ *mr*, ~ *mn*. Vowel-signs placed after (or, in the case of horizontal strokes, under) a consonant, having the *n* or *f, v* hook are read between the consonant and the *n* or *f*; thus — *cough*, (*fun*, but — *crow*, \ *pray*. A large hook at the commencement of a curve signifies the addition of *l*, as (*fl*. The hooks combine easily with the circle *s*, thus— \ *sp*, \ *spr* (where the hook *r* is implied or included in the circle), \ *spl*, \ *pns* (the hook *n* being included), \ *pfs*, etc. The halving principle is one of the happiest devices in the whole history of shorthand. The halving of a light stroke —that is, writing it half length—implies the addition of *t*; the halving of a heavy stroke that of *d*, the vowel placed after (or under) the halved stroke being read between the consonant and the added *t* or *d*, thus—) *saw*,) *sought*, | *Dee*, | *deed*, \ *pit*, — *cat*, (*fat*, ? *note*, etc. By this means very brief signs are provided for hosts of syllables ending in *t* and *d*, and for a number of verbal forms ending in *ed*, thus— ~ *ended*. The halving of a heavy stroke may, if necessary, add *t*, and that of a light stroke *d*, thus— (*beautified*. By combining the hook, the circle, and the halving principle, two or three together, exceedingly brief signs are obtained for a number of consonantal series consisting of the combination of a consonant with one or more of the sounds *s, r, l, n, f, t*, thus— \ *sp*, \ *spr*, \ *sprt*, \ *sprts*; \ *pl*, \ *spl*, \ *splt*, \ *splnt*, \ *splnts*; \ *fn*, \ *fns*, \ *fnt*, \ *fnts*; \ *frn*, \ *frnd*, etc. As a vowel-mark cannot conveniently be placed to a hook or circle, we are easily led to a way of distinguishing in outline between such words as — *cough* and — *coffee*, \ *pen* and \ *penny*, / *race* and / *racy*, etc. This distinction limits the number of possible readings of an unvocalized outline. A large hook at the end of a stroke indicates the addition of *-shon* (as in *fashion, action*, etc.). This hook easily combines with the circle *s*, as in) *actions*,) *positions*. The circle *s* made large indicates *ss* or *sz*, as in) *pieces*, (*losses*. The vowel between *s* and *s* (*z*) may be marked inside the circle, as in) *exercise*,) *subsistence*. The circle *s* lengthened to a loop signifies *st*, as in \ *step*, \ *post*, while a longer loop indicates *str*, as in \ *muster*, \ *minster*. The loop may be continued through the consonantal stroke and terminate in a circle to denote *sts* and *strs*, as in \ *boasts*, \ *minsters*. The loop written on the left or lower side of a straight stroke implies the *n* hook and so signifies *nst*, as in \ *against*, | *danced*. A curve (or a straight stroke with a final hook) written double length implies the addition of *tr, dr*, or *thr*, as in (*father*, (*letter*, (*kinder*, (*fender*, / *render*. This practice is quite safe in the case of curves, but a straight stroke should not be lengthened in this way when there is danger of reading it as a double letter. The lineal consonant-signs may stand alone to represent certain short and common words as in many of the old a, b, c systems, with this difference, that in the old systems each letter represents several words, but in phonography, in almost every case, only one. By writing the horizontal strokes in two positions with respect to the line (above and on) and the others in three positions (entirely above, resting on, and passing through the line) the number is nearly trebled, and very brief signs are obtained for some seventy or eighty common short words (e.g., *be, by, in, if, at, it, my, me*, etc.). A few very common monosyllables are represented by their vowel-marks, as . *the* (remnant of (.), ` *of* (remnant of `), ' *on* (remnant of '). A certain number of longer words which occur frequently are contracted, generally by omitting the latter part, sometimes a middle part of the word, as in \ (*ksp*) *expect*, | (*djr*) *danger*, — (*krk sk*) *characteristic*,) (*nd f t*) *indefatigable*. The connective phrase *of the* is intimated by writing the words between which it occurs near to each other. *The* is often expressed by a short slanting stroke or tick joined to the preceding word and generally struck downwards, thus ` *in the*,) *for the*.

Three principles which remain to be noticed are of such importance and advantage that any one of them would go far to place phonography at the head of all other systems. These are the principles of positional writing, similar outlines, and phraseography. (1) The first slanting stroke of a word can generally be written so as either to lie entirely above the line, or rest on the line, or run through the line, thus— \ / \, — — —. In the case of words composed wholly of horizontal strokes the last two positions (on and through the line) coincide, as ~ —. These three positions are called first, second, and third respectively. The first is specially connected with first-place vowels (*ā, ă; aw, ŏ; ĭ; oi*), the second with second-place vowels (*ē, ĕ; ō, ŭ*), and the third with third-place vowels (*ee, ĭ; o͞o, o͝o; ou*). In a fully vocalized style position is not employed, but in the reporting style it is of the greatest use. Thus the outline (*tm*) written above the line (—) must be read either *time* or *Tom*; when written resting on the line (—) *tome* or *tame*; when struck through the line (—) *teem, team*, or *tomb*. By this method the number of possible readings of an unvocalized outline is greatly reduced. That word in each positional group which occurs the most frequently need not be vocalized, but the others should. In the case of dissyllables it is the accented vowel which decides the position; thus *methought* should be written first position (—), *méthod* second position (—). (2) Another way of distinguishing between words having the same consonants but different vowels is to vary the outline. The possibility of variety of outline arises from the fact that many consonant-sounds have duplicate or even triplicate signs, as we have seen. For instance, *r* has two lineal signs and a hook sign, and so each of the words *carter, curator, creature* and *creator* obtains a distinct outline. A few simple rules direct the student to a proper choice of outline, but some difference of practice obtains among phonographers in this respect. Lists of outlines for words having the same consonants are

given in the instruction books; the *Reporter's Assistant* contains the outline of every word written with not more than three strokes, and the *Phonographic Dictionary* gives the vocalized outline of every word in the language. Aided by a true phonetic representation of sounds, by occasional vocalization, variety of outline, and the context, the phonographic verbatim reporter should never misread a word.[1] (3) Lastly, phraseography. It has been found that in numberless cases two or more words may be written without lifting the pen. A judicious use of this practice promotes legibility, and the saving of time is very considerable. Words written thus should be closely connected in sense, and awkward joinings avoided. Such phrases are *I am,* *I have,* *you are,* *you may,* *it would,* *it would not,* *we are,* *we have,* *we have not,* *we have never been,* *my dear friends,* *in a very short time,* *as far as possible,* *for the most part,* and many thousands of others. For the sake of obtaining a good phraseogram for a common phrase it is often advisable to omit some part of the consonant outline. Thus the phrase *you must recollect that* may very well be written (*you mus recollec that*). Lists of recommended phraseograms are given in the *Phonographic Phrase Book*, the *Legal Phrase Book*, and the *Railway Phrase Book*.

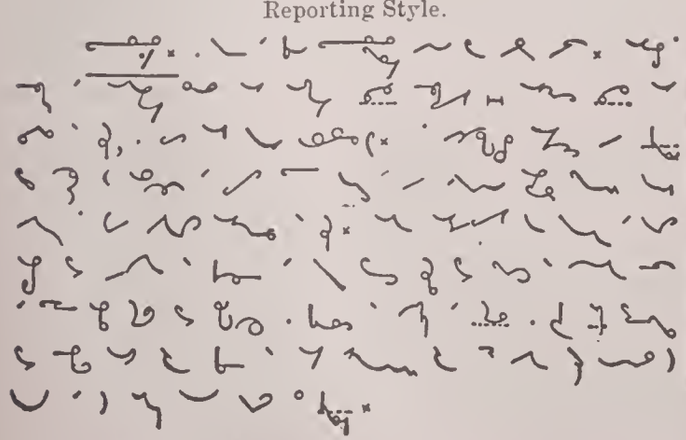
Specimens of Phonography.

Corresponding Style.



KEY.—If all the feelings of a patriot glow in our bosoms on a perusal of those eloquent speeches which are delivered in the senate, or in those public assemblies where the people are frequently convened to exercise the birthright of Britons—we owe it to shorthand. If new fervor be added to our devotion, and an additional stimulus be imparted to our exertions as Christians, by the eloquent appeals and encouraging statements made at the anniversaries of our various religious societies—we owe it to shorthand. If we have an opportunity in interesting judicial cases, of examining the evidence, and learning the proceedings with as much certainty, and nearly as much minuteness, as if we had been present on the occasion—we owe it to shorthand.

Reporting Style.



[1] Phonography is so legible that the experiment of handing the shorthand notes to phonographic compositors has often been tried with complete success. A speech of Richard Cobden, on the Corn Laws, delivered at Bath on 17th September, 1845, and occupying an hour and a quarter, was reported almost verbatim, and the notes, with a few vowels filled in, handed to the compositors of the *Bath Journal*, who set them up with the usual accuracy. A notice of the occurrence appeared the next day in the *Bath Journal*, and was immediately transferred to the columns of the *Times* and other newspapers. Mr. Reed has tried the same experiment with equal success, the notes being handed to the compositors in their original state (*Phonetic Journal*, 1884, p. 337). In Mr. Pitman's printing-office at Bath more type-setting is done from shorthand copy than from longhand. Of course it is generally unadvisable to print a speech verbatim, but much time would be saved if the reporter could write his copy in the "corresponding" or less brief and more vocalized style of phonography. Compositors could acquire the faculty of reading phonography in a very short time.

KEY (the phraseograms being indicated by hyphens).—CHARACTERISTICS OF THE AGE.—The peculiar and distinguishing characteristics of the present-age are-in every respect remarkable. Unquestionably an extraordinary and universal-change has commenced in-the internal as-well-as-the external-world—in-the-mind-of-man as-well-as in-the habits of society, the one indeed being-the necessary-consequence of the other. A rational consideration of the circumstances in-which-mankind are at-present placed must-show-us that influences of the most-important and wonderful character have-been and are operating in-such-a-manner-as-to bring-about if not-a reformation, a thorough revolution in-the-organization of society. Never in-the-history-of-the-world have benevolent and philanthropic institutions for-the relief of domestic and public affliction; societies for-the promotion of manufacturing, commercial, and agricultural interests; associations for-the instruction of the masses, the advancement of literature and science, the development of-true political-principles, for-the extension in-short of-every description of knowledge and-the-bringing-about of-every kind-of reform,—been-so numerous, so efficient, and so indefatigable in-their operation as at-the-present-day.

Systems subsequent to Pitman's.

Of the numerous systems published since the invention of phonography the principal are A. M. Bell's *Stenophonography* (Edinburgh, 1852), Professor J. D. Everett's (London, 1877), Pocknell's *Legible Shorthand* (London, 1881), and J. M. Sloan's adaptation of the French system of Duployé (1882). Of these Professor Everett's must be pronounced much the best. The author claims to have adhered to the phonetic principle more strictly than Mr. Pitman. Thus he distinguishes the *o* in *home, comb*, from that in *so*, and treats *ur, er* as a diphthong. The alphabet is very like Mr. Pitman's in construction, light and heavy sounds being represented by light and heavy strokes. The chief feature of the system is that all vowels are marked in. This is done by joined signs, by lengthening the preceding consonant, by separating the preceding from the following consonant, by lifting the pen and writing the one consonant attached to the other, and by intersection. Mr. Pocknell, in his somewhat bewildering system, seeks (like Mr. Melville Bell) to provide a method of indicating whether a consonant is preceded or followed by a vowel or vowels. To this end he gives to each consonant three linear signs (two curves and a straight line), the requisite number of signs being made up by using three lengths of stroke. The selection of the right sign is determined by the *length* and *class* of the words represented. Much energy is devoted to indicate where a vowel stands, but not to what it is. The vowels, when expressed, are disjoined, as in phonography and most systems. Though Mr. Bell's too elaborate classification of vowels is adopted, the phonetic method of representing consonants is frequently discarded in favor of the alphabetic. Thus, no sign is provided for *zh* (as in *vision*), and the barbarous *gh* (as in *bright*) is often retained "for the sake of legibility." Mr. Pocknell goes back to the antiquated device of pictorial and arbitrary signs. The Sloan-Duployan system has been vigorously propagated; but it does not provide alphabetic characters for all the vowels and consonants in the language, contents itself with representing not actual but "approximate" sounds, does not always indicate the order in which the characters should be read, recommends the frequent omission of consonants and syllables at the "discretion" of the student, avoids angles, and introduces three slopes, instead of one, between the perpendicular and the horizontal, and therefore is not likely to meet with general acceptance.

American systems.

A considerable number of American systems, as well as systems based on Taylor's and Gurney's, were issued during the early days of the republic. Since the introduction of phonography into the States in 1845, the dissemination of the art has gone steadily forward, and its use since 1880 has been greatly on the increase, shorthand being now taught in a large number of schools. From elaborate statistics given in Mr. Rockwell's *Circular of Information* it appears that during 1882 10,197 persons received instruction in schools and classes and 2273 by correspondence. But these figures probably bear no proportion to the number of persons studying without a teacher. In almost every case phonography, or a modification of it, was selected for instruction. American shorthand societies are very numerous, most of them having been formed since 1880. Two are devoted to the Stolzean system. Of the fourteen shorthand magazines which Mr. Rockwell enumerates eleven are phonographic.

In nine cases out of ten phonography will be found admirably adapted to the purposes of verbatim reporting. But to be legible it must be written with care. This necessity arises from its brevity and its use of light and heavy, halved and double-length strokes. Hence a clumsy scribe may find a longer system, such as Gurney's, answer his purpose better. A theoretical knowledge of most systems may be gained in a few hours. Pitman's method is not so easily acquired, but an intelligent person can master its details in a few weeks. Shorthand writing is, however, mainly a matter of practice. Few can make any considerable use of it with less than six months' assiduous practice. The average rate of public speaking is very slightly over 120 words a minute. Some speakers average 150. The slowest utterance is now and then exchanged for a rapid flow of words, and 180 or 200 words a minute is no uncommon speed in certain styles of speech such as the conversational,—a speed which many persons would never acquire.[1] Most persons of average intelligence may by perseverance write with certainty at 150 words a minute. The best method of practice in the early period is to write at dictation from a book; in public speaking the frequent pauses help the writer to regain lost time. The student should write on ruled paper, which checks the tendency to a large sprawling hand when following a rapid speaker. Taylor's, Gurney's, and Lewis's systems can be written without lines, but Pitman's only at a disadvantage. Ink is preferable to pencil.

Parliamentary reporting.

Shorthand was first employed officially in the service of Parliament in 1802, when a resolution was passed that "the evidence given before all committees inquiring into the election of members should or might be reported by a person well skilled in the art of writing shorthand," and shortly afterwards W. B. Gurney was appointed shorthand-writer in this capacity to both Houses of Parliament. In 1813 a further resolution was passed by both Houses that the official writer "should attend by himself or sufficient deputy when called upon to take minutes of evidence at the bar of this House or in committees of the same." The lucrative office of shorthand-writer to both Houses of Parliament is still held by the Gurney family. Of course most of the work is done by deputy. Some of the most efficient members of Messrs. Gurney's staff are phonographers; others use Taylor's system. The amount of evidence given in the course of a tolerably long day's sitting may amount to 400 or 500 folios (72 words make a folio), which would occupy from 12 to 15 columns of the *Times* in small type. The whole must often be transcribed and delivered to the printers in the course of the night, and copies, damp from the press, are in the hands of the members and "parties" at the beginning of the sitting on the following day. Since parliament abolished election-committees and committed to judges the duty of inquiring into petitions against the return of a member, an official shorthand-writer has to be in attendance upon the judge appointed to hear any particular case. He has often a small staff of assistants. Messrs. Gurney or their representatives are also required to attend the sittings of the House of Lords as a court of appeal to take the judgments of the law lords. Finally, Government shorthand-writers are often employed in taking notes of important state-trials and inquiries conducted by the various departments of Government, as well as of the proceedings of Royal Commissions, whenever the evidence of witnesses is taken.[2] The transcription of the notes may be accomplished in several ways, as by dictating from different parts of the notes to several longhand-writers simultaneously.[3] Not all the newspaper parliamentary reporters can take a perfect note, and cases occur in which the reporter enters the gallery without being able to write shorthand at all.

Foreign Shorthand Systems.

Foreign systems.

German.—C. A. Ramsay's *Tacheographia* (Frankfort, 1679, and several times afterwards until 1743) was an adaptation of T. Shelton's English system. Mosengeil (1797) first practically introduced shorthand writing into Germauy in an adaptation of the Taylor-Bertin method. Reischl's (1808) is a modification of Mosengeil's. On Horstig's (1797) are based those of an auonymous writer (Nuremberg, 1798), Heim (1820), Thon (1825), an anonymous author (Tübingen, 1830), Nowack (1830), Ineichen (1831), an anonymous author (Munich, 1831), and Binder (1855). Mosengeil published a second system (1819) in which Horstig's alphabet is used. On the Mosengeil-Horstig system are based Berthold's (1819) and Stärk's (1822). On Danzer's (1800), a close imitation of Taylor's, is based that of Ellison v. Nidlef (1820). Other systems are those of Leichtlen (1819); J. Brede (1827); Nowack (1834), a system in which the ellipse is employed as well as the circle; Billharz (1838); Cämmerer (1848), a modification of Selwyn's phonography (1847); Schmitt (1850); Fischbäck (1857), a reproduction of Taylor's; and that of an anonymous author (1872), based on Horstig, Mosengeil, and Heim. Nowack, in his later method of 1834, makes a new departure in avoiding right or obtuse angles, and in endeavoring to approximate to ordinary writing. This system Gabelsberger considered to be the best which had appeared down to that date. F. X. Gabelsberger's *Anleitung zur deutschen Redezeichenkunst* (Munich, 1834) is the most important of the German systems. The author, an official attached to the Bavarian ministry, commenced his system for private purposes, but was induced to perfect it on account of the summoning of a parliament for Bavaria in 1819. Submitted to public examination in 1829, it was prouounced satisfactory, the report stating that pupils taught on this system executed their trial specimens with the required speed, and read what they had written, aud even what others had written, with ease and certainty. The method is based on modifications of geometrical forms, designed to suit the position of the hand in ordinary writing. The author considered that a system composed of simple geometrical strokes forming determinate angles with each other was unadapted to rapid

[1] Phenomenal rates of speed are recorded in the *Phonetic Journal* for 1885, p. 338. Mr. T. A. Reed, the veteran phonographer, had been engaged to report a well-known American divine preaching at Westminster Abbey. The sermon was carefully timed and the words in the printed report counted. The average came out at 213 words a minute. A photographed specimen page of Mr. Reed's notes on this occasion is given in the *Reporter's Magazine*, September, 1885.

[2] There is no full official report of the debates in the British Parliament (as in most other countries), and technically no person has a right to report them. The House may be cleared at any moment of all strangers, including representatives of the press, by an order of the House as a whole. On seven occasions of note resolutions have been passed prohibiting the reporting of the proceedings of the House of Commons, the last on 25th March, 1771. But times have changed, and members now frequently complain that their speeches are not reported. To supply the deficiencies of the newspapers arrangements have been made by the House with Mr. Hansard for the special reporting of debates in committee and those occurring at an early hour in the morning, which are given only in the most summary form in the daily papers. Formerly all Hansard's reports were collected from those appearing in the newspapers. See further Mr. S. Whitaker's *Parliamentary Reporting in England, Foreign Countries, and the Colonies, with notes on Parliamentary Privilege* (Manchester, 1878).

[3] On the best methods of transcribing and dictating, see Mr. T. A. Reed's papers in the *Phonetic Journal*, 1886, pp. 10, 33, 45.

writing. He does not recognize all the varieties of sound, and makes some distinctions which are merely orthographical. Soft sounds have small, light, and round signs, while the hard sounds have large, heavy, and straight signs. The signs too are derived from the current alphabet, so that one can find the former contained in the latter. Vowels standing between consonants are not literally inserted, but symbolically indicated by either position or shape of the surrounding consonants, without however leaving the straight writing line. The proceedings of the chambers in Austria, Bavaria, Baden, Würtemberg, Saxony, Saxe-Weimar, Coburg-Gotha, Silesia, and the Rhine provinces are reported solely by writers of this method, and half the stenographers in the German reichstag use it. There are in Germany and Austria more than 540 societies containing over 20,000 members devoted to it. It is officially taught in all the middle class schools in Bavaria, Saxony, and Austria. It has been adapted to foreign languages to such an extent that legislative proceedings are reported by it in Prague, Agram, Pesth, Sophia, Athens, Copenhagen, Christiania, Stockholm, and Helsingfors. On Gabelsberger's system is based that of W. Stolze (1840). There are nearly 400 Stolzean associations with over 8000 members. The system is officially used in the Prussian, German, and Hungarian parliaments, in the last two along with Gabelsberger's. Faulmann (Vienna, 1875) attempted in his *Phonographie* to combine the two methods. While Gabelsberger's system has remained unchanged in principle, Stolze's has split into two divisions, the old and the new. These contain many smaller factions, *e.g.*, Velten's (1876) and Adler's (1877). Arends's (1860) is copied from the French system of Fayet. Roller's (1874) and Lehmann's (1875) are offshoots of Arends's. Many other methods have appeared and as rapidly been forgotten. The schools of Gabelsberger and Stolze can boast of a very extensive shorthand literature. Gabelsberger's system has been adapted to English by A. Geiger (Dresden, 1860 and 1873), who adhered too closely to the German original, and more successfully by H. Richter (London, 1886), and Stolze's by G. Michaelis (Berlin, 1863).

French.—The earliest French system worthy of notice is that of Conlon de Thévenot (1777), in which the vowels are disjoined from the consonants. The methods practiced at the present day may be divided into two classes, those derived from Taylor's English system, translated in 1791 by T. P. Bertin, and those invented in France. The latter are (*a*) Coulon de Thévenot's; (*b*) systems founded on the principle of the inclination of the usual writing,—the best known being those of Fayet (1832) and Sénocq (1842); and (*c*) systems derived from the method of Conen de Prépéan (5 editions from 1813 to 1833). Prévost, who till 1870 directed the stenographic service of the senate, produced the best modification of Taylor. Many authors have copied and spoiled this system of Prévost. The best known are Plantier (1844) and Tondeur (1849). Zeibig thinks well of A. Delannay's improvements on Prévost's system. On Conen's are based those of Aimé-Paris (1822), Cadrès-Marmet (1828), Potel (1842), the Duployé brothers (1868), Guénin, etc. Among amateur writers the Duployan method is best known, owing largely to vigorous pushing, but the profession class it among the least efficient of all. Of the forty writers in the official service of parliament twenty-two use Prévost's and those founded on it (all based ultimately on Taylor's), while ten employ methods based on Conen's.

Spanish.—The father of Spanish stenography was Don Francisco de Paula Marti, whose system, first published in 1803, still holds its ground against all rivals. The alphabet is a combination of Taylor's and Coulon's. By decree of 21st November, 1802, a public professorship of shorthand was founded in Madrid, Marti being the first professor. Founded on Marti's system are those of Serra y Ginesta (1816) and Xamarillo (1811). Of the thirty-two Spanish systems enumerated by Zeibig many are merely imitations or reproductions of Marti's, and adaptations of Gabelsberger's, Stolze's, and Pitman's systems. That of Garriga y Maril (1863) has attained some popularity in Spain.

Portuguese.—Marti's son carried his father's system to Portugal, where shorthand is still entirely unknown except in the parliament and the courts. Of the twenty reporters in the senate and chamber at Buenos Ayres ten use Pitman's phonography, six Marti's, and the rest Garriga's. A shorthand society was organized in Buenos Ayres in 1880. The systems used in the Brazilian chambers are those of Silva Velho (1852) and Garriga. The reporters in the assembly of Venezuela use Marti's method.

Italian.—Italian translations and adaptations of Taylor's system succeeded one another in considerable numbers from Amanti (1809) to Bianchini (1871). Delpino's (1819) is the best. The Gabelsberger-Noe system (1863) is the only other which has gained many followers. Since 1885 the debates of the senate have been partly reported by the Michela stenographic machine with fair results.

Dutch.—J. Reijner's Dutch method (1673) was an adaptation of Shelton's and Bussnijt's (1814) of Conen's system. Sommerhausen and Bossaert (1829) received prizes from the Government for their productions. The twelve stenographers employed in the parliament use the system of Cornelis Steger (1867), president of the bureau, who translated Taylor's work and has written a history of shorthand. Gabelsberger's system was transferred to Dutch by Rietstap (1869) and Stolze's by Reinbold (1881).

Adaptations of Gabelsberger's method have come into use in the remaining countries of Europe, superseding all others.

Numerous mechanical reporting machines have been invented. The best is by Michela mentioned above. For a description of such machines see *Phonetic Journal* for 1881, p. 274; 1884, pp. 12, 34, 35; 1885, pp. 52, 268, 278, 291, 447; 1886, p. 22. They take as long to learn as a shorthand system, cannot easily be carried about, are liable to get out of order, and make a noise.

Sources of Information.—J. W Zeibig's *Geschichte u. Literatur der Geschwindschreibkunst* (Dresden, 1878) contains an historical sketch of the use of shorthand in ancient and modern times (especially in Germany), a full bibliography of shorthand literature in all languages, a number of lithographed specimens, and a useful index. *Circulars of Information of the Bureau of Education*, No. 2, 1884 (Washington, 1884), by J. E. Rockwell, contains a very complete and accurate bibliography of English and American shorthand publications, a chronological list of 483 English and American shorthand authors, notices on shorthand in the United States, on the employment of stenographers in the American courts, on American shorthand societies and magazines, and a beautifully engraved sheet of 112 shorthand alphabets. The *Phonetic Journal*, especially the recent volumes, contains a mass of information on shorthand subjects. Isaac Pitman's *History of Shorthand* (reprinted in the *Phonetic Journal* of 1884) reviews the principal English systems previous to phonography, and a few foreign ones. The author draws largely on J. H. Lewis's *Historical Account of the Rise and Progress of Stenography* (London, 1816). Other histories of shorthand are by F. X. Gabelsberger (prefixed to his *Anleitung zur deutschen Redezeichenkunst*, Munich, 1834) A. Fossé (prefixed to his *Cours théorique et pratique de Sténographie*, Paris, 1849), Scott de Martinville (Paris, 1849), M. Levy (London, 1862), and T. Anderson (London, 1882). Here too should be mentioned J. Heger's *Bemerkenswerthes über die Stenographie* (Vienna, 1841), mainly historical; J. Anders's *Entwurf einer allgemeinen Gesch. u. Lit. d. Stenographie* (Coeslin, 1855); R. Fischer's *Die Stenographie nach Geschichte, Wesen, u. Bedeutung* (Leipsic, 1860); Krieg's *Katechismus der Stenographie* (Leipsic, 1876); Dr. Westby-Gibson's *Early Shorthand Systems* (London, 1882), T. Anderson's *Shorthand Systems*, with a number of specimens (London, 1884); T. A. Reed's *Reporter's Guide* (London, 1885) and *Leaves from the Notebook of T. A. Reed* (London, 1885). Mr. C. Walford's *Statistical Review of the Literature of Shorthand* (London, 1885) contains valuable information on the circulation of shorthand books and on shorthand libraries. The largest stenographic library in the world is that of the Royal Stenographic Institute at Dresden. (I. G N. K.-F.)

SHORTSIGHT. See Ophthalmology.

SHOSHONG, a town in the British protectorate of Bechuanaland, the chief settlement of the Eastern Bamangwatos, is situated in a glen at the foot of a range of Primary rocks on the Shoshon, a periodically flowing brook which flows eastwards into the Limpopo or Uri river. It lies about 400 miles north of Kimberley, with which it was connected by road and telegraph under Sir Charles Warren's administration. For white men—traders, hunters, and explorers—it is and must always be a place of primary importance, as three great routes, from Griqualand West, the Orange Free State, and the Transvaal, meet at this point and again branch off north to the Zambesi, northeast to the Matabele and Mashona countries, and northwest to the Western Bamangwato and Damaraland. Shoshong is thus a main gateway between Southern and Central Africa. The site was originally chosen as easily defensible against the Matabele. Water is scarce, and the present king, Khama, has taken over a well dug by one of the traders, the use of which he permits on the payment of a water-rate of £1 per month per family. Altogether there are 7000 to 8000 native huts in Shoshong, and the population is estimated at from 15,000 to 30,000. The white inhabitants—mostly English traders—number about 20. A flourishing mission station of the London Missionary Society, preceded for many years by a station of Hermannsburg Lutheran Missionary Society was founded in 1862, and has exercised a great influence on the history of the town and tribe. There is a brick-built church, erected in 1867.

See Mackenzie, *Ten Years North of the Orange River*, 1871; Holub, *Seven Years in South Africa*, 1881; *Further Government Correspondence respecting the affairs of the Transvaal*, 1886.

SHOVEL, Sir Cloudesley (*c.* 1650–1707), English admiral, was according to some accounts a native of Yorkshire, but the most commonly accepted statement is that he was born of poor parents about 1650 in Clay, a fishing-village of Norfolk, where he was apprenticed to a shoemaker. Having run away to sea, he became cabin-boy on board a ship commanded by Sir Christopher Mynns. He set himself to study navigation, and, owing to his able seamanship and brave and open-hearted disposition, became a general favorite and obtained quick promotion. In 1674 he served as lieutenant under Sir John Narborough in the Mediterranean, where he burned four men-of-war under the castles and walls of Tripoli, belonging to the pirates of that place. He was present as captain of the "Edgar" at the first fight at Bantry Bay, and shortly afterwards was knighted. In 1690 he convoyed William III. across St. George's Channel to Ireland; the same year he was made rear-admiral of the blue, and was present at the battle of Beachy Head on 10th July. In 1692 he was appointed rear-admiral of the red, and joined Admiral Russell, under whom he greatly distinguished himself at La Hogue, having a principal share in burning twenty of the enemy's men-of-war. Not long after, when Admiral Russell was dismissed from the service, Shovel was put in joint command of the fleet with Admiral Killigrew and Sir Ralph Delaval. In 1702 he was sent to bring home the spoils of the French and Spanish fleets from Vigo, after their capture by Sir George Rooke, and in 1704 he served under Sir George Rooke in the Mediterranean. In January, 1705, he was named rear-admiral of England, and shortly afterwards commander-in-chief of the British fleets. He coöperated in the capture of Barcelona along with the earl of Peterborough in 1705, and made an unsuccessful attempt on Toulon in October, 1707. When returning with the fleet to England his ship, the "Association," at eight o'clock at night on the 22d October, struck on the rocks near Scilly, and was seen by those on board the "St. George" to go down in three or four minutes' time, not a soul being saved of 800 men that were on board. The body of Sir Cloudesley Shovel was cast ashore next day, and was buried in Westminster Abbey.

See *Life and Glorious Actions of Sir Cloudesley Shovel*, 1707; Burnet's *Own Times;* and various discussions in *Notes and Queries*, 5th series, vols. x. and xi.

SHOVELER, formerly spelt Shovelar, and more anciently Shovelard, a word by which used to be meant the bird now almost invariably called Spoonbill (*q.v.*), but in the latter half of the 16th century transferred to one hitherto generally, and in these days locally, known as the Spoon-billed Duck—the *Anas clypeata* of Linnæus and *Spatula* or *Rhynchaspis clypeata* of modern writers. All these names refer to the shape of the bird's bill, which combined with the remarkably long *lamellæ* (not wholly incomparable with the "whalebone" of the toothless Cetaceans) that beset both maxilla and mandible, has been thought sufficient to remove the species from the Linnæan genus *Anas*. Except for the extraordinary formation of this feature, which carries with it a clumsy look, the male Shoveler would pass for one of the most beautiful of this generally beautiful group of birds. As it is, for bright and variegated coloring, there are few of his kindred to whom he is inferior. His golden eye, his dark green head, surmounting a throat of pure white and succeeded by a breast and flanks of rich bay, are conspicuous; while his deep brown back, white scapulars, lesser wing-coverts (often miscalled shoulders) of a glaucous blue, and glossy green speculum bordered with white present a wonderful contrast of the richest tints, heightened again by his bright orange feet. On the other hand, the female, excepting the blue wing-coverts she has in common with her mate, is habited very like the ordinary Wild-Duck, *A. boscas* (see vol. vii. p. 437). The Shoveler is not an abundant species, and in Great Britain its distribution is local; but its numbers have remarkably increased since the passing of the Wild-Fowl Protection Act in 1876,[1] so that in certain districts it has regained its old position as an indigenous member of the Fauna. It has not ordinarily a very high northern range, but inhabits the greater part of Europe, Asia, and America, passing southwards, like most of the *Anatidæ* towards winter, constantly reaching India, Ceylon, Abyssinia, the Antilles, and Central America, while it is known to have occurred at that season in New Granada, and, according to Gould, in Australia. Generally resembling in its habits the other freshwater Ducks, the Shoveler has one peculiarity that has been rarely, if ever, mentioned, and one that is perhaps correlated with the structure of its bill. It seems to be especially given to feeding on the surface of the water immediately above the spot where Diving Ducks (*Fuliguliæ*) are employing themselves beneath. On such occasions a pair of Shovelers may be watched, almost for the hour together, swimming in a circle, about a yard in diameter, their heads turned inwards towards its centre, their bills immersed vertically in the water, and engaged in sifting, by means of the long *lamellæ* before mentioned, the floating matters that are disturbed by their submerged allies and rise to the top. These gyrations are executed with the greatest ease, each Shoveler of the pair merely using the outer leg to impel it on its circular course, and to the observer the prettiest part of the performance is the precision with which each preserves its relative distance from its comrade.

Four other species of the genus *Spatula*, all possessing the characteristic light blue "shoulders," have been described: one, *S. platalea*, from the southern parts of South America, having the head, neck, and upper back of a pale reddish brown, freckled or closely spotted with dark brown, and a dull bay breast with interrupted bars; a second, *S. capensis*, from South Africa, much lighter in color than the female of *S. clypeata;* a third and a fourth, *S. rhynchotis* and *S. variegata*, from Australia and New Zealand respectively,—these last much darker in general coloration, and the males possessing a white crescentic mark between the bill and the eye, very like that which is found in the South-American Blue-winged Teal (*Querquedula cyanoptera*), but so much resembling each other that their specific distinctness has been disputed by good authority. In these last two the sexual difference is well marked by the plumage; but in the South-American and South-African species it would seem that both male and female have much the same appearance, as is the case with so many species of the restricted genus *Anas*, though this cannot yet be asserted with certainty.

(A. N.)

SHREVEPORT, a city of the United States, capital of Caddo parish, Louisiana, on the west bank of Red River and near to Sodo Lake, is the eastern terminus of the Texas Pacific Railroad, 327 miles by rail northwest of New Orleans, with which it has regular steamboat communication. Situated in the heart of a very fruitful cotton-growing region, it is one of the principal cotton-markets in the southwest of the United States, and is the second commercial city in the State. It exports annually about 125,000 bales of cotton, and carries on a trade likewise in hides, wool, and tallow. It has factories for carriages, cotton gins, cotton-seed oil, soap, ice, sashes, and blinds, and spokes and hubs, also foundries, machine-shops, a planing-mill, saw-mills, and breweries. The town possesses among public buildings a handsome court-house and a cotton exchange. Red River is spanned by an iron bridge 20 feet wide and 1200 long. Shreveport, which was incorporated in 1839, had a population of 4607 in 1870

[1] Prior to that year there was perhaps only one district in England wherein the Shoveler could be said to breed regularly, and thereto only a few pairs resorted. In 1885 there must have been a dozen counties in which it nested, and in some of them the pairs breeding might be reckoned by the score.

and of 8009 in 1880; in 1886 the population was estimated at 15,000.

SHREW, a general term applied to the species of the family *Soricidæ*, order *Insectivora* (see vol. xv. p. 407), but in the British Isles more particularly to the common and to the lesser shrew (*Sorex vulgaris*, L., and *S. pygmæus*, Pall.).

The common shrew is, in England at least, by far the commoner of the two. It is a small animal about the size of the common mouse, which it somewhat resembles in the shape of its body, tail, and feet. But here the resemblance ends, for, unlike the mouse, it possesses a remarkably long and slender muzzle, with prominent nostrils, which project far beyond the lower lip; the eyes are very small and almost concealed by the fur; the ears are wide and short, scarcely rising above the long hairs surrounding them, and are provided internally with a pair of deep folds, capable, when laid forward, of closing the entrance; the tail, which is slightly shorter than the body (without the head), is quadrangular in shape and clothed more or less densely with moderately long hairs, terminating in a short pencil (in old individuals these hairs become worn away, so that in some specimens the tail is almost quite naked); the feet are five-toed, the toes terminating in slender, acutely pointed, non-retractile claws. The dentition is very peculiar and characteristic: there are

Common Shrew (*Sorex vulgaris*, L.).

in all thirty-two teeth, tipped with deep crimson; of these twelve only (the number is characteristic, with one exception only, of the family) belong to the lower jaw; of the remaining twenty ten occupy each side of the upper jaw, and of these the first three, as they are implanted in the premaxillary bone, are termed incisors. The first incisor is a large tooth with a long anterior canine-like cusp and a small posterior one; then follow two small unicuspidate teeth; these are succeeded by three similar progressively smaller teeth, whereof the first has been called a canine and the other two premolars; the next tooth, also a premolar, is a large multicuspidate tooth; and this is followed by three molars, of which the third is small with a triangular crown. In the lower jaw we find on each side anteriorly three teeth corresponding to the seven anterior teeth above, of which the first is almost horizontal in direction, its upper surface being marked by three notches, which receive the points of the three upper front teeth with which they come in contact when the jaws are closed; then follow two small teeth and three molars. The body is clothed with closely set uniformly long fur, very soft and dense, varying in color from light reddish to dark brown above, rarely speckled over or spotted or even banded with white. The under surface of both the body and the tail is grayish; the basal four-fifths of all the hairs above and beneath are dark bluish gray; the hairs of the tail are less densely set and coarser. On each side of the body, at a point about one-third of the distance between the elbow and the knee, may be found, especially in the rutting season, a cutaneous gland covered by two rows of coarse inbent hairs. This gland secretes a peculiar fluid, on which the unpleasant cheesy odor of the animal depends, and which is evidently also protective, rendering it secure against the attacks of many predaceous animals.

The lesser shrew (*S. pygmæus*) is much less abundant in England and Scotland, but comparatively common in Ireland, where the common shrew has not yet been found. It appears at first sight to be a diminutive variant of that species which it closely resembles in external form. It was said to differ in having the tail longer than the body (without the head), whereas in the common shrew the body (without the head) is longer than the tail, and in the last unicuspidate upper molar tooth being comparatively larger and more external than in the other species. But the present writer has found these characters so exceedingly liable to variation as to be almost worthless; he has therefore discovered reliable points of distinction as follows: in *S. pygmæus* the third upper incisor (when the teeth are unworn) is shorter, or at least not longer, than the next following tooth, whereas in *S. vulgaris* it is always longer, and the length of the forearm and hand combined is very constantly 13 m.m. [.51 in.] in the former species, while in the latter it is 17 m.m. [.66 in.].

The habits of both the common and the lesser shrew correspond. They live generally in the neighborhood of woods, making their nests under the roots of trees or in any slight depression, occasionally even in the midst of open fields, inhabiting the disused burrows of field-mice. Owing to their very small size, dark color, rapid movements, and chiefly nocturnal habits, they easily escape observation. They seek their food, which consists of insects, insect larvæ, small worms, and slugs, under dead leaves, fallen trees, and in grassy places. Like the mole, they are very pugnacious, and if two or more are confined together in a limited space they invariably fight fiercely, the fallen becoming the food of the victorious. They also, like the mole, are exceedingly voracious, and soon die if deprived of food; and it is probably to insufficiency of food in the early dry autumnal season that the well-known immense mortality amongst these animals at that time of the year is due. The breeding season extends from the end of April to the beginning of August, and five to seven, more rarely ten, young may be found in their nests; they are naked, blind, and toothless at birth, but soon run about snapping at everything within reach, the anterior pair of incisors in both jaws quickly piercing the gum, followed by the last pair of upper premolars, which at birth form prominent elevations in the gum.

The alpine shrew (*S. alpinus*, Schinz), restricted to the Alpine region of Central Europe, is slightly longer than the common shrew and differs from it conspicuously in its much longer tail, which exceeds the length of the head and body, in the color of the fur, which is dark on both surfaces, and in the large size of the upper antepenultimate premolar.

The water-shrew (*Crossopus fodiens*, Pall.), the third and last species inhabiting England, differs from the common shrew in being considerably larger with a shorter and much broader muzzle, comparatively smaller eyes, and larger feet adapted for swimming,—the sides of the feet and toes being provided with comb-like fringes of stiff hairs. The tail is longer than the body (without the head) and possesses a well-developed swimming fringe of moderately long regularly ranged hairs, which extend along the middle of its flat under surface from the end of its basal third to its extremity. The fur of the body is long and very dense, varying much in color in different individuals, and this has given rise to descriptions of many nominal species; the prevailing shades are dark, almost black, brown above, beneath more or less bright ashy tinged with yellowish; occasionally, sometimes in the same brood, we find some individuals with the under surface more or less dark colored. In the number as well as in the shape of the teeth the water-shrew differs from the common shrew: there is a premolar less on each side above; the bases of the teeth are much more

prolonged posteriorly; and their cusps are much less stained brown, so that in old individuals with worn teeth they often appear altogether white. This species resembles the otter in its aquatic habits, swimming and diving with great agility. It frequents rivers and lakes, making its burrows in the overhanging banks, from which, when disturbed, it escapes into the water. Its food consists of the different species of water insects and their larvæ, small crustaceans, and probably the fry of small fishes. It is generally distributed throughout England, is less common in Scotland, but as yet it has not been recorded in Ireland.

The geographical range of the common shrew is exceedingly wide, extending eastward through Europe and Asia (north of the Himalayas) to North America. The lesser shrew extends concomitantly through Europe and Asia to Saghalin Island; and specimens of the water-shrew have been brought from different parts of Europe, and from Asia as far east as the Altai range. In Siberia the common shrew is abundant in the snow-clad wastes about the Olenek river within the arctic circle. Indeed the hardiness of this little animal, as well as of other species of red-toothed shrews is very remarkable. In Dr. C. H. Merriam's *Mammals of the Adirondack Region* we find the following note on the habits of the common North American species (*Blarina brevicauda*) of an allied genus: "The rigors of our northern winters seem to have no effect in diminishing its activity, for it scampers about on the snow during the severest weather, and I have known it to be out when the thermometer indicated a temperature of —20° Fahr. It makes long journeys over the snow, burrowing down whenever it comes to an elevation that denotes the presence of a log or stump, and I am inclined to believe that at this season it must feed largely upon the chrysalides and larvæ of insects that are always to be found in such places." Other species of red-toothed shrews are restricted chiefly to North America, where they are found in much greater variety than in the Old World, though *Crossopus* is not represented. Its place is taken by two species of the genus *Sorex* (*S. palustris*, Richardson, east of the Rocky Mountains, and *S. hydrodromus*, Dobson, from Unalaska Island, provided, like the water-shrew, with pedal swimming fringes, but with the unfringed tail and dentition of the common shrew,—the first named being about as large as the water shrew, while the Unalaska species scarcely exceeds the size of the lesser shrew. Of the American forms *S. bendiri*, Merriam, is by far the largest known species of the genus. In it, as in many others inhabiting North America, the canine shows a tendency to diminish in size, which is more pronounced in *S. richardsonii*, Bachm., and in *S. vagrans*, Cooper; in *S. hoyi*, Baird, it is rudimentary, and in *S. crawfordi*, Baird, altogether absent. The diminutive *S. personatus*, Geoff., widely distributed throughout temperate North America, resembles *S. pygmæus*, in its small size. Other red-toothed shrews belonging to the allied genus *Blarina*, distinguished from *Sorex* by their dentition and by the remarkable shortness of the tail, are very common and characteristic of the North American continent. All the red-toothed shrews (except the aquatic forms) closely resemble one another in habits and Dr. Merriam has made the highly interesting discovery that the common short-tailed North American shrew supplements its insectivorous fare by feeding on beech-nuts, which will account for the generally very worn state of the teeth in this species. In destroying great numbers of slugs, insects, and insect larvæ they greatly aid the farmer in the preservation of his crops and merit protection. Although their penetrating odor renders them in a great measure safe from the attacks of rapacious mammals, they are destroyed in large numbers by nocturnal birds of prey. (G. E. D.)

SHREWSBURY, an old market-town, a municipal and parliamentary borough, and the county and assize town of Shropshire, England, is situated on a slightly elevated peninsula formed by a bend of the Severn, and on various railway lines, 30 miles south of Chester, and 163 northwest of London by the London and Northwestern Railway, the distance by the Great Western being 171 miles. The Severn is crossed by three stone bridges,—the English bridge (re-erected 1774), on the east, consisting of seven semicircular arches; the Welsh bridge (re-erected 1795), of five arches, on the west; and the Kingsland bridge (opened in 1882), of iron on the bow and girder principle. The streets are hilly and irregular, but strikingly picturesque from their number of antique timber houses, among which may be mentioned that in Butcher Row formerly the town residence of the abbot of Lilleshall, and the old council-house overlooking the Severn, erected in 1502 for the presidents of the council of the Welsh marches. Of the town ramparts built in the reign of Henry III. the principal remains are a small portion on the north side called the Roushill walls, and another portion on the southwest, used as a public walk, on which stands a square embattled tower. The castle built by Roger de Montgomery was dismantled in the reign of James II. but there still remain the archway of the interior gateway, the walls of the inner court, and two large round towers of the time of Edward I. Roger de Montgomery also founded in 1083 the abbey of St. Peter and St. Paul, which was of great extent and very richly endowed. At the dissolution it was destroyed except part of the nave and the western tower of the church, which have been converted into a parish church, under the name of the church of the Holy Cross. The other churches of special interest are St. Mary's, founded in the 10th century, a fine cruciform structure with a tower and spire 222 feet in height, displaying examples of various styles of architecture from Early Norman to Perpendicular,—the base of the tower, the nave, and the doorways being Norman, the transept Early English, and the aisles 15th century, while the interior is specially worthy of notice for its elaborate details, its stained glass, and its ancient monuments; St. Julian's, originally built before the Conquest, but rebuilt in 1748, except the tower, the older portion of which is Norman and the upper part 15th century; St. Alkmonds, also dating from the 10th century, but rebuilt towards the close of the 18th century, with the exception of the tower and spire; and St. Giles's, dating from the time of Henry I., much altered at various periods, but still retaining its ancient nave and chancel. The old church of St. Chad, supposed to have occupied the site of a palace of the princes of Powis, was destroyed by the fall of the tower in 1788, and of the ancient building the bishop's chancel alone remains. The new church of St. Chad was built on another site in 1792. There are still slight remains of the abbey of Greyfriars founded in 1291, and of the Augustine friary founded in 1255. The old buildings completed in 1630 for the free grammar-school of Edward VI., founded in 1551, are now occupied by the county museum and free library, the school having been removed in 1882 to new buildings at Kingsland. Among the principal secular buildings of the town are the fine market-house in the Elizabethan style (completed according to an inscription over the northern arch in 1595), the shire hall (rebuilt in 1837, and again, after a fire, in 1883), the music-hall buildings (1840), the general market and corn exchange (1869), the working-men's hall (1863), the drapers' hall (an old timbered structure dating from the 16th century), the theatre (1834), and the post-office (1877). The principal benevolent institutions are the county infirmary (1747), Millington's hospital (1734), and the eye, ear, and throat hospital (1881). A monument to Lord Clive was erected in the market-place in 1860, and a Doric memorial pillar to General Lord Hill in 1816 at the top of the Abbey Foregate. The town racecourse occupies a portion of the "Soldiers' Piece," where Charles I. addressed his army in 1642. To the southwest of the town is a fine park 23 acres in extent, known as the Quarry, adorned by a beautiful avenue of lime trees. Formerly Shrewsbury was one of the principal marts for Welsh flannel, but this trade has now in great part ceased. Glass-staining, the spinning of flax and linen yarn, iron-founding, brewing, malting, the preparation of brawn, and the manufacture of the well-known Shrewsbury cakes are now the principal industries. The population of the municipal and parliamentary borough (area 3674 acres) in 1871 was 23,406, and in 1881 it was 26,478.

Shrewsbury, anciently called Pengwerne, was founded in the 5th century as a defence against the inroads of the Saxons, and became the seat of the princes of Powis. After its conquest by the Saxons its name was changed to Scrobbesbyrig, altered gradually into Sloppesbury, Shrewsbury, and Salop. It became one of the principal cities of the Saxon kingdom, and a mint was established there by Athelstan about 925. After the Norman Conquest it was included in the earldom of Shrewsbury bestowed by William I. on Roger de Montgomery, who erected a strong castle on the site of the ancient Saxon fortress. But in 1067 it was besieged by Owen Gwynedd, prince of Wales, till relieved by William, who marched specially to its assistance from York. On the rebellion of Robert de Belesme, son of the first earl of Shrewsbury, the castle and town were attacked by Henry I. and surrendered in 1102. During the wars of the next two centuries the town was frequently attacked and plundered by the Welsh, being captured by Llewelyn in 1215, surrendered to the English in 1221, plundered by the earl of Pembroke in 1223, burnt by Llewelyn ap Jorwerth in January, 1234, taken by Simon de Montfort in 1264, and restored to the crown in 1265. In 1267 Henry III. assembled his army there, to threaten the Welsh, but peace was restored without bloodshed, after which he strengthened its fortifications. Edward I. in 1277 made it the seat of his government, and removed to it the Courts of Exchequer and King's Bench. In 1283 he held a parliament there for the trial of David, the last of the royal princes of Wales, who was dragged through the streets of the town and afterwards hanged and quartered. At a parliament held in Shrewsbury in January, 1398, Richard II. assumed the title of Earl of Chester. Near the town was fought, 23d July, 1403, the battle of Shrewsbury, described in Shakespeare's *Henry IV.*, when the king defeated the earl of Northumberland with great slaughter, Hotspur, the earl's son, being among the slain. It became the headquarters of Charles I., 20th September, 1642, but was taken by the Parliamentarians in February, 1645. The town from the reign of William I. to that of James II. received no less than thirty-two charters, its first governing charter being obtained from Richard I. It returned two members to parliament from the reign of Edward I. until 1885, when it was allowed only one.

See Phillips, *History and Antiquities of Shrewsbury*, 1779; Owen and Blakeway, *History of Shrewsbury*, 1825; Pidgeon, *Memorials of Shrewsbury*, 1857.

SHREWSBURY, Earls of. See Talbot.

SHRIKE, a bird's name so given by Turner (1544), but solely on the authority of Sir Francis Lovell, for Turner had seen the bird but twice in England, though in Germany often, and could not find any one else who so called it. However, the word[1] was caught up by succeeding writers; and though hardly used except in books—for Butcher-bird is its vernacular synonym—it not only retains its first position in literary English, but has been largely extended so as to apply in general to all birds of the Family *Laniidæ* and others besides. The name *Lanius*, in this sense, originated with Gesner[2] (1555), who thought that the birds to which he gave it had not been mentioned by the ancients. Sundevall, however, considers that the *Malacocraneus* of Aristotle was one of them, as indeed Turner had before suggested, though repelling the latter's supposition that Aristotle's *Tyrannus* was another, as well as Belon's reference of *Collyrion*.

The species designated Shrike by Turner is the *Lanius excubitor* of Linnæus and nearly all succeeding authors, nowadays[3] commonly known as the Greater Butcher-bird, Ash-colored or Great Gray Shrike,—a bird which visits the British Islands pretty regularly, though not numerously, in autumn or winter, occasionally prolonging its stay into the next summer; but it has never been ascertained to breed there, though often asserted to have done so. This is the more remarkable since it breeds more or less commonly on the Continent from the north of France to within the Arctic Circle. Exceeding a Song-Thrush in linear measurements, it is a much less bulky bird, of a pearly-gray above with a well-defined black band passing from the forehead to the ear-coverts; beneath it is nearly white, or—and this is particularly observable in Eastern examples—barred with dusky. The quill-feathers of the wings, and of the elongated tail, are variegated with black and white, but are mostly of the former, though what there is of the latter shows very conspicuously, especially at the base of the remiges, where it forms either a single or a double patch.[4] Much smaller than this is the Red-backed Shrike, *L. collurio*, the best-known species in Great Britain, where it is a summer visitor, and, though its distribution is rather local, it may be seen in many parts of England and occasionally reaches Scotland. The cock is a sightly bird with his gray head and neck, black-cheek-band, chestnut back, and pale red breast, while the hen is ordinarily of a dull brown, barred on the lower plumage. A more highly-colored species is called the Woodchat, *L. auriculatus* or *rutilus*, with a bright bay crown and nape, and the rest of its plumage black, gray, and white. This is an accidental visitor to England, but breeds commonly throughout Europe. All these birds, with many others included in the genus *Lanius*, which there is no room here to specify, have, according to their respective power, the very remarkable habit (whence they have earned their opprobrious name) of catching insects, frogs, lizards, or small birds and mammals, and of spitting them on a thorn or of fixing them in a forked branch, the more conveniently to tear them in pieces and eat them.

The limits of the Family *Laniidæ* have been very variously regarded, and agreement between almost any two systematists on this point seems at present out of the question. The latest synopsis is that by Dr. Gadow (*Cat. B. Brit. Museum*, viii. pp. 88–321), who frankly states that it is "quite impossible to give a concise diagnosis of what we are to understand by" the Family. For his purpose he makes it to include about 250 species and divides it into five sub-families: *Gymnorhininæ*, *Malaconotinæ*, *Pachycephalinæ*, *Laniinæ*, and *Vireoninæ*. Of these doubts may be entertained as to the affinity of the first and especially of the last. He, but for the crude plan to which he was compelled to conform, would not have separated *Strepera* from *Gymnorhina;* but the former had been already included, to the exclusion of the latter, among the *Corvidæ*, and even placed among the normal *Corvinæ*. The need of exercising reserve on this matter has been before stated (Crow, vol. vi. p. 545); but the number of ornithologists who think that these two genera should be placed in different Families must be small. The view taken by Prof. Parker seems to be the most reasonable: these genera—with others doubtless and most of them Australian—are morphologically inferior to the *Corvidæ*, and perhaps deserve some such designation as that of "*Noto-Coracomorphæ*" suggested by him (*Trans. Zool. Society*, ix. p. 327). At the same time their relationship to the *Laniidæ* appears to be

[1] Few birds enjoy such a wealth of local names as the Shrikes. M. Rolland (*Faune Pop. de la France*, ii. pp. 146–151) enumerates upwards of ninety applied to them in France and Savoy; but not one of these has any affinity to our word "Shrike."

[2] He does not seem, however, to have known that Butcher-bird was an English name; indeed it may not have been so at the time, but subsequently introduced.

[3] According to Willughby, Rae, and Charleton, it was in their day called in many parts of England "Wierangle" (Germ. *Würgengel* and *Würger*, the Strangler); but it is hard to see how a bird which few people in England could know by sight should have a popular name, though Chaucer had used it in his *Assemblye of Foules*.

[4] On this character great store has been laid by some recent writers, who maintain that the birds presenting only a single patch, with some other minor distinctions, as the barred breast above mentioned, come from the far East and deserve specific recognition as the *Lanius major* of Pallas. But it is admitted that every intermediate form occurs, and Prof. Collett has now shown (*Ibis*, 1886, pp. 30-40) that the typical *L. excubitor* and typical *L. major* may be found in one and the same brood, and also that this occasional divergence is due neither to age nor sex. That it does depend to some extent on locality is allowed; for, though examples with the single patch (*i.e.*, *L. major*) occasionally reach Great Britain, it is asserted that nearly all the specimens from Eastern Siberia are so marked. But it is also found that by almost insensible degrees other (and sometimes more important) distinctions are manifested, and the extreme terms of the several series have been exalted to the rank of "species"—or at least local races. These are too many to be here enumerated, but it may be mentioned that the Great Gray Shrike of North America, which ordinarily has the lower plumage strongly barred, and is usually known as *L. borealis*, seems to be only one of these divergent forms, though perhaps the most divergent, as might be expected from the wholly distinct area it occupies. Yet occasionally examples occur in the Old World, which there is no reason to suppose have an American origin, indistinguishable from the typical *L. borealis*, and an uninterrupted series from one extreme to the other can be found. The differences when compared with those observable in other animals are, as a whole, too slight to justify the epithet "polymorphic" to *L. excubitor* as a species; but enough has been said to show that it indicates a tendency in that direction.

evident, and they may perhaps be best regarded as the less-altered descendants of an old type, whence both the true Crows and the true Shrikes have sprung, each to develop into higher morphological rank, and by the way to throw out numerous other branches. As to the Vireos it would seem almost certain that they have little or no connection with the *Laniidæ*.

(A. N.)

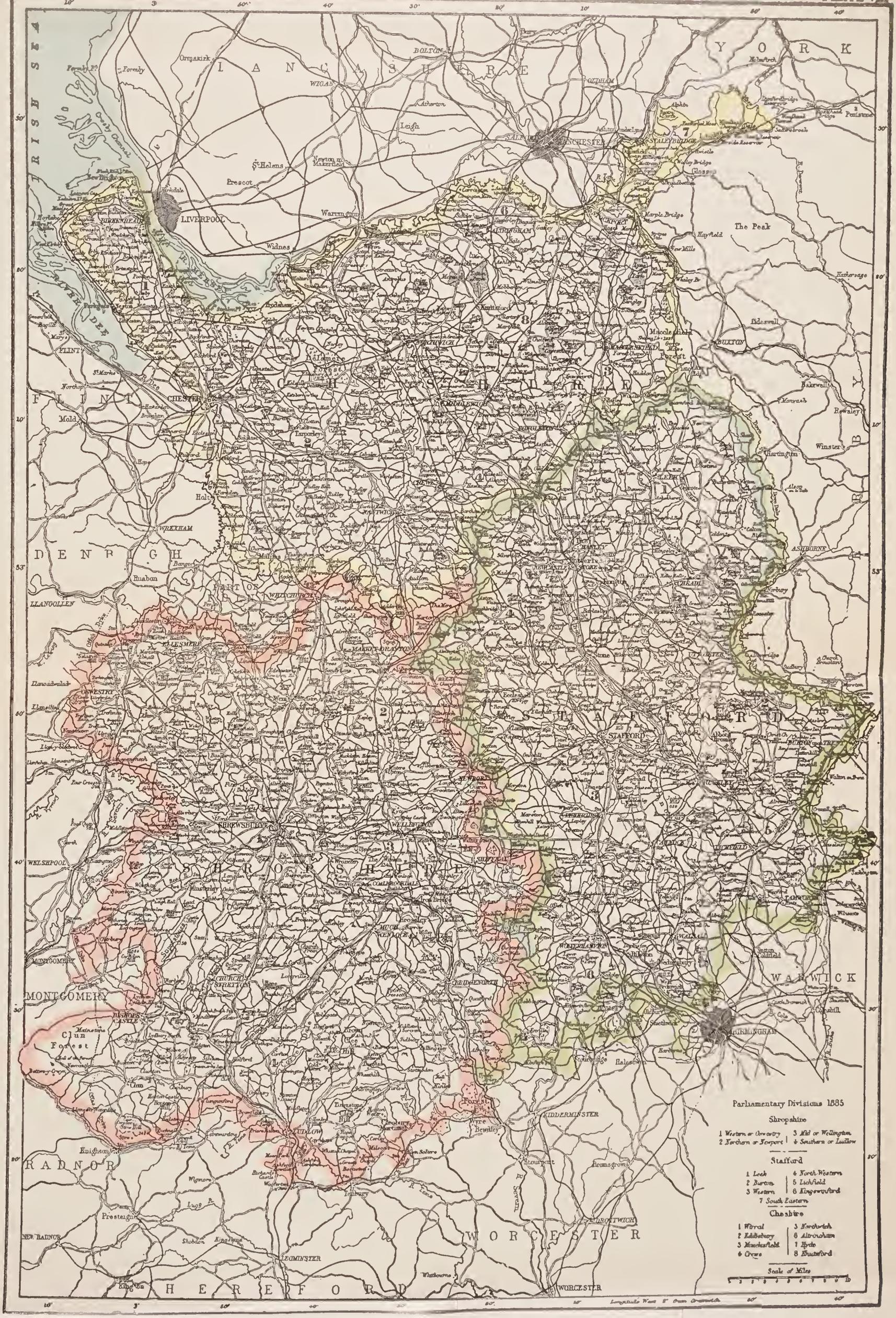
SHRIMP, the name applied to two species of Crustaceans commonly used as food in Great Britain. One kind after boiling is brown in color, the other bright red. The brown kind belongs to the species *Crangon vulgaris*, the red to the species *Pandalus annulicornis*. Both these species belong to the sub-order *Decapoda*, and to that division of it which is distinguished by a well-developed abdomen or tail, and called *Macroura*. The Crustaceans placed in this division have five pairs of limbs adapted for crawling on the sea-bottom; usually the anterior one or more pairs of these five are chelate or pincer-formed. In front of the ambulatory limbs are six pairs of limbs whose function is to assist in the conveyance of food to the mouth, three pairs of maxillipeds, two pairs of maxillæ, and a pair of mandibles. In front of these, again, are two pairs of antennæ and a pair of eyes. The latter are held by some naturalists to represent a pair of limbs, but evidence exists which is in opposition to this view. Behind the ambulatory limbs are six segments of the body, each bearing a pair of limbs adapted for swimming. The sixth pair of these abdominal limbs are larger than the rest and expanded, extending backwards in the same plane as the flattened terminal segment of the body or telson, and the three together form a powerful organ of locomotion by which a rapid backward movement of the whole body in the water is produced. The genus *Crangon* is the type of a family, the *Crangonidæ*. The most conspicuous characteristic of the genus is the shape of the first pair of ambulatory limbs. These differ less from the rest than is usually the case, and the terminal pincer apparatus is but slightly developed. The terminal joint is small, and the projection of the second joint against which it acts is still smaller, so that the cutting edges of the pincer are transverse to the rest of the limb. The second pair of limbs have also a terminal pincer apparatus, and both the second and the third are slender. The fourth and fifth pairs are short and thick. The rostrum, the median projection of the anterior part of the carapace, is rudimentary. The line joining the attachments of the two pairs of antennæ are transverse to the axis of the body. The abdomen is large. There are seven branchiæ on each side.

The specific characters of *C. vulgaris*, Fabr., are the smoothness of the dorsal surface, the carapace presenting only three small spines, one median in the gastric region and one on each side on the branchiostegite. The second pair of ambulatory limbs are nearly as long as the third. The size of the adult animal is about 2½ inches. The species is abundant on sandy shores at nearly all parts of the British and Irish coasts, and is captured by nets which have a semicircular mouth, and are attached to a pole wielded by a fisherman wading in the water at ebb-tide. The common shrimp is an exception to the general rule that the cuticle of Crustaceans is either red in the living animal or becomes so on boiling. The cuticle of *C. vulgaris* in the living state is light brown or almost white, and the animal is somewhat translucent. The color closely approximates to that of the sand on which the animal is found. After boiling the cuticle assumes its well-known brown color. Several other species of *Crangon* are known on the British shores, but none of them are as abundant as *C. vulgaris*, and they are not captured as food. *C. vulgaris* is common on the east coast of North America from North Carolina to Labrador; in the neighborhood of New York it is used as food. The species also occurs on the west coast of America from San Diego to Alaska, and is commonly eaten at San Francisco, as also is another species, *Crangon franciscorum*, Stimpson.

The genus *Pandalus*, first defined by Leach in his *Malacologia Britannica*, is chiefly distinguished by the great length of the second pair of antennæ, which are longer than the whole body, the presence of a long spiny rostrum curved upwards, the total absence of pincers on the first pair of ambulatory limbs, and the great length of the second of these limbs on the left side. The ambulatory limbs are all long and slender, and the first pair are not thicker than the rest. The second pair are provided with a very small pincer apparatus. The third somite of the abdomen is large and projects upwards, so that the body has a hump-backed appearance. The serrated upper edge of the rostrum extends backwards along the median line of the carapace, half way to its posterior border. The specific characters of the species *Annulicornis* are that the rostrum is equal in length to the carapace, and that its anterior half is destitute of teeth above, with the exception of one small tooth near the apex. This species is not so abundant as *C. vulgaris* and is an inhabitant of deeper water. It is taken usually for the market on the east and south coasts of Britain, but is widely distributed, occurring in Scotland, Ireland, Shetland, and Iceland. In color it is when alive of a reddish gray with spots of deeper red; when boiled it is of a uniform deep red. This species is sometimes confounded with the common prawn, but it never reaches the size of the prawn, its adult length being 2 to 2½ inches. *P. annulicornis* is the only species of the genus occurring in Great Britain. The common prawn when adult is above 4 inches in length. It belongs to the species *Palæmon serratus*. In *Palæmon* the second pair of antennæ are long, as in *Pandalus*, but the first pair are much larger in the former than in the latter. In *Palæmon* both of the first two pairs of ambulatory limbs are didactyle or pincer formed; the second pair are stronger than the first, and the left not longer than the right. Some of the smaller species of *Palæmon* are used as food and sometimes called shrimps. At Poole in Dorsetshire, according to Prof. Bell's *British Crustacea*, *Palæmon squilla*, Fabr., *P. varians*, Leach and *P. leachii*, Bell, are all taken, and sold as cup-shrimps.

SHROPSHIRE, or SALOP, an inland county of England, on the borders of Wales, lies between 52° 20′ and 53° 4′ N. lat. and 2° 17′ and 3° 14′ W. long., and is bounded N. by Cheshire and an interpolated portion of Flint, E. by Stafford, S. E. by Worcester, S. by Hereford, S. W. by Radnor, W. by Montgomery, and N. W. by Denbigh. The total area in 1880 was 844,565 acres, or about 1319 square miles. Plate VIII.

Towards the west Shropshire partakes of the hilly scenery of the neighboring Wales, from which several ranges are continued into it. South of the Severn on the borders of Montgomery the Breidden Hills of Lower Silurian formation rise abruptly in three peaks, of which Cefn-y-Castell, about 1300 feet high, is in Shropshire; and in the southwest there is a broad range of rough rounded hills known as Clun Forest, extending from Radnor. South and west of the Severn there are four other principal chains of hills extending from southwest to northeast—the Long Mynd (1674 feet), to the west of Church Stretton, of Cambrian formation; the Caradoc Hills, a little to the north, which cross the Severn, terminating in the isolated sugar-loaf peak of the Wrekin (1320 feet); the Wenlock Edge, to the east of Church Stretton, a sharp ridge extending for 20 miles, and in some places rising above 1000 feet; and the Clee Hills, near the southeastern border (Brown Clee Hill, 1805 feet; Titterstone Clee Hill, 1750 feet). The remainder of the county is for the most part pleasantly undulating, finely cultivated, and watered by numerous rivulets and streams. It may be said to lie in the basin of the Severn, which enters the county near its centre from Montgomery, and flows eastwards to Shrewsbury, after which it turns southeastwards to Ironbridge, and then continues in a more southerly direction past Bridgnorth, entering Worcester near Bewdley. It is navigable to Shrewsbury and has connection with the Donington, the Shropshire Union, the Shrewsbury, the Birmingham and Liverpool, and the Chester and Ellesmere Canals. Its principal tributaries within the county are—from the right the Meol (which receives the Rea), the Cound, the Mor, and the Borle, and from the left the Vyrnwy (dividing Shropshire from Montgomery), the Perry, the Tern (which receives the Roden), the Bell, and the Worf. The Dee


IRISH SEA
LANCASHIRE
YORK
DENBIGH
FLINT
SHROPSHIRE
STAFFORD
CHESHIRE
WARWICK
WORCESTER
HEREFORD
RADNOR
MONTGOMERY
LIVERPOOL
MANCHESTER
BIRMINGHAM
CHESTER
SHREWSBURY
STOKE
WORCESTER
Parliamentary Divisions 1885
Shropshire
1 Western or Oswestry
2 Northern or Newport
3 Mid or Wellington
4 Southern or Ludlow
Stafford
1 Leek
2 Burton
3 Western
4 North-Western
5 Lichfield
6 Kingswinford
7 South Eastern
Cheshire
1 Wirral
2 Eddisbury
3 Macclesfield
4 Crewe
5 Northwich
6 Altrincham
7 Hyde
8 Knutsford
Scale of Miles

touches the northwestern boundary of the county with Denbigh. In the south the Teme, which receives the Clun, the Onny, and the Corve, flows near the borders of Hereford, which it occasionally touches and intersects. Of the numerous lakes and pools the largest is Ellesmere (116 acres) near the borders of Denbigh. The Severn forms the boundary between the Old and the New Red Sandstone formations, which constitute the principal strata of the county. The Old Red Sandstone rocks lying to the south and west of the river are bounded and deeply interpenetrated by Cambrian and Silurian strata. There are five separate coal-fields within the county,—the Forest of Wyre, Colebrookdale, Shrewsbury, Clee Hills, and Oswestry, The Forest of Wyre field on the borders of Worcester rests directly on the Devonian rocks, and has a great thickness of measures, but comparatively few workable seams. The Colebrookdale embraces an area of 28 square miles, and is triangular in form, with its base resting on the Severn and its northern apex at Newport. On its western side it is bounded partly by a great fault, which brings in the New Red Sandstone, and partly by the Silurian strata; on its eastern side it passes beneath the Permian strata; and it is supposed that the productive measures are continued towards South Staffordshire. Its general dip is eastwards, and the strata have a vertical thickness of over 1000 feet. The organic remains include fishes, crustaceans, and molluscs. Mingled with the coal strata are several valuable courses of ironstone. The original quantity of coal in the field is estimated to have been about 43 million tons, of which there are about 12 millions now remaining. Neither the Shrewsbury nor the Clee Hills fields are of much value. The Oswestry field is small, but has some workable seams adjoining the extensive field of Denbigh. In 1884 850,000 tons of coal, valued at £286,000 [$1,389,960], were raised in Shropshire from fifty-five collieries, while 198,700 tons of iron were obtained valued at £109,285 [$531,125.10]. Iron-casting forms one of the most important industries of the county. Lead mining is carried on with some success on the Stiperstones, 3788 tons of lead ore being raised in 1884. The other principal minerals are iron pyrites (500 tons in 1884, valued at £250 [or $1215]), barytes (4939 tons, worth £7395 [or $35,939.70]), and fire-clay (56,000 tons, worth £8475 [or $41,188.50]). There are also a large number of stone and lime quarries.

Manufactures.—With the exception of iron, the manufactures of the county are comparatively unimportant. Bricks and tiles, earthen and china ware, and tobacco pipes are largely made in various districts. At Shrewsbury there are linen, yarn, and thread mills, and in several districts small paper-mills.

Agriculture.—There is much fertile land suitable for all kinds of culture, the richest soil being that in the vicinity of the Severn, including the Vale of Shrewsbury. Much of the hilly ground, including Wenlock Edge and the Clee Hills, admits of tillage; but a portion of the western mountainous region is of comparatively small value even for the pasturage of sheep. Out of a total area of 844,565 acres there were 716,509 in 1885 under culture, of which 150,085 were under corn crops, 61,101 under green crops, 426,859 under permanent pasture, 71,470 under rotation grasses, and 6978 fallow. The area under woods in 1881 was 45,641 acres, and in 1885 the area under orchards was 4015. Of corn crops the areas under wheat and barley were in 1885 nearly equal, 53,161 and 53,300 acres respectively, while that under oats amounted to 34,445 acres, rye to 848, beans 4648, and pease 3683. Nearly five-sixths of the area under green crops were occupied by turnips and swedes, which covered 47,119 acres, the area under potatoes being 6874, and that under mangold wurzel 4355. Horses in 1885 numbered 32,323, of which 19,377 were used solely for purposes of agriculture; cattle (chiefly Herefords) 162,932, of which 60,976 were cows and heifers in milk or in calf and 69,865 animals under two years old; sheep (mainly Shropshire) 438,664; pigs 61,067; and poultry 369,890. In the northern districts Cheshire cheese is largely made. According to the latest *Landowners' Return for England* Shropshire was divided among 12,119 owners, possessing 791,941 acres at an annual value of £1,484,833 [$7,216,288.38], or an average value of about £1, 16s. 8d. [$8.91] per acre. There were 7281 proprietors or about 60 per cent. who possessed less than 1 acre, and 19,675 acres were common land. The following possessed over 8000 acres each—Earl of Powis, 26,986; Duke of Cleveland, 25,604; Earl Brownlow, 20,233; Duke of Sutherland, 17,495; Lord Hill, 16,290; Lord Forester, 14,891; Lord Windsor, 10,846; Earl of Bradford, 10,515; Sir V. R. Corbet, 9489; W. O. Foster, 8547; W. L. Childe, 8430; Lord Boyne, 8424; I. D. Corbet, 8118.

Administration and Population.—Shropshire comprises 14 hundreds and the municipal boroughs of Bridgnorth (population, 5885 in 1881), Ludlow (5035), Oswestry (7847), Shrewsbury (26,478), and Wenlock (18,442). For parliamentary purposes the county, which was formerly shared between North and South Shropshire, was in 1885 divided into four separate divisions,—Mid (Wellington), North (Newport), South (Ludlow), and West (Oswestry), each returning one member. At the same time the boroughs of Bridgnorth, Wenlock, and Ludlow were merged in the county divisions to which they severally belong; but Shrewsbury continues to return one member. Shropshire contains also the following urban sanitary districts: Broseley (population, 4458 in 1881), Dawley (9200), Ellesmere (1875), Madeley (9212), Much Wenlock (2321), Newport (3044), Wellington (6217), and Whitchurch and Dodington (3756). The county has one court of quarter sessions, and is divided into nineteen special sessional divisions. All the boroughs have separate courts of quarter sessions and commissions of the peace. The county contains 252 civil parishes with parts of six others. Ecclesiastically it is in the dioceses of Hereford, Lichfield, and St. Asaph. The population (240,959 in 1861) in 1881 was 248,014 (124,157 males and 123,857 females). The number of persons to an acre was 0.29 and of acres to a person 3.41.

History and Antiquities.—The British tribes inhabiting Shropshire at the time of the Romans were named by them the Ordovices and the Cornavii. It was within its boundaries that Caractacus (Caradoc) struggled against Vespasian in 51 A.D. A connected chain of military works was erected by him over the southern and western districts of the county, the most important fortresses being Caer Caradoc (where he is said to have made his last stand), occupying a commanding position in the forest of Clun, and the earthwork of Hên Dinas at Old Oswestry, consisting of four or five concentric circles, still well marked. The Roman Watling Street entered Shropshire near Weston-under-Lizard in Stafford and passed in an oblique line to Leintwardine in Hereford. Various other Roman roads diverged from it in different directions. Wroxeter, a little to the west of the Wrekin, occupies the site of the ancient Roman city Uriconium, of which a portion of the wall, originally 3 miles in circumference, still remains. Explorations made on the site of the city have revealed many interesting features of its construction, and have led to the discovery of an immense variety of remains. By some authorities the Roman Mediolanum is placed near Drayton and Rutunium near Wem; but the evidence in both cases is doubtful. Throughout Shropshire there are many remains of Roman camps. Under the Romans it was included in the province of Flavia Cæsariensis. After their departure it was annexed to the kingdom of the Saxons by Offa, who about 765 caused Watt's dyke to be erected to guard against the incursions of the Welsh, and later erected parallel with it, 2 miles to the west, the entrenchment known as Offa's dyke, which, extending from the Wye near Hereford to the parish of Mold in Flintshire, forms in some places a well-defined boundary between Shropshire and Montgomery. The greater part of the history of Shropshire is included under that of SHREWSBURY (*q.v.*). There are several important old ecclesiastical ruins, including Wenlock priory, once very wealthy, said to have been founded by St. Milburg, grand-daughter of Penda, king of the Mercians, as a college for secular priests, and changed into a priory for Cluniac monks by Roger de Montgomery about 1080; Lilleshall abbey, for Augustinian canons, founded in the reign of Stephen; Shrewsbury abbey, founded in 1083 in honor of St. Peter and St. Paul; Buildwas abbey, one of the finest ruins in the county, founded in 1135 for Cistercians by Roger de Clinton, bishop of Chester; and Haughmond abbey, for Augustinian canons, founded by William Fitzalan about 1138. Other remains of less consequence are those of the convent of White Ladies or St. Leonard's, a Norman structure, said to have been founded in the reign of Richard I. or John; slight traces of Wombridge priory, for Augustinian canons, founded before the reign of Henry I.; Alberbury priory, for Benedictines, founded by Fulk Fitzwarin between 1220 and 1230; and Chirbury priory, founded towards the close of the 12th century. The castles of Bridgnorth (see BRIDGENORTH), Ludlow, and Shrewsbury are referred to in the notices of

these towns, and in addition to these may be mentioned Clun Castle, which after a long siege was taken and burnt by the Welsh prince Rees about 1196, and Boscobel House, near which Charles II. is said to have been sheltered in an oak.

See Hartshorne, *Salopia Antiqua*, 1841; Eyton, *Antiquities of Shropshire*, 12 vols., 1854–60; Anderson, *History of Shropshire*, 1869; Blakeway, *Sheriffs of Shropshire;* Duke, *Antiquities of Shropshire*.

(T. F. H.)

SHROVE TUESDAY, the day preceding Ash Wednesday, or the first day of Lent, was so called as the day on which "shrift" or confession was made. Compare CARNIVAL.

SHUMLA (Bulg. *Shumen*, Turk. *Shumna*), a fortified town of Bulgaria, 58 miles south-southwest of Silistria and in that pashalic and 50 west of Varna. The town is built within a cluster of hills which curve round it on the west and north in the shape of a horse-shoe. A rugged ravine intersects the ground longitudinally within the horse-shoe ridge. From Shumla roads radiate northwards to the Danubian fortresses of Rustchuk and Silistria and those in the Dobrudja, southwards to the passes of the Balkans, and eastwards to Varna and Baltchik. Shumla is therefore one of the most important military positions to the north of Turkey, while it ranks as the third largest town in Bulgaria. Spread over a large extent of ground, each house mostly isolated in the midst of its own stables and cow-houses, Shumla has the appearance of a vast village. A broad street and rivulet divide the military or upper quarter, Gorni-Mahlé, from the lower quarter, Dolni-Mahlé. The latter, dirty and unhealthy, intersected by a labyrinth of lanes, is inhabited mostly by Christians and Jews. The Armenians possess a small church, and each of the two Bulgarian quarters has its temple. The houses of the Gorni-Mahlé, occupied chiefly by Turks, stand pleasantly embowered each in its flower and fruit garden. Gorni-Mahlé has preserved the old church of the Resurrection. In the Dolni-Mahlé is the new church of St. Cyril, a fine basilica adorned with a peristyle. The Bulgarian community possesses two boys' and two girls' schools, giving instruction superior to that obtainable at the primary Turkish school. In the upper part of the town is the magnificent mausoleum of Jezairli Hassan Pasha, who in the 18th century enlarged the fortifications of Shumla. The principal mosque, with a cupola of very interesting architecture, forms the centre of the Moslem quarter. At the farther end of the town, isolated on a hill, is a large military hospital. The population of Shumla in 1881 was 23,093, exclusive of the garrison. The town is renowned for its manufacture of red and yellow slippers, ready-made clothes, richly embroidered dresses for females, and its copper and tin wares. It also rears silk-worms, spins silk, and carries on an important trade in grain and wine. The branch railway from Shumla to Kaspidjan, 9½ miles, to connect the town with the Rustchuk-Varna Railway, though commenced in 1870, was not finished in 1886.

In 811 Shumla was burned by the emperor Nicephorus, and in 1087 was besieged by Alexius. In 1388 the sultan Murad I. forced the castle to surrender; and thence till the 17th century Shumla disappears from history. In the 18th century it was enlarged and fortified. Three times—1774, 1810, and 1828—it was unsuccessfully attacked by Russian armies. The Turks consequently gave it the name of Gazi ("Victorious"). But on 22d June, 1878, Shumla capitulated to the Russians. The treaty of Berlin stipulated the demolition of the fortifications; but this article has not been executed, and Bulgarian troops garrison the fort.

See F. Kanitz, *La Bulgarie Danubienne* (1882); H. C. Barkley, *Bulgaria before the War* (1877), and *Between the Danube and Black Sea* (1876); S. G. B. and C. A. St. Clair, *Residence in Bulgaria* (1869); J. L. Farley, *New Bulgaria* (1880); and J. G. Minchin, *Bulgaria since the War* (1880).

SHUSHA, a town, formerly a fortress, of Russia, in the Caucasian government of Elisabethpol, lies in 39° 46′ N. lat. and 46° 25′ E. long., 230 miles southeast of Tiflis, on an isolated rocky eminence, 3860 feet high. The town, which is accessible only on one side, occupies but a small part of the plateau, whence there is a splendid view over the surrounding mountain gorges and defiles. In 1873 the population was 24,552 (males 13,666, females 10,886), of whom 13,504 were Armenians and 10,804 Tatars. Instead of flat earthen roofs, as in most other towns of Transcaucasia, the houses have very high steep roofs, covered with shingle. The streets are sinuous, and are intersected by ravines. Shusha was formerly the capital of the khanate of Karabagh. The town is locally renowned for its carpet manufactures, and the district for its excellent breed of Karabagh horses.

The fortress, formed in 1789 by Pana Khan, has a wall on one side, and is defended naturally on the other three sides. In 1795 Shusha successfully withstood a siege by Agha Mohammed of Persia, but was constrained to surrender two years afterwards. In 1805 Ibrahim Khan of Karabagh invoked the protection of Russia, but the annexation was completed only in 1822. The present district of Shusha (2934 square miles) forms only a part of the former khanate of Karabagh. In 1873 it had (exclusive of Shusha) a population of 80,913 (males 45,163, females 35,750), Armenians numbering 43,562 and Tatars 37,351. Agriculture and cattle breeding are almost the sole occupations of the inhabitants. General culture is very low; there is no enterprise, and but inadequate security for life and property.

SHUSTAR, or SHÚSTAR, SHÚSHTAR (Arab. *Tostar*), once a flourishing provincial capital of Persia, is now a comparatively unimportant town of 6000 inhabitants,—exclusive, however, of the Bakhtiáris, who during the winter months encamp with their flocks and herds in the immediate vicinity. It is situated (32° 3′ 30″ N. lat. and 48° 52′ E. long.) at the foot of an offshoot of the Bakhtiári Mountains in the northwest of Khuzistán and just below the point in the Kárún (Dojail or Little Tigris) where—the main stream running westwards—a cutting of 70 feet deep has been made through the natural rock for an easterly branch. Thence the two streams, enclosing a wide alluvial tract, of which Shustar is the crown, follow independent courses until they reunite some 40 miles to the south. According to Lieutenant Selby, I. N., who ascended the Kárún from Muhamrah (Mohammera) in 1842 by the Shutait (or main stream on the west) to within 6 miles, and further tested the navigation of the Ab-i-Gargar (or eastern channel) to within 1 mile, of Shustar, the town is built on a small hill which rises gradually from the southwest and increases in elevation to the citadel, which presents on the northeastern side an abrupt face of about 150 feet in length, having the river immediately beneath. Mr. Loftus, who visited Shustar some eight years after Lieutenant Selby, gives an account of the two great dams thrown across the river,—the "Band-i-Mizán" over the natural course, the "Band-i-Kaisar" over the artificially diverted branch. About a mile below the latter is a similar work of more recent and more solid and substantial construction, called the "Púl," or bridge of Belaiti. Legend ascribes these ancient works to Shápúr I. and his captive the emperor Valerian. In 1875, and again in 1878, Mr. Mackenzie visited Shustar; he speaks of the town as being in a wretchedly decayed and filthy condition. The houses are of stone, some few good, with underground rooms (*sardábs* or *zír zamin*) excavated to a depth of two stories below the ground level. In these relief is obtained from the intense summer heat. The traffic of the bazaar, which is a poor one, seemed to depend chiefly on the Iliyáts or wandering tribes. The inhabitants—for the most part Arabs and Sáiyids—have a reputation for hospitality.

Some writers have identified Shúshar with Susa (Shushan of the Bible), the capital of Susiana and a residence of the Achæmenian kings. The true site of the latter, however, as Loftus's explorations showed, is at Shúsh, a widely spread ruin 30 or 40 miles to the northwest. On the other side of Shustar is the locally classic ground of Rám Hormuz. In fact, of the whole neighborhood Sir H. Rawlinson writes that it "still requires elaborate exploration, and would well repay any traveller who would devote six months to examining the ruins and carefully copying the inscriptions."

The river Karún, which rises in the Bakhtiári Mountains and passes down the broad Shattu 'l-'Arab, joins the Tigris and Euphrates. It has been declared by many and trustworthy authorities to be well adapted for steam navigation—save as regards one obstacle at Ahwaz, removable at little cost—from its mouth to the near neighborhood of Shustar. Thence to Ispahan the land journey would be shorter than from Bushahr (Bushire) to that city by 200 miles.

SHUYA, one of the chief centres of the cotton industry in middle Russia, is a district town in the government of Vladimir, 68 miles northeast of the town of Vladimir. A branch railway connects it with the Novki station of the railway from Moscow to Nijni-Novgorod. The town is built on the high left bank of the navigable Teza, a tributary of the Klazma, with two suburbs on the right bank. Annalists mention princes of Shuya in 1403. Its first linen manufactures were established in 1755; but in 1800 its population did not exceed 1500. Its growth began only with the development of the cotton industry in central Russia, and since then has been rapid; in 1882 it had 19,560 inhabitants, as against 10,440 in 1870. Of these about 10,000 live by the manufactures, and only a few keep to agriculture and gardening. In 1881 the output of twelve cotton-mills was valued at £442,160 [$2,148,897.60] for various cotton stuffs and £48,000 [$233,280] for cotton yarns. Tanneries, especially for the preparation of sheepskins—widely renowned throughout Russia—still maintain their importance, although this industry has migrated to a great extent to the country districts. The products of its manufactories are chiefly sent to Moscow and Nijni-Novgorod. The town is mainly built of wood. Its cathedral (1799) is a large building, with five gilt cupolas. Shuya has also two gymnasia, for boys and girls, besides a progymnasium for girls, and several secondary and primary schools.

The surrounding district is also important for its manufactures. The village of Ivanovo-Voznesensk, north of Shuya, with a population of more than 19,000 inhabitants, employed 11,329 workmen in its 39 manufactories in 1881, and showed a return of £1,939,950 [$9,428,157] (£1,700,000 [$8,262,000] for cottons and the remainder for chemicals and machinery). Teikovo and Kokhma are two other centres of manufacture,—the whole production of the manufactories within the district (exclusive of Shuya and Ivanovo) being estimated at £630,000 [$3,061,800]. These figures, of course, do not include any statistics of the petty trades carried on side by side with agriculture. Nearly every village has a specialty of its own—bricks, pottery (Menschikovo), wheels, toys, packing-boxes, looms and other weaving implements, house furniture, sieves, combs, boots, gloves, felt goods, candles, and so on. The manufacture of linen and cotton in villages, as well as the preparation and manufacture of sheepskins and rough gloves, occupies about 40,000 peasants. The Shuya merchants carry on an active trade in these products all over Russia, and in corn, spirits, salt, and other food stuffs, which are imported to a great extent. In 1880 the imported goods reached 1,613,000 cwts. (1,208,000 by rail), and the exports 1,318,000 cwts., chiefly by the Teza.

SHWE-GYENG, a district of British Burmah, in the Tenasserim division, containing an area of 5567 square miles, and lying in the valley of the Tsit-toung (Sitoung) river. It is bounded on the N. by Tounggnú district, on the E. by the Poung-loung Hills and the Salwín Hill Tracts, on the S. by Amherst district, and on the W. by the Pegu Yoma Hills. The boundaries have more than once been altered, the last change having taken place in 1877. The aspect of the country is mountainous, especially in the north. The Tsit-toung is navigable throughout its entire length in the district by large boats and steam-launches. Shwegyeng has never been accurately surveyed from a geological point of view, but is supposed to be rich in minerals. Gold is found in most of the affluents of the river Shwe-gyeng; copper, lead, tin, and coal also exist, but are not worked. Except in the hills, the climate is generally healthy; the average annual rainfall at Shwe-gyeng station is 144 inches.

In 1881 the population of the district was 171,144 (89,687 males and 81,457 females) of whom Hindus numbered 958, Mohammedans 855, Buddhists 158,149, and Christians 1250. The only town with more than 5000 inhabitants is Shwegyeng, the capital and headquarters of the district, which was founded during the 18th century, before the Burmese conquest, by Alompra. It is situated at the junction of the Shwe-gyeng with the Tsit-toung, and had a population of 7519 in 1881. Only 187 square miles of the district were cultivated in 1883–84; the cultivated area is, however, gradually extending, and there are some 3474 square miles capable of cultivation. The principal crop is rice, of which twenty-five different kinds are grown; other products are cotton, betel-nuts, tobacco, and sugar-cane. The only industries are potteries, salt-making, and silk-spinning. In 1883–84 the total revenue amounted to £36,476 [$177,273.76], of which the land-tax contributed £15,967 [$77,599.62].

SIÁLKOT, or SEALKOTE, a district of British India, in the Amritsar division of the lieutenant-governorship of the Punjab, with an area of 1959 square miles. It lies between 31° 44′ and 32° 50′ N. lat. and 74° 12′ and 75° 3′ E. long., and is bounded on the N.E. by the Jámu state of Kashmir, on the N.W. by the Chénab, on the E. by Gurdáspur, on the S.E. by the Rávi, and on the W. by Lahore and Gujránwála. Siálkot is an oblong tract of country occupying the submontane portion of the Rechna (Rávi Chenáb) Doáb, and is fringed on either side by a line of fresh alluvial soil, above which rise the high banks that form the limits of the river beds. The Degh, which rises in the Jámu Hills, traverses the district parallel to the Rávi, and is likewise fringed by low alluvial soil. The northeastern boundary of Siálkot is 20 miles distant from the outer line of the Himálayas; but about midway between the Rávi and the Chenáb is a high dorsal tract, extending from beyond the border and stretching far into the district. Siálkot is above the average of the Punjab in fertility: three-fourths of its area have already been brought under the plough, and a third of the remainder is reported to be capable of improvement. The upper portion of the district is very productive: but the southern portion, farther removed from the influence of the rains shows a marked decrease of fertility. The district is also watered by numerous small torrents; and several swamps or *jhils*, scattered over the face of the country, are of considerable value as reservoirs of surplus water for purposes of irrigation. Siálkot is reputed to be healthy; it is free from excessive heat, judged by the common standard of the Punjab; and its average annual rainfall is about 37 inches.

The district possesses a total length of 790 miles of road; and a branch line of the Punjab Northern State Railway, from Wazirábád in the northwest corner of the district to Siálkot town (28 miles), was opened in January, 1884. In 1881 the population was 1,012,148 (males 539,661, females 472,487) of whom Mohammedans numbered 669,712, Hindus, 299, 311, Sikhs 40,195, and Christians 1535. The only town of any importance is SIÁLKOT (*q.v.*). The principal agricultural products of the district are wheat, barley, rice, maize, millets, pulses, oil-seeds, sugar-cane, cotton and vegetables. The local commerce centres in the town of Siálkot, which gathers into its bazaars more than half the raw produce of the district. Its surplus stock finds a ready outlet in the markets of Lahore and Amritsar, while the great rivers on either side form natural channels of communication with the lower parts of the Punjab. The native manufactures comprise silk, saddlery, shawl edging, coarse chintzes, pottery, brass vessels, country cloth, cutlery, and paper. The gross revenue of the district in 1883–84 amounted to £145,531 [$707,280.66], of which the land-tax contributed £111,713 [$542,925.18].

The early history of Siálkot is closely interwoven with that of the rest of the Punjab. It was annexed by the British after the Second Sikh War in 1849; since then its area has been considerably reduced, assuming its present proportions in 1867. During the mutiny of 1857 the native troops stationed in the cantonments of Siálkot besieged the European residents in the fort, and remained masters of the whole district; they also plundered the treasury and destroyed all the records.

SIÁLKOT, the capital and administrative headquarters of the above district, is situated in 32° 31′ N.

lat and 74° 36′ E. long., on the northern bank of the Aik torrent. It is an extensive city with handsome and well-built streets, and contains several shrines and buildings of historical interest. In 1881 its population was 39,613.

SIAM.[1] The kingdom of Siam embraces the greater part of the Indo-Chinese and part of the Malay peninsula. On the northwest the river Salwín separates it from Karen-nee, southwards thence the river Toon-gyeen; then, from the Three Pagodas in 18° 15′ N. lat. down to the Pak-chan river in 10° N. lat., the principal watershed separates it from Pegu and Tenasserim. Its seaboard on the Bay of Bengal extends from the Pak-chan river to Wellesley Province in 5° 30′ N. lat.; but the islands along the coast are British. On the other (east) side of the peninsula the territory extends to 4° 35′ N. lat., or, if the vassal state of Pahang is included, to Johore in about 2° 30′ N. lat. On the east side of the Gulf of Siam the frontier line (according to the Siamese authorities; cf. Plate IX.) starts from the Bay of Compong Som in 103° 20′ E. long., and runs north inland to Mount Pang-chak, thence, after crossing Tonle-sap Lake, east across the Me-kong to the crest of the range which separates the Me-kong valley from Anam. It then follows this range north, including the country northeast of Luang Prabang, to the frontiers of Tongking. Thence it runs west-southwest, separating the tributary from the independent or Burmese Shan states, and meets the Salwín in about 20° N. lat.

Plate IX.

Boundaries.

The great natural and economical centre of Siam is the delta of the Me-nam river, which is annually flooded between June and November, the waters attaining their greatest height in August. The inundation covers several thousand square miles, so that the capacity for production of rice, which furnishes two-thirds of the entire exports, is almost unlimited, but is very partially developed both from scarcity of population and want of means of transport, mills, and better cultivation. Irrigation channels are, however, cut above the point where the creeks naturally cease by some of the small Chinese settlers. The bar formed at the mouth of this and of the other converging rivers—the Tachim, the Me-klong, and the Pechaburi on the west, and the Kharayok on the east—extends right across the upper end of the gulf, and has 12 or 13 feet of water at high water. The yearly encroachment of the land on the sea is considerable, and the entire delta from Chein-nat in 15° 20′ N. lat. downwards has probably been formed in comparatively recent times. At Bangkok sea-shells are found 20 feet below the surface. The Tachim, the first great branch of the Me-nam, joins its right bank above Chein-nat; below this the main stream anastomoses naturally or by canals freely, the banks of the different channels being densely peopled. Above Chein-nat the Me-nam continues deep and navigable up to the junction of the Pak-nam Pho, its east branch being formed by several important affluents from the northeast. The west branch of the Me nam is formed mainly by two affluents, the Me-wang and the Me-ping, which flow down through the west Laos states, some of whose chief towns are situated on their banks. In this more elevated region the hill ranges, with a general north-south direction, ramify widely, rising in places to from 6000 to 8000 feet, while the valleys between them widen out into great fertile plains, having the appearance of former lake-basins—a view which coincides with ancient local traditions. On the west frontier the rapid and broken stream of the Toon-gyeen, whose tributary valleys on the Siamese side produce valuable teak and cinnamon, flows from a mass of laterite, south of which the central range consists of granite, with syenite and quartzose rocks. Its spurs (6000 feet high) extending in every direction, of sandstones, Carboniferous limestones, and other Secondary formations, are clothed with sappan and other forest trees, and contain probably gold, besides argentiferous lead, tin, coal, and iron, the latter in nodules of clay oxide and brown hematite. On the west of the Gulf of Siam, as far south as 11° N. lat., is a dry barren region, enclosed between two ranges which intercept the rainfall on either side, but farther south are luxuriant damp forests containing *Hopea* (wood-oil), iron-wood, etc., with occasional clearings for cultivation, and many rivers with wide mouths, but becoming mere streams higher up.

Rivers.

In about 10° 30′ N. lat. the Malay peninsula is narrowed by a river at either side to a width of only 27 miles, and there a survey for a canal has been made; the maximum height of the section is 250 feet, the mean 130; the amount of excavation is estimated at 84 million cubic feet, mostly through hard rock, and the cost at £20,000,000 [$97,200,000]. But the approaches by the river mouths on both sides are intricate and bad. This has latterly been the chief route across the peninsula; but there are other breaks in the range which forms the backbone of the peninsula, and the Buddhist propaganda is said to have crossed by the isthmus of Ligor. Here, however—perhaps, properly speaking, in Junk Ceylon Island—is the real termination of the great range which comes down unbroken from Yun-nan, separating the Salwín and the Me-nam valleys.

Isthmus of Kra.

East from the plain of the Me-nam, and separating it from the Me-kong valley, a plateau rises with very gradual ascent, clothed to a width of from 30 to 50 miles with forest. From its east side several large and partly navigable rivers flow towards the Me-kong through a sandy and for the most part arid plain, with stunted growth of resinous trees and bamboos, brushwood and grass; but on the lower courses of some of these streams are rich irrigated tracts, producing rice, bananas, sugar, maize, and the usual tropical vegetables. The whole region is very unhealthy, especially in the wet season. Travelling would hardly be possible without elephants, of which some are kept in every village. The rocks are mostly calcareous or sandstone, and at the south edge of the plateau corals and recent shells at a slight depth show the former limits of the land. Farther north the mountains of Pechaboun and Lom are rich in magnetic iron ore, argentiferous copper, antimony, and tin. Only the first-named is worked to any extent; and, though by very primitive methods, a large quantity of tools and weapons are manufactured. From the south of the plateau a range sweeps round to the southeast into Cambodia, outliers from which are the two peaks north and east from Chantaboun, the latter noted for its emeralds, topazes, and sapphires. Isolated hills, apparently volcanic, occur, as the sacred Mount Phrabat, to the northeast of Ayuthia, where there are hot springs and a famous footprint of the Buddha, and the conical hills at Pechaburi in the southwest, consisting of lavas, scoriæ, and trachytic rocks, abounding in caverns elaborately fitted as temples.

Eastern Siam.

Tin is extensively distributed, especially throughout the Malay peninsula, where it is worked at Bang-ta-phang in the province of Chumphon, at Chaija and Chaliang, also on the Me-klong, at Kanburi, and at Rapri. Gold is found pretty extensively in Tringanu and Pahang; there are mines at Bang-ta-phang; and it is extracted in the Me-kong valley by washing or with mercury. Most of it is consumed in trinkets and presents given by the king,—gold leaf being imported from China for gilding pagodas, etc. Iron abounds in the east, as at Lom and Muln Prey, antimony at Rapri, lead at Pak-phrek and Suphan, silver in the Me-pik valley. Both the lead and copper ores are often argentiferous.

Minerals.

Much of the natural rainfall in Siam is intercepted by the high lands of the Malacca peninsula and by the mountains on the northwest and north, while the proximity of the Gulf of Siam tempers the heat. The rainfall at Bangkok on an average of ten years is 67.04 inches, of which 50.59 inches fall from May to October in-

Climate.

[1] Compare MALAY PENINSULA, also SHANS, LAOS, and CAMBODIA.

North-West Continuation of Shan States.

Independent Shan States

Siamese Shan States

Karenni

BAY OF BENGAL

GULF OF SIAM

TONG KING

Scale of English Miles 0 50 100 150

For the Southward continuation of the Kingdom of Siam see Plate VI & XV.

Longitude East of Greenwich

clusive.[1] The mean annual temperature is 80.1°, varying from 74.8° in December to 83.4° in April; the lowest recorded absolute minimum was 57° in December, 1866, the highest recorded absolute maximum 97.5° in May, 1867. The northeast mousoon begins to blow early in November, preceded by a mouth of variable weather. It has lost half its force in January, and by March strong south and south-southwest winds have set in, the southwest monsoon blowing then steadily and strongly till September. Thus there are three seasons of four months each,—the hot, rainy, and cold.

Fauna.

As to general features, the fauna of Siam is identical with that of Burmah and of southern China, and is one of the richest in the world. Elephants are very numerons in the south and east, but are not found so far north as in India. They are as intelligent as the Indian, but usually less highly trained White (albino) monkeys are sacred, as are the elephant, an iguana which lives in the house and kills rats and other vermin, and the crow; white ants' nests are respected as resembling pagodas, so that libraries are often kept in tanks to escape the ants' ravages.

Flora.

The flora is very similar in character to that of Burmah and has much in common with the Chinese, the transition to which is almost insensible. The coast region is characterized by mangroves, pandanus, rattans, and similar palms with loug flexible stems, and the middle region by the great rice-fields, the cocoa-nut aud areca palms, and the usual tropical plants of culture. In the temperate uplands of the interior, as about Luang Prabang, Himalayan and Japanese species occur,—oaks, pines, chestnuts, peach aud great apple trees, raspberries, honeysuckle, vines, saxifrages, *Cichoraceæ*, anemoues, aud *Violaceæ;* there are many valuable timber trees,—teak, sappan, eaglewood, wood oil (*Hopea*), and other *Dipterocarpaccæ*, *Cedrelaceæ*, *Pterocarpaceæ*, *Xylia*, iron-wood, and other dye-woods and resinous trees, these last forming in many districts a large proportion of the more open forests, with an undergrowth of bamboo.

Trade.

Numerous caravans of cattle, horses, mules, and porters pass annually from Yun-nan (southwest China) to the northern (Siamese) Shan states, whence many of them proceed *via* Chieng-mai to Moulmain (Maulmain). They bring from China silk goods, tea, opium, and brass wares, and take back raw cotton, deer and rhinoceros horns, ivory, and saltpetre. The northern states, which are a great breeding-ground for cattle and ponies—elephants too are exported into Burmah—send down teak and other produce. The proposed railway from Moulmain *via* Myawaddi to Raheng, and thence to Kiangseu, 190 miles from the Chinese frontier, is intended to stimulate not only the traffic with China but the local resources (see address by Mr. Holt Hallett, C.E., in *London Chamber of Commerce Journal*, 5th May, 1885). The eastern states, comprising nearly half the area and a considerable part of the wealth of the kiugdom, send much produce *via* Korat to Bangkok. They produce chiefly China grass (*Bœhmeria nivea*), sugar, indigo, silk, cardamoms, cotton, tobacco, sisiet (a substitute for betel), beeswax, benzoin, lac, iron, lime, snlphur, salt, coarse pottery, mats, hides, tigers, and bones, horns, aud tusks of elephants, rhinoceroses, and boars European cottons and hardware and Chinese goods penetrate everywhere, the chief entrepôts being Nangkoi in the east and Chieng-mai in the west. The eastern plains produce alteruate crops of rice and salt. The rains dissolve the salt in the soil and wash it down, making cultivation possible. In the dry season the salt comes up again and is swept up from the surface. Much alcohol is distilled and consumed. Vast quantities (6900 to 7900 tons) of dried fish are prepared at Lake Tonle-sap, and at fisheries on the coast.[2] Although silk has been known from remote antiquity, it is produced exclnsively by the Lao communities settled throughout the country,—the chief centres being Korat and Battampong. The export in 1884 was 325 cwts., valued at £19,890 [$96,665.40]; but the best quality hardly reaches the Bangkok market, its natural bright yellow color making it difficult to dye. There is, however, not much of it, the demand for the better kinds being supplied from Cambodia. But for the apathy and indolence of the people the production might be largely increased; the spinning and reeling apparatus too are very primitive, though some beautiful cloths are woven at Chieng-mai. Much of the trade in teak and cattle is worked by Burmese; otherwise almost all the trade of the country is in Chinese hands. In some of the remoter districts barter is resorted to, beeswax, salt, lac, and bars of iron being mediums of exchange; but geuerally silver is used, and sometimes Indian rupees. Civilization increases in the eastern districts as the frontier of China is approached. In 1884 419 vessels cleared from Bangkok with cargoes valued at £27,170 [$132,046.20]; of these 240 (tonnage, 1 1,984) were British. In addition, there were 143 junks (tonnage, 3350) The total value of the exports was £2,262,240 [$10,994,486.40], rice being the principal item, £1,444,200 [$7,018,812]. The imports were valued at £1,044,253 [$5,075,079.30], the chief items being—gray and white shirtings, £161,997 [$787,305.42]; opium (704 chests), £81,410 [$395,652.60]; chowls, *i.e.*, shawls, a cotton cloth from Bombay, £105,264 [$511,583.04]. In 1885 the exports were valued at £1,907,006 [$9,268,049.16], and the imports at £1,380,233 [$6,707,932.38]. The exports being in excess of the imports, the difference is paid in Mexican dollars, which are melted dowu and re-coined,—the silver coinage being the staudard of weight.

Exports and imports.

Coinage and weights.

The money and weights seem to be the same as the Old Cambodian. A copper coinage has replaced the cowries, aud there is also a silver coinage, viz., the fuang = 7½ cents, the salung = 15 cents, the bat or tikal = 60 cents or half a crown, 5 tikals = 3 Mexican dollars. From the tikal upwards these coins are also used as measures of weight. Thus 1 tikal weighs 15 grammes or 231 grains, 4 tikals = 1 tamlung, 20 tamlungs = 1 chang or catty, or two Chinese catties = 3.2 lb. There are a few gold coins, but not in general circulation. Their value is sixteen times their weight in silver.

Taxation.

The land-tax is fixed at ten per cent., the first person who clears land being entitled to hold it. The tax on garden produce and on fruit trees is higher, but is fixed at intervals of some fifteen years, or at the beginning of a reign. There is a *corvée* of four months in the year, to which all classes except the nobles and the priesthood are theoretically liable, but it may be commuted for a poll-tax of from 6 to 18 tikals [$3.60 to $10.80], payable either directly iu money to Government or to the feudal superior, for all except the nobility are thus dependent on a superior; in the provinces it is payable in kind through the governor. A smaller amount, 1½ tikals [90 cts.], is payable by masters for their slaves. But there are some considerate exceptions, viz., persons over sixty or under eighteen years of age, or who have three sons paying the tax, and cases of incurable illness. If a special demand for labor be made there is exemption from poll-tax for that year. The Chinese only pay 4½ tikals [$2.55] trienmally, and Europeans are exempted There is a tax on houses, on amusements (theatricals, dancers, etc.), and on fishing-boats, nets, and other tackle. There is a royalty on tin, and the sale of opium and of alcohol is a Government monopoly, farmed to Chinese. Three per cent is levied by treaty on British and other foreign imports, export duties on a great number of raw articles, aud inland or transit dues on certain tropical products. The revenue from all these sources is estimated at 80,000 catties (£800,000 [$3,888,000]).

Administration

The head of the administration is the king, with five ministers,—viz., of war, foreign affairs, northern provinces, agriculture, justice,—and some thirty councillors. The office known to Europeans as "second king" (Siamese, *wang-na*, lit., "front palace") is difficult to define, as the share taken in government by him depends very much on his individual character He has a palace and an official establishment, and a few soldiers at his orders. The country is divided into forty-one provinces, excluding the Laos and Malay states, and the Cambodian provinces. The provinces are of different grades, and their governors have very different degrees of authority Speaking generally, they have cognizance of all civil cases —though there is an appeal to the capital (which generally reaches its destination, as the governor's council act as spies),—and of minor criminal cases. The graver crimes, as murder aud dacoity, involving a question of life or death committed in Siam proper, are referred to a special department in the capital. Villages are governed by a head-man (*kamnan, amp'hon*, or *nakhon*), sometimes with a small salary, chosen usually in accordauce with the popular wish, and dependent on the provincial capital. The Siamese mandarins in the Lao provinces do not oppress overmuch, nor do the native chiefs, since their power depends on their popularity. Besides the lower grades there are always four principal officials, the *chao*, lord or king, the *uparat, rachavangsa*, and *rachabutr* (the first title of Chinese, the others of Indian origin). These are hereditary in one or two families, any disputed succession being referred to Bangkok. The Siamese law is recognized, but the national "customs" are much regarded, and in ordinary cases followed. Civil and criminal processes alike end usually in a fine. Besides the capitation tax, there is a duty on rice, and each state

[1] But on the neighboring ranges the fall is, at Moulmain 244 inches, at Tavoy 202, at Mergui 185.

[2] During the floods vast quantities of fish swarm into the riee-grounds and are caught when the water recedes, furnishing a valuable and abundant food-supply.

pays tribute to Bangkok. The tie between Bangkok and the Malay states is slighter, being confined usually to interference in cases of disputed succession, and to a triennial tribute of a gold or silver tree or flower. The rules of procedur in Siam are very strict, but theoretically there is no hereditary rank.

Laws.

The laws of Siam are ancient, though not very full or complete, a great part having been lost at the sack of Ayuthia in 1753. Generally speaking, they are referable to an Indian origin especially as regards religious, moral, and ceremonial ordinances; the civil and criminal codes bear the impress of Chinese influence. There are several digests of the law, some centuries old, under systematic headings, *e.g.*, of the civil law, real and personal property, inheritance, ranks, evidence and ordeal, marriage, education, parental authority, slavery, money, weights and measures, contracts, and of the penal code, crimes, punishments, police, prisons. The king is absolute, but claims no absolute rights over the land. Great attention is paid to precedents. Among the peculiarities of the system are the employment of ordeal—by diving or chewing rice, etc.—in the absence of witnesses, and the rejection of the evidence of certain classes, viz., drunkards, gamblers, virgins, executioners, beggars, persons who cannot read, and bad characters. When a crime is committed the family and even the neighbors of the accused can be held responsible for his appearance. The property of intestates goes to the king, of an intestate priest to his monastery; but the neglect of the heir to perform funeral rites renders his claim to property invalid,—a curious relic of Hindu feeling. Another trace of this may be found in the hereditary professions, though their doctrinal significance as castes has disappeared. The laws have many curious and not inequitable provisions about slavery (see below), *e.g.*, if a temporary (debtor) slave has undergone punishment or suffering for his master, his debt shall be remitted wholly or in part; but if he is a slave absolutely, his master is not legally liable. And there are well-defined rules as to non-fulfilment of contract with a slave, his maintenance during famine, injury by accidents, employment as a substitute in war, etc. Slaves who are allowed to become priests or nuns are free.

Army and navy.

All men are liable to serve in war; but only from 4000 to 5000, taken from classes specially at the disposal of the war department, are regularly trained under European officers. The capital and surrounding forts are garrisoned, and there is a body of palace guards. The fleet consists of some twenty men-of-war and armed steamers and 500 junks.

Population.

The population is estimated by the Siamese Government at 6,000,000 for Siam proper, 3,000,000 Siamese Laos, and 1,000,000 Malays; others estimate it variously at from 6,000,000 to 8,000,000. There are besides perhaps from 1,500,000 to 2,000,000 Chinese. In lower Siam the population is clustered along the rivers and canals; in the diversified hill and plain country to the north it is distributed more generally. In character the Siamese are mild, patient, and submissive to authority. They are hospitable to strangers and to the poor; quarrels, violent crimes, and suicide are rare. But they are idle and apathetic; much time is devoted to amusements, as festivals and processions, boat-races, games, cock and dog fighting, and even combats between fish. The position of women is good, although girls can be sold as wives. The Chinese population are energetic and industrious, but very independent, and sometimes give trouble, so that their increasing numbers and organization through their secret societies are a source of anxiety. The Siamese are of medium height, well formed, with olive complexion, darker than Chinese, but fairer and handsomer than Malays, eyes well shaped, nose slightly flattened, lips a little prominent, the face wide across the cheek bones, top of forehead pointed and chin short, thus giving the face a lozenge shape, beard scanty and with hairs pulled out, hair of head coarse and black. But intermarriage during many ages with Peguans, Laos, and Cambodians (though in many cases they and their descendants keep themselves apart), as well as of slaves from the aboriginal races, has produced much variety of type. Besides the Karens, who are the remnant of a more widely extended people, and who are found on the borders of Siam and Burmah and throughout the mountains of north and west Siam, the Lawas in the same region, and the Khongs, a settled people inland from the northeastern angle of the Gulf of Siam, many other tribes of the earlier inhabitants are found occupying the whole of the forest region on both sides of the Me-kong, and known to their different neighbors by various names, all probably meaning simply "man," or "savage," as Kha, Moi, Pnom, Lolo. These eastern tribes more or less resemble each other. They are shy and timid, some having no chiefs or social organization, and these are preyed on or hunted down as slaves by their more civilized fellows in combination with the Laos. One divison of these tribes, the Kouis (the name recalls the savage "Gueos" of the Portuguese), amalgamates readily with the Laos and in some provinces forms the bulk of the population. They live by cultivating rice, by collecting honey, beeswax, and resin, or by the chase. Their women are absolutely free before marriage, but adultery is punished with death. They worship ancestral and other spirits and can hardly be called Buddhists. Yet with a few exceptions these earlier peoples are by no means inferior in appearance to the Thai or Siamese, but often the contrary; some ethnologists assign them a Caucasian origin, and identify them with the brown Polynesian race.

Slavery.

Slavery is general, but consists mainly of bondage for debt, a debtor being able to sell himself, wife, or children, or nephews or nieces,—their freedom being recoverable on payment of the debt. But the present enlightened ruler has set his face against the practice, and decreed its abolition, except in the Laos provinces and in the eastern states. The market is further recruited, first by the sale of offenders, who have the option between death and slavery, and secondly by slave-hunting raids, made in combination with the Anamites, on the villages of the wilder aborigines. These are disposed of on the spot or else to dealers from Cambodia or Siam proper.

Towns.

Bangkok (*q.v.*) was established as the capital in 1782 after the sack of Ayuthia by the Burmese. Its population was estimated at about 300,000 in 1886. Ayuthia, now called Krung-krao, the famous capital founded in 1351 and half destroyed by the Burmese in 1767, was a generation ago the second city of the kingdom. It is still important as the entrepôt of the trade of south Laos. Many junks and fishermen come up from Bangkok. The modern town is chiefly on the water. In its most prosperous days in the 16th century it was three leagues in circumference, and contained distinct quarters for foreigners of different nationalities—Chinese, Peguans, Malays, Malabars, Japanese, and Portuguese. Prominent among its great buildings is the pyramidal structure called the Golden Mount, some 400 feet high, surmounted by a dome and spire; but most of them are now crumbling away into great broken masses of sculptured masonry, statues, and spires, half buried under the vegetation of the tropics. Chantaburi, near the Cambodian frontier, the second port of the kingdom, is noted for its shipbuilding and fisheries, and has an active export trade from the southeastern provinces. There are considerable Chinese and Burmese elements in the population, which in many of these southern towns is much mixed. Paknam, the port of Bangkok, 3 miles from the river's mouth, is fortified, as is Paklat Lang, 5 miles higher up, which is inhabited chiefly by Peguans. Various canals extend hence across the delta towards the Me-klong. Near its mouth is the town of Me-klong, peopled by Chinese merchants, fishermen, and gardeners. Higher up the river, at the foot of the hills, is Prapri, peopled by descendants of Cambodian captives. Peehaburi, a little to the south, at the foot of a range some 1500 feet high, where the king has a palace, is built after English designs; its inhabitants are Peguans. Petriu, on the east side of the Gulf of Siam, on the Kharayok river, has sugar plantations cultivated by Chinese. At Bangplasoi, at the mouth of the river, are extensive fisheries. Raheng, some 300 miles up the Me-nam, possesses docks, and there a good many teak ships are built. In the Lao or Shan country to the north Chieng-mai (Zimmé) is the most important tributary state. Its capital, Chieng-mai, the Jangomai of early European travellers, is the principal town of that region, with broad streets of good teak-built houses, surrounded with gardens, numerous pagodas, markets, and a large population. It lies in the wide fertile valley of the Me-ping, and is a great entrepôt of trade from Bangkok and southwest China (Yun-uan and Ssmao), which finds its natural outlet thence to the Bay of Bengal. The rice, timber, etc., of the districts through which this route passes are considerable. Lapong, in the same valley, and Lagong, on a neighboring tributary, are Lao towns of less importance and subordinate to Chieng-mai, as were formerly Nan and Pre, fertile teak-producing valleys to the east. Kiang-hai and Kiang-sen, farther north, on the Me-kong, were old Lao capitals of note (see Shans), as was Luang Prabang, with its charming capital, which, like Chieng-mai, still retains some administrative independence. The extensive fertile and partly wooded plains to the north and east support great herds of cattle. With Vien-chang, a little lower down the river, Luang Prabang held its own for centuries against both Siam and Burmah. On the destruction of Vien-chang in 1828, Nangkoi, 25 miles lower down, increased in size and importance, and now has an extensive trade in English and Chinese goods. This district might perhaps without much difficulty be opened up by an easy route starting from Lak-

hon, only 130 miles distant from the sea. One of the most important provincial centres is the district of Korat, on the eastern plateau. The country is a series of fertile oases separated by tracts of waterless forest, containing good timber, and full of game. The town is fortified, and has about thirty pagodas and some well-built houses, belonging chiefly to the Chinese merchants. Cart roads converge hither with the traffic both of north Laos and of the Cambodian provinces south and east, the latter passing up the fertile Moun valley on its way to Bangkok. The whole region between the Dang-rek Mountains and the Moun river is full of splendid ruins, attesting the former Cambodian influence as far at least as 16° north, to which limit, therefore, the southward movement of the Laos may be supposed to have reached at the date of these buildings. The principal ruins of the district are found at Korat, Bassac, Phimai, and Kukhau. The character of this wonderful series of buildings, the greatest of which, those of Angkor, are on Siamese territory, have been touched on under CAMBODIA (*q.v.*), to which they properly belong; but it may be mentioned here that the earliest inscription yet found, relating to the erection of a Sivaite linga, is interpreted as belonging to 589 saka = 667 A.D., though another, undated, refers to three generations earlier. The earliest references indisputably Buddhist that have been found are three centuries later than this.

Education.

With the exception of a few schools in the capital, education is entirely in the hands of the priests, the boys going to the temples between the ages of eight or nine and thirteen. The teaching is elementary, and, by the precepts of Buddhism, must be gratuitous, the pupils repaying it by menial services in house or boat or garden, or by presents of food. At thirteen the boy enters on a novitiate, which lasts till the age of twenty-one; but, if not inclined for study, he may give it up after three or four months,—this temporary consecration symbolizing a separation from the world. At twenty-one, if so disposed, he may enter the priesthood; but there are no perpetual vows. Girls are taught, if at all, only at home, by parents or brothers. There are no educational endowments: but a certain number of persons occupy themselves with literary studies, as history, astrology, or alchemy, with which medicine is more or less combined. Medical practice, indeed, comprises a good deal of magic; but there is also considerable knowledge of medicinal herbs, and ancient medical works were written in Pali. Inoculation was long ago introduced by the Chinese, and vaccination lately by European missionaries. Women after childbirth are exposed for some time to the heat of a strong fire, the result being sometimes fatal.

Arts.

Skill is shown in the casting of large metal statues 50 feet high or more, in *repoussé* work in gold and silver, in enamelling on metals, and in gold and silver tissue work. Their drawing is spirited, but strictly conventional. The system of music is elaborate, but with no written notation. There is no harmony, but all the instruments of the orchestra play in unison, breaking off into variations and then returning to the air. They are proud of their national music, and both men and women play and sing generally. Their instruments are—a harmonicon with wooden or metal bars struck with a hammer, a two-stringed and a three-stringed violin, flutes, drums, and pipes, also the Lao "organ," the tones of which, produced by metal tongues in the pipes, are very effective.

Religion.

The Buddhism of Siam is the same as that of Ceylon, with slight doctrinal differences, much insisted on, from the Burmese. It is, however, professed in its purity by very few. The religions reform initiated by King Phra Mongkut, himself for many years a priest, has divided the people of the capital into two sects,—the reformed, known as Dhammayut, and the older or unreformed, Phra Maha Nikai. The former attach more weight to the observance of the canon than to meditation. The other sect is again divided into two parties, the one holding more to meditation, the other to the study of the scriptures. The only Brahmanical temple remaining in the country is at Bangkok, and its priests are said to be of Indian descent. Brahmans, however, are constantly employed in divination, in fixing the fortunate days for warlike expeditions, business transactions, marriages, and the like, and in arranging festivals. Buddhism is corrupted by a general worship or propitiation of nats or phees (spirits or demons); superstition in the more remote districts constitutes practically the only religion. The belief in these spirits informs and affects every department of life. There are local earth divinities to whom temples or shrines are erected. Others with human or animal form dwell in the water. Others cause children to sicken and die. Others wander and deceive as *ignes fatui*. By certain spells men can become tigers or were-wolves. Bodies of the dead are sometimes possessed, and they are carried out not by the door, but by an extemporized opening, so that they may not be able to find their way back. The numerous offerings and honors paid to these spirits lead to drunkenness and to killing of animals in sacrifice. Phallic worship prevails to a considerable extent, notwithstanding the efforts of the king to put it down. A female incarnation of deity, the Nang Tim, is found in one or two villages of east Laos. Pilgrimages are frequently made to sacred places with Indian names (all the chief towns, indeed, have an official Indian name). Many of the figures and designs employed in the ornamentation of houses are really talismans intended to avert evil. The temples, with their surrounding monastic establishments, form a conspicuous feature everywhere. Some are very extensive, covering altogether an area of 100 or 150 acres. New temples are often built, or the priests' quarters in the existing buildings repaired, by rich men desirous of "acquiring merit." The temples (*wats*) hold very little landed or house property; but, where they have been built or repaired by the king, or presented to him by some high official, they enjoy a small income chargeable on the revenues of the district, besides receiving presents from the king when he visits them in state. The priests of such temples are bound in return to give their services at state ceremonies, and their secular affairs, including repairs of temples and disciplinary matters, are administered by a special department of state. There remain now at Bangkok only two communities of nuns, who are employed in the service of the temples, and are allowed to receive voluntary offerings.

Festivals.

The numerous public festivals are partly connected with religion, but are accompanied with much rejoicing and amusement. Among them are the lunar and the fixed New-Year's Day, and the festival of agriculture, when the plough is guided by the minister, the ladies of the court following and sowing seeds, which are picked up by the people to add to their usual sowings. At the ceremony at which the king and his ministers pledge themselves, the former to administer impartial justice, the latter to be faithful and loyal in their service, the oath is taken by drinking water, and the meeting of the king and nobles, with all the attendant paraphernalia, forms a gorgeous spectacle, the day terminating with fireworks and processions of boats. On the king's state visits to the *wats* there are festive processions of boats and troops. Other festivals are at the beginning and end of the rainy season. When the floods begin to subside there is a great water procession, and the priests command the waters to retire. Even the cutting of the king's hair is made an occasion for rejoicing. In every family the cutting, at the age of twelve or thirteen, of the tuft left on the top of the head is a great ceremony; it is not practiced, except by way of imitation, among the Laos. The head is considered very sacred (this is a characteristic Papuan notion); no one must touch it, nor may it be raised above that of a superior, as in a carriage or boat. The funeral ceremonies of a prince or great man, often delayed for some months after death, are also attended by elaborate feasting, dancing, and other amusements in temporary buildings erected for the purpose. The dead, with the exception of the poor, whose bodies are given to the vultures and wild beasts, and women who die in childbirth, are usually burned within the *wats*, the ashes being preserved, or mixed with lime to plaster the sacred walls. A rich man will often bequeath a limb to the birds and beasts.

Calendar.

The Siamese month is lunar, and, as a lunar month contains 29½ days, they give the odd months 29 and the even 30. This gives a year of 354 days, and to make up the deficiency they intercalate seven or eight months in nineteen years, and add besides an occasional day to the seventh month. The years are denoted by a cycle of twelve names (of animals) taken in decades, so that every sixtieth year the year of a given name returns to the same place in the decade. The system resembles the Indian cycle of sixty years, but it is derived from China, where it dates from 2637 B.C. Two eras are in use, the Putta Sakarat or Buddhist, used in religious matters, which commences 543 B.C., and the civil era or Chula Sakarat (*i.e.*, little era), said to commemorate the establishment of Buddhism in 638 A.D. The ancient Aryan inscriptions usually employ the Saka (Salivahana) era, dating from 79 A.D.

History.

History.—The name "Siam" has been usually derived from a Malay word, *sajam*, "brown;" but this is mere conjecture. They and the Shans both call themselves Thai (Shan *Tai*), *i.e.*, "free," and the Peguans call them Shan or Shian, which seems to be a translation of "Thai" and an allied word, as are perhaps Ahom = Assam, and Sam (Assamese for Shan). The obsolete Siamese word is Siem and the Chinese Sien-lo,—the Sien being, according to them, a tribe which came from the north about 1341 and united with the Lohoh, who had previously occupied the shores of the gulf, and were prob-

ably Shans. The Siamese call the Shans *Thai-nyai*, "Great Thai," perhaps as having preceded them, and themselves *Thai-noi* or "Little Thai." They are probably therefore closely related, though this is disputed by De Rosny and others; but the inferior physique of the Siamese may be explained as due to intercourse with Malays and other southern races and to their more enervating climate. Meauwhile for many centuries before the southward move above referred to the entire south as well as southeast of the Indo-Chinese peninsula was Cambodian. The town of Lapong is said to have been founded in 575, and the half-mythical king, Phra Ruang, to have freed the Siamese from the Cambodian yoke and founded Sangkalok, on the upper waters of the Me-nam, in the following century. Buddhism is said to have been introduced in his time, but Indian influences had penetrated the country both from the north and from the south long before this. Other Lao towns were built about the 7th century, and during the following centuries this branch of the race gradually advanced southwards, driving the Karens, Lawas, and other tribes into the hills, and encroaching on what had hitherto been Cambodian territory Their southward progress may indeed almost be traced by their successive capitals, several of which are clustered on the Me-nam within a short distance of each other, viz., Phitsalok, Sukkothai, and Sangkalok on the easteru branch, Nakhon Savan at the junction, aud Kamphoug-pet, the immediate precursor of Ayuthia, on the western branch. A Sukkothai inscription of about 1284 states that the dominions of King Rama Kamheng extended across the country from the Me-kong to Pechaburi, and thence down the Gulf of Siam to Ligor; and the Malay annals say that the Siamese had penetrated to the extremity of the peninsula before the first Malay colony from Menangkabu founded Singapore, *i.e.*, about 1160. The ancestors of the Siamese were then on the western branch of the Me-nam, and in 1351, under the famous Phaya Uthong (afterwards styled Phra Rama Thibodi, and probably of a Shan family) moved down from Kamphong-pet, where they had been for five geuerations, to Chaliang; and, being driven thence, it is said, by a pestilence, they established themselves at Ayuthia. This king's sway extended to Moulmain, Tavoy, Tenasserim, and the whole Malacca peninsula (where among the traders from the West Siam was known as Sornau, *i.e.*, Shahr-i-nau or Newtown, probably in allusion to Ayuthia,—Yule's *Marco Polo*, ii. 260), aud was felt even in Java. This is corroborated by Javan records, which described a "Cambodian" invasion about 1340, but Cambodia was itself invaded about this time by the Siamese, who took Angkor and held it for a time, carrying off 90,000 captives. The great southward expansion here recorded, whether of one or of two allied Thai tribes, confirms in a remarkable way the Chinese statement above mentioned, and was probably a consequence or a part of the great contemporaneous activity of the more northern Shan kingdom of Mau. The wars with Cambodia continued with varying success for some 400 years, but Cambodia gradually lost ground and was finally shorn of several provinces, her sovereign falling entirely under Siamese influence. This, however, latterly became displeasing to the French, now in Cochin China, and Siam has been obliged to recognize the protectorate forced on Cambodia by that power. Vigorous attacks were also made during this period on the Lao states to the northwest and northeast, followed by vast deportation of the people, and Siamese supremacy was pretty firmly established in Chiengmai aud its dependencies by the end of the 18th century, and over the great eastern capitals, Luang Prabang and Vien-chang, about 1828. During the 15th and 16th centuries Siam was frequently invaded by the Burmese and Peguans, who, attracted probably by the great wealth of Ayuthia, besieged it more thau once without success, the defenders being aided by Portuguese mercenaries, till about 1555, when the city was taken and Siam reduced to dependence. From this condition, however, it was raised a few years later by the great conqueror and national hero Phra Naret, who after subduing Laos and Cambodia invaded Pegu, which was utterly overthrown in the next century by his successors. But after the civil wars of the 18th century the Burmese, having previously taken Chiengmai, which appealed to Siam for help, entered Tenasserim and took Mergui and Tavoy in 1764, and then advancing simultaneously from the north and the west captured and destroyed Ayuthia after a two years' siege (1767).

The intercourse between France and Siam began about 1580 uuder Phra Narain, who by the advice of his minister, the Cephalonian adventurer Constantine Phaulcon, sent an embassy to Louis XIV. When the return missiou arrived, the eagerness of the ambassador for the king's conversion to Christianity, added to the intrigues of Phaulcon with the Jesuits with the supposed intention of establishing a French supremacy, led to the death of Phaulcon, the persecution of the Christians, and the cessation of all intercourse with France. An interesting episode was the active intercourse, chiefly commercial, between the Siamese and Japanese Governments from 1592 to 1632. Many Japanese settled in Siam, where they were much employed They were dreaded as soldiers, aud as individuals commanded a position resembling that of Europeaus in most Eastern countries. The jealousy of their increasing influence at last led to a massacre, and to the expulsion or absorption of the survivors. Japan was soon after this, in 1636, closed to foreigners; but trade with Siam was carried on at all events down to 1745 through Dutch and Chiuese and occasional English traders. In 1752 an embassy came from Ceylon, desiring to renew the ancient friendship and to discuss religious matters. During recent agitations of the Buddhist priests against Christianity iu Ceylon they received much active sympathy from Siam. After the fall of Ayuthia a great general, Phaya Takh Sin, collected the remains of the army and restored the fortunes of the kingdom, establishing his capital at Baugkok; but, becoming insane, he was put to death, and was succeeded by another successful general, Phaya Chakkri, who founded the present dynasty. Uuder him Tenasserim was invaded and Tavoy held for the last time by the Siamese in 1792, though in 1825, taking advantage of the Burmese difficulty with England, they bombarded some of the towns on that coast. The supremacy of Chiua is indicated by occasional missions sent, as on the founding of a new dynasty, to Peking, to bring back a seal and calcudar. But the Siamese now repudiate this supremacy, and have sent neither mission nor tribute for thirty years, and yet their trading vessels are admitted to the Chinese free ports, like those of any other friendly power. The late sovereigu Phra Paramendr Maha Mongkut, was a very accomplished man, an enlightened reformer, and devoted to science; his death indeed was caused by fatigue and exposure while observing an eclipse. Mauy of his predecessors, too, were men of different fibre from the ordinary Oriental sovereign. Chao Dua, the adversary of Phaulcon, went about seeking pugilistic encounters. He is reported to have been a cruel tyrant and debauchee and a keen sportsman; but the offence given to his subjects in the latter character and the evil reports of the persecuted French missionaries may have unduly blackened his reputation.

Of European nations the Portuguese first established intercourse with Siam. This was in 1511, after the conquest of Malacca by D'Albuquerque, and the intimacy lasted over a century, the tradition of their greatness having hardly yet died out. They were supplanted gradually in the 17th century by the Dutch, whose intercourse also lasted for a similar period; but they have left no traces of their presence as the Portuguese always did in these countries to a greater extent than any other people. English traders were in Siam very early in the 17th century; there was a friendly interchange of letters between James I. and the king of Siam, who had some Englishmen in his service, and, when the ships visited "Sia" (which was "as great a city as London") or the queen of Patani, they were hospitably received and accorded privileges,—the important items of export being, as now, tin, varnish, deerskins, and "precious drugs." Later on the East India Company's servants, jealous at the employment of Englishmen not in their service, attacked the Siamese, which led to a massacre of the English at Merqui in 1687; and the factory at Ayuthia was abandoned iu 1688. A similar attack is said to have been made in 1719 by the governor of Madras. After this the trade was neglected. Penang, a dependency of Quedah, was occupied in 1786, and in the 19th century the stagnation of trade led to the missions of Crawford (1822), Burney (1826), and Sir J. Brooke (1850); but they were not very cordially received, and effected little. Sir J. Bowring's treaty in 1856, however, put matters on a different footing, and Europeans can now reside in Siam, buy or rent houses, and lease land. The export and import duties are also fixed, and there is a vice-consular court at Chiengmai, with appeal to the consular court at Bangkok, held from time to time by a judge from Singapore, with which place there are extradition arrangements. Of late years the northeastern provinces have been harassed by invasions of the Lu and Ho, people of Chinese extraction, their incursions extending down the Me-kong as far as Nang-koi.

Besides works referred to at the end of article SHANS, the chief authorities are La Loubère, *Description du Royaume de Siam*, 1714 (the best of the old writers); Pallegoix, *Royaume Thai ou Siam*, Paris, 1854; Crawford, *Embassy to Siam;* Bowring, *The Kingdom and People of Siam*, London, 1857; Bastian, *Die Völker des östlichen Asiens*, vols. i., iii., Leipsic, 1867; Garnier, *Voyage d'Exploration en Indo-Chine*, Paris, 1873: Mouhot, *Travels in Indo-China*, etc.; *Journ. of Ind. Archip.*, vols. i., v.; Gréhan, *Le Royaume de Siam*, Paris, 1870; Réclus, *Nouvelle Géographie Universelle*, vol. viii.; Bagge, *Rä*

port on the Settlement of the Boundary between Siam and British Burmah, 1868; Satow; *Notes of the Intercourse between Japan and Siam in the 17th Century;* Aymonnier, in *Excursions et Reconnaissances*, Nos. 20-22 (Saigon); *Consular Reports*, 1884-85. (C. T.)

Language and Literature.

The Siamese language is spoken over the whole of Siam proper. In the Malay peninsula the boundary-line comes down on the west coast nearly as far as Quedah and Perlis, and includes also Junk Ceylon, while on the east coast the population is mainly Siamese as far as Ligor inclusive, and also in Singora Siamese appears to be the ruling language. Its boundary towards Burmah, the Shan and Laos states, and Anam and Cambodia cannot be defined so precisely. There are also in the northeast a number of wild tribes who speak languages of their own. The name by which the Siamese themselves call their language is *phâsâ thai*, or "language of the freemen;" and it probably dates from the period when the Siamese made themselves independent of Cambodian rule in the 12th century. The Shan tribes, whose language (with those of the Ahom, Khamti, and Laos) is closely akin to Siamese, also use the term *tai* (only with the unaspirated *t*) for their race and language. Language.

Both in Shan and Siamese the system of tones, which is one of the main features of all the languages of Indo-China, has attained its greatest development. But while in Shan the tones are not marked in the written language, in Siamese there are distinct signs to denote at least four of the five simple tones (the even tone not being marked), and there is further a classification of the consonants into three groups, in each of which certain tones predominate. It is always the initial consonant of a word that indicates, either by its phonetic power or by the tonic accent superadded or by a combination of the two, the tone in which the word is to be uttered, so that, *e.g.*, a word beginning with a letter of the second class in which the even tone is inherent, and which has the mark of the ascending tone over it, is to be pronounced with the descending tone.[1] The difficulties caused to a European student of the spoken language by the tones are increased by the greatly expanded vowel-system. In addition to the short and long, there are shortest vowels, sets of open and close vowels, etc., and a large number of vowel combinations. Owing to the introduction of the Indian cousonantal system and the incorporation in it of many letters to express certain sounds peculiar to Siamese, the number of cousonants has been swelled to forty-three; but, while many of these are only used in words adopted from the Sanskrit and Pali, Siamese utterance knows no more than twenty; *kh*, *g*, *gh* are all pronounced as *kh*, similarly *ph*, *b*, *bh* as *ph*, etc.,—the language having a predilection for hard letters, especially aspirates. The only compound letters at the beginning of words are combinations of hard letters with *l*, *r*, *w*, *y*, while the finals are confined in pronunciation to *k*, *t*, *p*, *ṅ* (ng), *n*, *m*. This causes a considerable discrepancy between the spelling of words (especially loan words) and their pronunciation. Thus *sampûrn* is pronounced *sombun*, *bhâshâ—phâsá*, *nagara—nakhon*, *saddharma—satham*, *kuśala—kuson*, *śesha—set*, *vâra—van*, *Magadha—Makhot*. The foreign ingredients in Siamese are principally Sanskrit, mostly in a corrupted form. The importation of Pali words dates from about the 12th century, when, the country having shaken off the yoke of Cambodia, a religious intercourse was established between Siam and Ceylon. Besides these, there are some Khmêr (Cambodian) and Malay words.[2] Exclusive of those foreign importations, Siamese is a monosyllabic language in which neither the form nor the accent or tone of a word determines the part of speech to which it belongs. Homonymous words abound and are only distinguished from one another by the tones. Compare *lan*, "white"; *lân*, "to relate"; *lạn*, "to flatter"; *lán*, "to smooth"; *lăn*, "relation." Words are unchangeable and incapable of inflection. The Siamese are fond of joining two words the second of which is either purely synonymous to or modifies the sense of the first, or is only a jingling addition. There is no article, and no distinction of gender, number, or case. These, if it is at all necessary to denote them, are expressed by explanatory words after the respective nouns; only the dative and ablative are denoted by subsidiary words, which precede the nouns, the nominative being marked by its position before, the objective by its position after, the verb, and the genitive (and also the adjective) by its place after the noun it qualifies. Occasionally, however, auxiliary nouns serve that purpose. Words like "mother," "son," "water" are often employed in forming compounds to express ideas for which the Siamese have no single words; *e.g.*, *lúk câñ*, "the son of hire," a laborer; *mê mü*, "the mother of the hand," the thumb. The use of class words with numerals obtains in Siamese as it does in Chinese, Burmese, Anamese, Malay, and many other Eastern languages. As in these, so in Siamese the personal pronouns are mostly represented by nouns expressive of the various shades of superior or lower rank according to Eastern etiquette. The verb is, like the noun, perfectly colorless,—person, number, tense, and mood being indicated by auxiliary words only when they cannot be inferred from the context. Such auxiliary words are *yû*, "to be," "to dwell" (present); *dai*, "to have," *lêñ*, "end" (past); *că*, "also" (future); the first and third follow, the second and fourth precede, the verb *Hài*, "to give" (prefixed), often indicates the subjunctive. As there are compound nouns, so there are compound verbs; thus, *e. g.*, *pai*, "to go," is joined to a transitive verb to convert it into an intransitive or neuter; and *thûk*, "to touch," and *tòng*, "to be obliged," serve to form a sort of passive voice.[3] The number of adverbs, single and compound, is very large. The prepositions mostly consist of nouns. The order of the words in a single sentence is subject, verb, object. All attributes (adjectives, genitive, adverbs) follow the word to which they are subordinated. The following simple sentence may serve as an example of Siamese construction and diction; *mûa* (time) *ăn* (read) *nañsü* (book) *ní* (this); *lêo* (end, done (*coń* (should) *fâk-vai* (entrust) *kî* (to) *phüenbàn* (neighbors) *hai* (give cause) *khan* (they) *ăn* (read), *i. e.*, "when you have read this book, please give it to your neighbors that they may read it."

The current Siamese characters are derived from the more monumental Cambodian alphabet, which again owes its origin to the alphabet of the inscriptions, an offshoot of the character found on the stone monuments of Southern India in the 6th and 8th centuries. The sacred books of Siam are still written in the Cambodian character, and some have occasionally an interlinear translation in the current Siamese hand.

The study of the Siamese language was initiated in Europe by La Loubère (1687), from whom Dr. J. Leyden (the Languages and Literature of the Indo-Chinese Nations," in *Asiatic Researches*, vol. x. pp. 158-289, reprinted in *Miscellaneous Papers on Indo-China*, vol. i., 1886, pp. (84-171) has derived much of his information. Leyden's *Comparative Vocabulary of the Barma, Malayu, and Thai Languages* appeared in 1810. The first grammar of the language we owe to James Low, Calcutta, 1828. Very useful *Grammatical Notices of the Siamese Language*, by the Rev. J. Taylor Jones, appeared at Bangkok in 1842. The *Grammatica Linguæ Thai* of J. B. Pallegoix, Bangkok, 1850, was followed in 1854 by his great *Dictionarium* in Siamese, Latin, French, and English. An analytical account of the language was attempted by Ad. Bastian in his *Sprachvergleichende Studien*, 1870, pp. 191-226. In 1881 L. Ewald brought out at Leipsic his *Grammatik der T'ai-oder Siamesischen Sprache*. Lastly, Prof. Fr. Müller gave a summary of Siamese grammar in his *Grundriss der Sprachwissenschaft*, vol. ii. part 2; Vienna, 1882, pp. 367-376. A new grammar, by the Rev. S. George, is in progress. Compare also W. Schott, *Ueber die indochinesischen Sprachen, insonderheit das Siamesische*, 1856; and E. Kuhn, *Ueber Herkunft und Sprache der transgangetischen Völker*, 1883. An English grammar written in Siamese, and designed for use in schools, appeared at Bangkok in 1837

There are no records in Siamese referring to the time antecedent to the settlement of the nation in their present locality, or, in the words of Mr. Ney Elias, "of earlier date than the founding of their first national capital, Ayuthia, at the commencement of the 14th century."[4] The inscription at Sukkothai, said to be of the year 671 of the Siamese era, nine years after the invention of the present Siamese characters,[5] cannot be put in evidence as an historical record till a facsimile and revised translation shall have been obtained. The few manuscript annals mentioned by Bishop Pallegoix have not yet been critically examined; but metrical compositions, containing legendary tales and romances, abound and are eagerly studied. The subjects are mostly taken from the Indian epics, as in the case of the *Râma-kiun* or Rámáyaṇa, more rarely from Malay or Javanese legend, such as the drama *I-hnao*. There is a great variety of metres, all of which have been described with much minuteness of detail by Colonel Low in his article on Siamese literature, in *Asiatic Researches*, vol. xx. pp. 351-373.[6] In their romantic poetry the Siamese have a greater tendency to describe than to relate, their pictures of places and scenery are grand and striking and form the best part of their poetical conceptions. The great blemish of their poetry consists in tedious embellishments and a hankering after Literature.

[1] See A. Bastian, "Ueber die siamesischen Laut-und Ton-Accente," in *Monatsber. d. k. Akad. d. Wissensch. zu Berlin*, June, 1867.

[2] See Pallegoix, *Gramm.*, pp. 155-156, and van der Tunk, *Bataksch Leesboek*, vol. iv. pp. 127-133, 208-214.

[3] See "The Passive Verb of the Thai Language," by F. L. W. von Bergen, Krung Theph Maha Nakhon, 1874.

[4] *Sketch of the History of the Shans*, Calcutta, 1876, p. 34.

[5] Bastian, in *Jour. As. Soc. Bengal*, vol. xxxiv. p. 27, and *Sprachvergleichende Studien*, p. 227.

[6] See also Pallegoix, *Gramm. Linguæ Thai*, pp. 120-129.

indecent and often gross allusions, from which but few works, such as *Sang Sin Chai*, and *Samut Niyai Si Muang*, may be said to be free. The titles of the principal romances are *Hoi Sang*, *Nang Prathom*, *Sang Sin Chai*, *Thepha Lin Thong*, *Suwanna Hong*, *Thao Sawatthi Racha*, *Phra Unarut*, *Dara Suriwong*, *Khun Phan*, *Nong Sip Song*, and the dramas *I-hnao* and *Phra Simuang*. The plots of some of these have been given by Colonel Low. The most popular of the religious books, all of which are translations or amplifications from Pali originals, is called *Somanakhodom* (Çramana Gantama), which is identical with the *Wessantara Jâtaka*. In miscellaneous literature may be mentioned *Suphâsit*, consisting of 222 elegant sayings in the accented metre called Klong, and *Wuta Chindamani* (Vritta Chintâmaṇi), a work on prosody like the Pali *Vuttodaya*, but treating also of a number of grammatical questions. The fable literature is of course largely represented; the lists, however, are frequently swelled by the enumeration of single fables which are but parts of larger collections.

The number of works on law is considerable; and it is remarkable that, while in Burmah many Pali codes have currency, not a single Pali text-book on law should have been discovered in Siam; all that we meet with in the law books are a few Pali quotations here and there. *Laksana Phra Thammasat Laksana Phua Mia*, an introduction to the code of Siamese laws, founded on the Dharmaçâstra and on royal edicts, was completed in 1804. It contains thirty books, at the head of which stands the *Phra Thammasat*, attributed to Manosâra or Manu, a treatise on the classification of laws. Next comes the *Inthaphat*, or book of Indra, a guide or exhortation to councillors and judges, and then the *Phra Thamnun*, or rules for the general conduct of judicial business. Then follow in order the undermentioned sections—disputes, plaints and allegations, official rank, classification of people, debt, marriage, criminal law, abduction, slavery, disputes connected with land, evidence, inheritance, examining officers, appeal, disputes as to classification of people, radius of responsibility for burglaries, etc., the thirty-six laws, the royal edicts, trial by ordeal of water and fire, laws of the palace, laws of the priesthood, offences against the king, offences against the people, rebellion, ancient statutes, recent statutes. Only one of these sections, the one on slavery, has been translated into English, by Dr. Bradley; it appeared in the *Bangkok Calendar*. The whole work has been printed at Bangkok in two volumes. The *Kathu Phra Aiyakan*, another compendium of laws, contains edicts principally referring to assaults, adultery, and the appraisement of fines. Among these we find the following: "A man who strikes another with a blank book shall be fined as though he had struck him with his hand; but if the assault is committed with a book of the classics the offender shall be fined twice as much as he would have had to pay for assaulting with a stick." The *Laksana Tat Fong*, or law of plaints and allegations, and of the institution and summary dismissal of suits, appears to be identical with the fifth section of the printed code. There is also a separate work called *Phra Thamnun*, which, though identical in name with the section of the *Laksana Phra Thammasat* above described, covers much more ground. A compendium of law entitled *Rüang Kot Mai Müang Thai*, or Code of Laws of the Kingdom of Siam, in two volumes, was printed at Bangkok in 1879. Colonel Low, who did not touch on jurisprudence in his essay on Siamese literature, made good the omission in a separate article "On the Laws of Siam," in the first volume of Logan's *Journal of the Indian Archipelago* (Singapore, 1847).

Pallegoix, in his "Catalogus præcipuorum librorum linguæ Thai" (*Grammatica*, pp. 172–180), gives the titles of a good many treatises on scientific subjects, medicine, mathematics, astrology; but none appear to have been critically examined. In the first volume of his *Description du royaume Thai* (1854) are inserted various pieces translated from Siamese works. See also on the Siamese language and literature generally the "Remarks" by the Rev. C. Gützlaff, in the *Transactions of the Royal Asiatic Society*, vol. iii. (1835), pp. 291–304; and on the literature Leyden's "Essay" above referred to (*Miscellaneous Papers*, vol. i. pp. 143–147). It is only in quite recent times that an Anamese influence has begun to be traceable in the language and literature of the Siamese.

In 1810 Dr. Leyden undertook, at the instance of the Calcutta Auxiliary Bible Society, to superintend a translation of the four Gospels into Siamese; but he died before the project was carried into effect. Subsequently Messrs. Gützlaff and Tomlin, assisted by learned natives, labored till 1833 at a trustworthy translation of the New Testament into Siamese. Their task was continued and completed by Messrs. Jones and Robinson, and the work was published in 1846. (R. R.)

End of Volume Twenty-first.

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WILLCOX, Orlando Bolivar, soldier, was born at Detroit, Michigan, on April 16, 1823, and was graduated from West Point in 1847. He entered the artillery service, and took part in the closing operations of the Mexican War. He served in the last Seminole War, and then, in 1857, retired from the army, and practiced law at Detroit. At the beginning of the Civil War he returned to the army as colonel of the first regiment of Michigan volunteers, and had a distinguished career. He took part in the capture of Alexandria, was wounded and captured at Bull Run, was with the Army of the Potomac in 1862, commanded the district of central Kentucky in 1863, served in eastern Tennessee until March, 1864, led a division in the Richmond campaign and was the first to enter Petersburg, did gallant work at Spottsylvania Courthouse, and was made major-general of volunteers. After the war he was in command of the Department of Arizona, where he was conspicuously successful in suppressing the hostile Apaches, for which services he received a vote of thanks from the Arizona legislature. He also received the Congressional medal of honor for his services in the Civil War. He was promoted to be brigadier-general in the regular army on October 13, 1886, and on April 16, 1887, was retired for age, since which time he has lived partly in Detroit and partly in Washington, D. C. He wrote two books in his earlier years: *Shœpac Recollections, by Walter March*, in 1856, and *Faca, an Army Memoir, by Major March*, in 1857. He died in 1907. W.F.J.

WILLEMITE. See Zinc, Vol. XXIV, p. 823.

WILLEMSTAD. See Curaçoa, Vol. VI, 626.

WILLET, the common name of a North American bird, *Totanus* (sometimes *Symphemia*) *semipalmatus*, of the plover tribe. It is the largest of its genus. Its general color is brownish-gray, while the under parts are white, with brownish streaks. It goes south as far as Brazil in the winter, and sometimes wanders to Europe. R.W.C.

WILLETT'S POINT, a cape on the northern shore of Long Island, New York, between Little Bay and Little Neck Bay, at the junction of the East River and Long Island Sound. Formerly a part of the town of Flushing, it is now included in the borough of Queens, New York city. It is occupied by a government reservation, military post and fortifications. It is directly opposite Throgg's Neck, on the other shore of the sound, and with the latter forms the chief defences of the harbor and city of New York at the east. Its population (1905) is about 800. W.F.J.

WILLIAM II (Friedrich Wilhelm Victor Albrecht), king of Prussia, and emperor of Germany; was born in Berlin, Jan. 27, 1859. He was the eldest son of the late Friedrich Wilhelm, second emperor, and of Victoria, princess royal of Britain. He succeeded to the throne on the death of his father, June 15, 1888. He was educated at Cassel, undergoing the regular discipline there until 1877, when he entered the University of Bonn. He married, February 27, 1881, Augusta Victoria, Duchess de Schleswig-Holstein-Sonderbourg Augustenbourg, niece of Prince Christian, and has had six sons and one daughter. Prior to the death of his father he evinced a feeling of repugnance to the peaceful policy inaugurated by the latter, and it was feared his accession menaced the peace of Europe; but upon succeeding to the throne he issued two addresses, one to the army and the other to the navy, which in their pacific tone were a surprise to the outside world, and were received with a degree of caution as to their sincerity. These were supplemented by an address to the Prussian people, dated June 18, setting forth the determination of its author to adopt and enforce a policy that would preserve the peaceful condition existing, protect imperial interests and promote the national welfare. The young emperor spent several months following, visiting various courts of Europe for the ostensible purpose of cementing friendly relations, and has paid like visits annually since, going to England in 1893 and winning the Queen's cup at the Cowes yacht-race. He early evinced great energy, love of display, and determination to impress his will upon his subjects—qualities which strengthened with time. The first important result of this was the resignation of Prince Bismarck as chancellor of the Empire, March 17, 1890, forced by the emperor's insistence on being ruler in fact as well as in name. Besides being a firm ruler, he possesses an alert mind, as we see in his inaugurating an international labor congress in 1890, and in 1892 interesting himself in primary education. He is a patron of science; a good violinist; composed *Sang an Ægir*, a song; and published a collection of sermons delivered to the men of his yacht. The important events of his reign are the acquisition of Heligoland, Kiao-chau, and the Caroline and Ladrone islands (except Guam), legislation in favor of workingmen, and the renewal of the Triple Alliance. *Revised by* R.C.A.

WILLIAM II.

WILLIAM, the name of three kings of Holland; of the third it may be said that he succeeded to the crown upon the death of his father (see Holland, Vol. XII, p. 86). In 1866, at the dissolution of the German Union, he succeeded in annexing Limburg and in obtaining the neutrality of Luxemburg. He carried out reforms inaugurated by his father, emancipating the West Indian slaves in 1862. The drainage of the Haarlem Lake, the extensive construction of railways and the improvement of the waterway to Rotterdam, as well as the development of parliamentary institutions, are also reforms incident to his reign. He died at the Castle of Loo, Nov. 23, 1890.

WILLIAM AND MARY, College of, an educa-

tional institution located near Williamsburg, Virginia. It was organized in 1693, and therefore is the second oldest college in the United States, Harvard having been founded a few years before. A charter was obtained in 1693 from Queen Mary, and King William aided in the original endowment; contributions from England were received, and the Virginia House of Burgesses levied a special tax. The first building was designed by Sir Christopher Wren, but was burned in 1705, and a new building was not completed until 1719; in 1732 a chapel was added as a south wing to the building. In this chapel were buried the magnates of the colony, including Lord Botetourt, whose statue, erected in 1797, still stands on the campus. The president's house, erected in 1732, was occupied by Cornwallis as his headquarters during the siege of Yorktown. The college building was again burned in 1859, but was rebuilt in 1860, only to be destroyed in 1861 by the Union troops. After the war, generous donations were received from citizens of the Northern states and from England, new buildings were erected, and the work of instruction was resumed. For many years William and Mary College held a foremost rank, and its classes were attended by many men afterward prominent in the life of the state and the nation. In 1904, the productive funds amounted to $133,000, the annual income to $31,800; there were 178 students in attendance, with 16 instructors, and a library of 10,000 volumes.

WILLIAM OF CHAMPEAUX. See CHAMPEAUX, Vol. V, p. 335.

WILLIAMS, EDWARD (1745–1826). See CELTIC LITERATURE, Vol. V, pp. 273, 274.

WILLIAMS, EDWARD LEADER, an English engineer; born April 6, 1828. Beginning his career under his father on the River Severn navigation, he was appointed, in 1856, engineer on the Great Northern railway, then in course of construction. After holding several other important engineering offices, he was given, in September, 1882, the office of chief engineer on the construction of the Manchester Ship Canal, according to plans proposed by himself. In recognition of this magnificent achievement he was knighted in July, 1894.

WILLIAMS, ELEAZER, missionary, descendant of John Williams, was born in Montgomery County, N. Y., about 1787, was educated at Longmeadow and Westhampton, Mass., and in the War of 1812 served under General Dearborn, a United States Indian agent in the north. He was the author of an Iroquois spelling-book, and of an Iroquois version of the Protestant Episcopal prayer-book. He did excellent service for many years as a missionary among the Indians. He believed himself, and was believed by many, to be the ill-fated Dauphin of France, son of Louis XVI. He made no effort, however, to assert his rank, and contented himself with a humble life among the Indians. He died on August 28, 1858. W.F.J.

WILLIAMS, ELISHA, educator, a kinsman of John Williams, was born at Hatfield, Mass., on August 24, 1694, and was graduated from Harvard College in 1711. He practiced law, was clerk of the Connecticut Assembly, was a Congregational minister after 1721, and in 1725 became the fourth president of Yale College. He held that place for fourteen years, and did much for the secure foundation and development of the institution. After his retirement from the presidency of Yale he was a Congregational preacher, a member of the assembly, a judge of the superior court, and a colonel in the army. He died on July 24, 1755. W.F.J.

WILLIAMS, EPHRAIM, soldier and founder of Williams College, kinsman of John Williams, was born at Newton, Mass., on February 24, 1715, removed to Stockbridge, Mass., and became a soldier in the colonial wars with France. He led a regiment in the Crown Point expedition, attacked Baron Dieskau, fell into an ambuscade near the head of Lake George, and was killed on September 8, 1755. Being unmarried, he left all his property to a school near his home, which, in time, was developed into Williams College, named in his honor. In 1854 the alumni of Williams College erected a monument on the spot where he was killed. W.F.J.

WILLIAMS, GEORGE, the founder of the Young Men's Christian Association; born at Dulverton, Somersetshire, Oct. 11, 1821; went to London in 1841, as junior assistant with Hitchcock and Rogers. Struck with the neglected condition of young men, he soon gathered together a company of those employed in this establishment, with the result that Mr. Hitchcock became converted, and gave them the greatest encouragement. Widening their sphere, 12 of them met on June 6, 1844, and founded the Young Men's Christian Association, which was designated as "a society for improving the spiritual condition of young men engaged in the drapery and other trades." He was the first treasurer of the Y. M. C. A., and was always energetically devoted to its welfare and growth. He was knighted in 1894. Died November 6, 1905.

WILLIAMS, GEORGE HENRY, lawyer, was born at New Lebanon, N. Y., March 23, 1823, was admitted to the bar of New York in 1844, and then removed to Iowa. In 1847 he was elected judge of the first judicial district of Iowa, and filled the place until 1852, in which year he was a Presidential elector. In 1853 he was appointed chief justice of the Territory of Oregon, which office he resigned in 1857. In 1858 he was a member of the Oregon Constitutional Convention, and in 1865–71 was United States Senator from Oregon. He was the author of the "Tenure of Office" and "Military Reconstruction" acts. In 1871–72 he was a member of the Joint High Commission for settlement of the Alabama claims, and from 1872 to 1875 was attorney-general of the United States. He was nominated to be chief justice of the Supreme Court of the United States, in 1873, but the nomination was withdrawn. After 1875 he settled in Washington, in the practice of law. W.F.J.

WILLIAMS, GEORGE HUNTINGTON, an American geologist; born in Utica, New York, January 28, 1856. He was graduated from Am-

herst College in 1878, and then went abroad and studied in Germany at Heidelberg University, where he received the degree of Doctor of Philosophy, in 1881. After his return to the United States he was an instructor for several years in various colleges, and in 1892 was called to the chair of inorganic geology in Johns Hopkins University, Baltimore, Maryland. He was vice-president of the Geological Society of America, and served on the international jury of awards at the World's Columbian Exhibition at Chicago in 1893. He was the author of *Elements of Crystallography* (1890). He invented a petrographic microscope and an electric machine for cutting thin sections of rock formation. He died in Utica, New York, July 12, 1894. W.M.C.

WILLIAMS, Henry Shaler, an American geologist and educator; born in Ithaca, New York, March 6, 1847. He was graduated from the Sheffield Scientific School in 1868, and then became an instructor at Yale College. In 1871 he was appointed assistant professor of geology at the University of Kentucky, and in 1879 was made professor of geology and paleontology at Cornell University. In 1892 he resigned this post to accept the chair of geology at Yale. In the same year he was in charge of the section of geology in the American Association for the Advancement of Science and in 1891 was secretary of the International Congress of Geologists held in Washington. He has written *The Classification of the Upper Devonian* (1885); *The Cuboides Zone and Its Fauna* (1890); *Correlation Papers, Devonian and Carboniferous* (1891), and *Shifting of Faunas as a Problem of Stratigraphic Geology* (1903). W.M.C.

WILLIAMS, John, an American theologian; born in Deerfield, Massachusetts, August 30, 1817. He was graduated from Trinity College in 1835; traveled abroad and was ordained in the Protestant Episcopal Church in 1841. From 1848 to 1853 he was president of Trinity College. In 1854 he became dean of the Berkeley Divinity School in Middletown, and held that position until his death. In 1865 he was consecrated bishop of Connecticut. In 1894, upon the death of Bishop Southgate, he became the senior bishop of the Episcopal Church. He was the author of *Thoughts on the Gospel Miracles* (1848); *Studies in the Book of Acts; The World's Witness to Jesus Christ* (1882). He died in Middletown, Connecticut, February 7, 1899. W.M.C.

WILLIAMS, John, pioneer and missionary, one of the early members of a family noted in New England annals, was born at Roxbury, Mass., on December 10, 1664. He was graduated from Harvard College in 1683, was ordained to the Congregationalist ministry in 1688, and became a pioneer preacher and missionary at Deerfield, Mass. That place was the scene of one of the most appalling French and Indian massacres of those tragic times, on February 29 [illegible]4. The town was burned, thirty-eight of its inhabitants were murdered, including two of Williams's children, and he and his wife and other children were taken captives. Two days later his wife was butchered by her captors, but he was kept alive and carried to Montreal, where for two years the Jesuits strove to convert him to their faith. In 1706 he was released, with his remaining children, and returned to Boston, where he published an account of his sufferings, entitled *The Redeemed Captive Returning to Zion.* Deerfield having been rebuilt, he returned to his pastorate there, and in 1710 went to Canada with Stoddard's expedition. He died at Deerfield on June 12, 1729. W.F.J.

WILLIAMS, Jonathan, soldier, was born in Boston on May 26, 1750, and after receiving a good common school education entered the counting room of his father, a prosperous merchant. In his father's service he made numerous voyages, going to England in 1770 and visiting his uncle, Benjamin Franklin, who was then in that country. In 1775 he also visited France, and in 1777 he was appointed a commercial agent of the colonies in France, and established himself at Nantes. After the conclusion of peace, in 1783, he was commissioned by the organized farmers of France to supply them with tobacco, and settled at St. Germain, where he remained until 1785, when he came home with Franklin. Five years later he settled upon a farm near Philadelphia, and became a judge of the court of common pleas in that city. While in France he had given much study to military science, and when the "Whiskey Rebellion" broke out in Pennsylvania he entered the regular army as a major of artillery and engineers. Later he was an inspector of fortifications, and when the Military Academy at West Point was organized, in 1802, he was made its first superintendent. In 1805 he returned to the army, planned the fortifications of New York harbor (Castle Williams, on Governor's Island was named for him), and in 1812 resigned his commission. He died on May 16, 1815. (See West Point, Vol. XXIV.) W.F.J.

WILLIAMS, Rowland, an English clergyman; born at Halkyn, Flintshire, August 16, 1817. He was educated at Eton and at King's College, Cambridge, where he became fellow and tutor. After taking orders he became chaplain to the Bishop of Llandaff, and in 1850 vice-principal and professor of Hebrew at Lampeter College. In 1854 he was select preacher to Cambridge University, and in 1859 was appointed to the vicarage of Broadchalk, Wilts. He resigned his professorship at Lampeter in consequence of a paper on Bunsen's *Biblical Researches* which he contributed to the *Essays and Reviews.* He also wrote *Rational Godliness* (1855); *Christianity and Hinduism* (1856); *The Hebrew Prophets, a New Translation* (1868), and *Psalms and Litanies* (1872). He died at Broadchalk, England, January 18, 1870. W.M.C.

WILLIAMS, Samuel Wells, Chinese scholar, was born at Utica, N. Y., on September 22, 1812, learned the printer's trade, studied at the Rensselaer Polytechnic Institute, Troy, N. Y., and in 1833 went to Canton, China, as printer for the

American Board of Commissioners for Foreign Missions. He there mastered the Chinese language with exceptional completeness, and became one of the foremost American scholars in Chinese and Japanese. He published *Chinese Christomathy; Easy Lessons in Chinese*, *Chinese Vocabulary; Chinese Topography; Syllabic Dictionary of the Chinese Language*, and *The Middle Kingdom*, the last named being one of the most complete and authoritative general works on China ever written. He also edited *The Chinese Repository* for a number of years. He was Perry's interpreter in Japan, and from 1855 to 1876 was United States interpreter and secretary of legation at Peking. He aided in the negotiation of the treaty of 1858, with China, under which toleration was secured for the Christian religion, and he designed and erected the buildings of the American legation at Peking. In 1877 he became lecturer on the Chinese language and literature at Yale University. He died at New Haven on February 16, 1884. W.F.J.

WILLIAMS, Sir William Fenwick (1800–83), a British general. See Kars, Vol. XIV, p. 8.

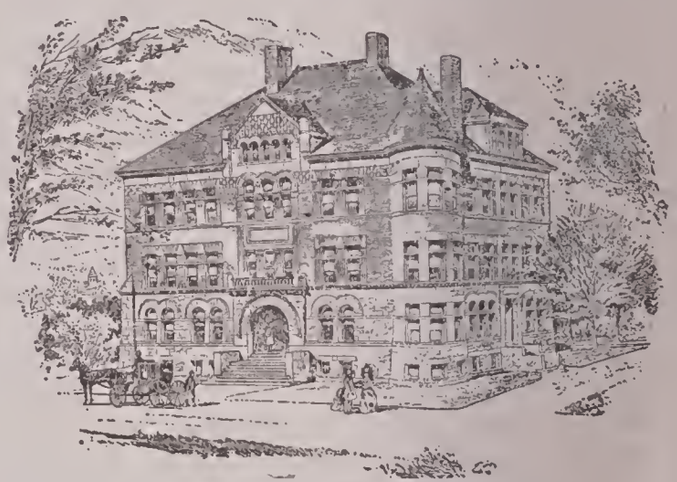
WILLIAMSBURG, Kentucky, a city and the county seat of Whitley County, in the southeastern part of the state. It lies among the mountains, on the Cumberland River, and has considerable coal-mining and lumber interests. It is reached by the Louisville and Nashville railroad, and in 1900 had a population of 1,495. W.F.J.

WILLIAMSBURG, Massachusetts, one of the mountain towns of Hampshire County, in the western part of the state. It is on Mill River, a few miles northwest of Northampton, and is reached by a branch of the New York, New Haven and Hartford railroad. It contains several villages, devoted to agriculture and the manufacture of hardware, and had in 1900 a population of 1,926. W.F.J.

WILLIAMSBURG, Virginia, an independent city, formerly a part of James City County, in the southeastern part of the state, on the peninsula between the York and James rivers. It was founded in 1632, and was the colonial and state capital down to the latter part of the Revolutionary War. It is the oldest city in the state, is the seat of William and Mary College (q. v.) and of the Eastern State Lunatic Asylum, and was the scene of a severe battle of the Civil War in May, 1862. It is near Jamestown, at the southwest, and Yorktown, at the east. Its population in 1900 was 2,044. W.F.J.

WILLIAMSBURG, Battle of, was fought after the abandonment, May 5, 1862, of Yorktown by the Confederates. The Union troops were under several commanders who did not seem to have had any preconcerted plan of action when they again faced the enemy after its pursuit by them. Hooker opposed the left and bore the brunt of the attack, sustaining severe losses. Hancock eventually drew the attack to himself in a brilliant diversion in which Early fell, while Kearney also later went to his aid enabling him to rest his men. During this attack the other generals secured some advantages, on the right. On the arrival of McClellan the enemy resumed its retreat, falling back on Richmond. The losses were: Federals, 2,280, Confederates, 1,560. R.C.A.

WILLIAMS COLLEGE, Williamstown, Mass., originally "a Free School" established in 1785 by virtue of a bequest made by Colonel Ephraim Williams, it was transformed into a college by legislative enactment June 22, 1793. In 1796 the legislature granted the college two townships of six square miles each, and in 1809, another township of land in Maine, in support of Williams College. In 1814 the college received the sum of $30,000 from taxes, due the commonwealth from the Massachusetts bank. Since then, the college has been greatly enriched by private donations and by the erection of special buildings either at the cost of the president and trustees or that of private individuals. The various courses of instruction include departments of Greek, Latin, English, elocution, romance languages, German, philosophy, history, political science,



MARK HOPKINS MEMORIAL.

mathematics, astronomy and meteorology, chemistry, physics, biology and physical training. Candidates for admission to the freshman class must present satisfactory qualifications in English, Greek, Latin, French or German, history and mathematics. Under certain conditions certificates of preparatory schools are accepted in lieu of examinations in the above subjects. The necessary expenses for the college year of 36 weeks are board, $144 to $216; washing, $15 to $20; fuel and light, $8 to $18; total, $167 to $254. The scholarship fund, composed of 68 different donations, amounts to $263,669.47, the income of which is over $11,000 annually and available for distribution among the students. In 1907 there were 57 instructors and 472 students, the total income being $124,422. W.R.B.

WILLIAMSON, a town of Wayne County, in the northwestern part of the state of New York, on the shore of Lake Ontario, and on the line of the Rome, Watertown and Ogdensburg railroad. It includes several agricultural villages, and has some flour mills and other factories, and mineral springs, and in 1900 had a population of 2,670. W.F.J.

WILLIAMSON, Benjamin, an Irish mathematician; born in Cork, in 1827; educated at Kilkenny College, and at Trinity College, Dublin, graduating at the latter in 1848, and being elected fellow in 1852, appointed a college tutor in 1858, and professor of natural philosophy in 1884, in that institution. He was elected a fellow of the Royal Society in 1879, and received the honorary degree, D.C.L., from the University of Oxford in 1892. Besides publishing *A Treatise on the Differential Calculus* (8th ed., 1892); *A Treatise on the Integral Calculus* (6th ed., 1891); and an *Introduction to the Mathematical Theory of the Stress and Strain of Elastic Solids* (1894), he also contributed to this Encyclopædia the articles on Infinitesimal Calculus, Maclaurin, Variable, and Variations.

WILLIAMSON, Hugh, statesman, was born at West Nottingham, Penn., on December 5, 1735, and was graduated from the College of Philadelphia in 1757. He studied theology and was a lay preacher of the Presbyterian Church, but was not ordained. He served as professor of mathematics in the College of Philadelphia for three years, studied medicine, and became a practical astronomer. In 1773–76 he was in Europe, and in the latter year returned to America and joined the Revolutionary army in the South. After the war he was for some years a member of Congress, and was a member of the Convention which framed the Constitution of the United States. He was also a member of the North Carolina Convention which ratified the Constitution. In 1793 he removed to New York, and spent the rest of his life there in scientific and literary pursuits. He wrote *Observations on the Climate of America* (1811), *Observations on Navigable Canals*, *Comets*, *A Discourse on the Benefits of Civil History*, and a *History of North Carolina*, the last named an important work in two volumes, published in Philadelphia in 1812. He died in New York City on May 22, 1819. W.F.J.

WILLIAMSON, Isaiah Vansant, an American philanthropist; born at Fallingston, Bucks County, Pennsylvania, Feb. 3, 1803. He opened a small dry-goods store in Philadelphia in 1824; later, became a partner in a wholesale house, and in 1830 was worth $200,000. He then began speculating in stocks and bonds, and in 1888 placed in the hands of a board of trustees, property and securities valued at $2,500,000, for the founding of a free school of mechanical trades at Media, Delaware County, Pennsylvania. This industrial school is located on a farm of about 350 acres, and gives instruction to an average attendance of about 200 in drawing and all the mechanical trades. Mr. Williamson's will gave over $9,000,000 to relatives and $5,000,000 to Protestant charitable institutions in Philadelphia, to which he had long been a large benefactor. He died in Philadelphia, March 7, 1889.

WILLIAMSON, William Crawford, an English biologist; born in Yorkshire, November 24, 1816. He was educated at the Manchester Medical School and University College, London. In 1851 he settled in Manchester and began the practice of medicine and made extensive researches in biology. In 1848 he gained a world-wide reputation by the publication of two important monographs, *Organisms of the Levant* and *On the Recent Foraminifera of Great Britain*. In 1849 he was elected a fellow of the British Royal Society in recognition of his researches. In 1851 he was appointed professor of biology and geology at Owens College, Manchester. Later he resigned all his collegiate duties save the professorship of botany. His careful study of carboniferous plants resulted in the publication in 1851 of various monographs *On the Organization of the Fossil Plants of the Coal Measures*. For these publications he received the Royal medal of the British Royal Society. In 1854 he went to Paris to study the diseases of the ear, and upon his return to England in 1856, he founded the Manchester Institute for Diseases of the Ear. In 1884 he was elected president of the Manchester Literary and Philosophical Society. In 1892 he was elected emeritus professor of botany in Owens College. He wrote many scientific articles for magazines and reviews and contributed the article on Agassiz to this Encyclopædia. He was made an honorary member of the Royal Society of Sweden, of the Physical and Natural History Society of Geneva, the Göttingen Academy of Sciences, of the Royal Microscopic Society of London and other societies. The University of Edinburgh conferred upon him the degree of Doctor of Laws. W.M.C.

WILLIAMSPORT, Indiana, a city and the county seat of Warren County, on the western border of the state. It lies on the Wabash River, in a region of varied interests, including agriculture, stock raising, coal mining, and the quarrying of building stone. It is reached by the Wabash railroad, and has a large trade in both Indiana and Illinois. Its population in 1900 was 1,245. W.F.J.

WILLIAMSPORT, Maryland, a town of Washington County, in the western part of the state. It lies on the Potomac River, a few miles southwest of Hagerstown. It is a trade outlet for the Cumberland Valley and also for the upper part of the Potomac Valley, is reached by the Western Maryland and the Cumberland Valley railroads, and has flour and lumber mills and other establishments, supplied with an ample water power. Its population in 1900 was 1,472. W.F.J.

WILLIAMSPORT, Pennsylvania, an important city and the county seat of Lycoming County, in the northeast-central part of the state. It lies in a beautiful spot on the west branch of the Susquehanna River, which is there spanned by a bridge, is surrounded by coal mines, and is one of the greatest lumber markets of the eastern states. It is the site of a well-known seminary, and is a favorite place of summer resort. It is reached by the Beech Creek, the Fall Brook Coal Company's, the Northern Central, the Pennsylvania and the

Philadelphia and Reading railroads, and had in 1900 a population of 28,757. W.F.J.

WILLIAMSTON, a village of Ingham County, Michigan, in the south-central part of the southern peninsula of that state. It lies in a fertile country on the Cedar River, has agricultural and coal-mining interests, is reached by the Detroit, Lansing and Northern railroad, and in 1900 had a population of 1,113. W.F.J.

WILLIAMSTOWN, Massachusetts, a town of Berkshire County, in the northwestern corner of the state. It is picturesquely situated among hills and upon the Hoosac River, has some factories of woolen, leather and iron goods, and is the seat of the well-known Williams College (q. v., in this volume, p. 558). It is reached by the Fitchburg railroad. Part of the town was annexed to North Adams in 1897. The population of the remainder in 1900 was 5,013. W.F.J.

WILLIAMSTOWN, Pennsylvania, a borough of Dauphin County, in the southeast-central part of the state. It lies near the foot of Peters Mountain, in a coal-mining and manufacturing region, is reached by the Northern Central railroad, and in 1900 had a population of 2,934. W.F.J.

WILLIMANTIC, an important manufacturing city of Windham County, Connecticut, in the northeastern part of the state. It receives a splendid water power from the Willimantic and Natchaug rivers, which there unite to form the Shetucket, and has numerous manufacturing establishments. It is especially noted for its production of thread, and cotton, woolen and silk textiles, but also has factories of vehicles, tinware, and other goods. It is the seat of a state normal school, is reached by the Central Vermont and two divisions of the New York, New Haven and Hartford railroads, and had in 1900 a population of 8,937. W.F.J.

WILLISTON, Samuel, philanthropist; was born at Easthampton, Mass., on June 17, 1795. After desperate struggles to secure an education at Phillips Andover Academy he had to abandon the attempt because of failing sight. In 1822 he married Emily Graves, who strove to aid him in making a living by covering buttons with cloth. She thus established an industry which she and he developed to great proportions, and which brought them a fortune. He founded Williston Seminary, at Easthampton, richly endowed several professorships in Amherst College, and built many churches, schools, town halls, etc. He died on July 18, 1874. W.F.J.

WILLMAR, a village and the county seat of Kandijohi County, North Dakota, in the southwest-central part of the state. Its interests are chiefly agricultural, but it has some machine shops and other industries. It is on the Great Northern railroad, and had in 1900 a population of 3,409. W.F.J.

WILL-O'-THE-WISP. See Phosphorescence, Vol. XVIII, p. 826, and Fata Morgana, in these Supplements.

WILLOUGHBY, a village of Lake County, Ohio, in the northeastern part of the state. It lies on the shore of Lake Erie, at the mouth of the Chagrin River, and has extensive fruit and dairying interests. It is reached by the Lake Shore and Michigan Southern and the New York, Chicago and St. Louis railroads, and in 1900 had a population of 1,753. W.F.J.

WILLOUGHBY, Sir Hugh. See Geography, Vol. X, p. 164.

WILLOWS, a town and the county seat of Glenn County, California, in the central-northern part of the state. It lies about 150 miles north of San Francisco, in the western part of the Sacramento Valley, in a farming and fruit-raising region, is reached by the Southern Pacific railroad, and had in 1900 a population of 893. W.F.J.

WILLOW-GALLS. See Galls, Vol. X, p. 40.

WILLOW-GROUSE. See Grouse, Vol. XI, p. 197.

WILLOW SPRINGS, a city of Howell County, Missouri, in the center of the southern tier of the state. It is in an agricultural and horticultural region, is reached by the Kansas City, Fort Scott and Memphis and the Current River railroads, and had in 1900 a population of 1,078. W.F.J.

WILLOW WEED. See Pochard, Vol. XIX, p. 264, note.

WILLS, in the United States. See Will, Vol. XXIV, p. 605.

WILLS, William Gorman, dramatist; was born in County Kilkenny, Ireland, was educated at Trinity College, Dublin, and studied art at the Royal Irish Academy. While in the latter institution he wrote a successful play, *The Man o' Airlie* (1866), and thereafter gave his chief attention to such work. Among his best known plays are *Charles I* (1872), *Jane Shore* (1876), *Olivia* (produced by Henry Irving and Ellen Terry), *Nell Gwynne*, *Sedgemoor*, *Claudian*, *Eugene Aram*, and a most picturesque and spectacular version of Goethe's *Faust*, also produced with great success by Irving and Terry. Mr. Wills also wrote some novels and was an accomplished portrait painter. His most successful novels were *Notice to Quit* and *Wife's Evidence*, which have run through several editions. He died on December 14, 1893. W.F.J.

WILLS POINT, a town of Van Zandt County, Texas, in the northeastern part of the state, near the upper waters of the Sabine River. It is in a grain, cotton and cattle country, is reached by the Texas and Pacific railroad, and in 1900 had a population of 1,347. W.F.J.

WILMERDING, an incorporated borough of Allegheny County, Pennsylvania, in the southwestern part of the state. It lies only a few miles from Pittsburg, on the Monongahela River, and is closely identified with that city in industrial and social interests. It is largely occupied by the homes of employees of a great electric light and power establishment. It is one of the suburban communities which it is now (1905) proposed to annex to Pittsburg, making the latter the fourth city of the United States in population. It is

reached by the Pennsylvania railroad and in 1890 had a population of 4,179. W.F.J.

WILMINGTON, Delaware, an important city and the county seat of New Castle County, in the northern part of the state, and the social and business metropolis of the state. It lies at the junction of Brandywine Creek with the Delaware River, has a large water-borne commerce and is a port of entry, with a United States custom-house. It has extensive shipyards for building iron and steel vessels, railroad car shops, machine shops, manufactories of chemicals, fertilizers, boots and shoes, and many other articles. It contains a state library, which is a large and well organized institution, and an excellent system of public and private schools. It is reached by the Baltimore and Ohio, the Pennsylvania, and the Wilmington and Northern railroads, and had a population of 61,431 in 1890 and 76,508 in 1900. W.F.J.

WILMINGTON, Illinois, a city of Will County, in the northeastern part of the state. It lies on the Kankakee River, in an agricultural and bituminous coal region, and is reached by the Chicago and Alton railroad. Its population in 1900 was 1,420. W.F.J.

WILMINGTON, North Carolina, a city and the county seat of New Hanover County, in the southern part of the state. It lies on the estuary of the Cape Fear River, and has a large commerce in cotton, lumber, naval stores, and fertilizers. It was a great center of blockade running in the Civil War, and suffered much from the ravages of that conflict, but has since regained great prosperity. It is an important railroad center, being reached by the Cape Fear and Yadkin Valley, the Carolina Central, the Wilmington, Columbus and Augusta, the Wilmington, Onslow and East Carolina, the Wilmington and Sea Coast and the Wilmington and Weldon roads. It contains a fine United States custom-house and post-office and other public buildings, and a public library, and some churches and other edifices of much historic interest. Population, 1900, 20,976. W.F.J.

WILMINGTON, Ohio, a city and the county seat of Clinton County, in the southwestern part of the state. It is reached by the Cincinnati and Muskingum Valley and the Baltimore and Ohio railroads, and had in 1900 a population of 3,613. W.F.J.

WILMINGTON, Vermont, a town of Windham County, in the southern part of the state. It is in an agricultural, dairying and sugar-producing region, twenty miles west of Brattleboro, on the Deerfield River and the Hoosac Tunnel and Wilmington railroad, connecting with the Boston and Albany and Fitchburg lines. Its population in 1900 was 1,221. W.F.J.

WILMOT, David, statesman; was born at Bethany, Penn., on January 20, 1814, and became a lawyer. He was a representative in Congress from 1845–51, and in that capacity was the author of the famous "Wilmot Proviso," prohibiting the extension of slavery into newly-acquired territory. (See United States, Vol. XXIII, p. 806.) He was a district judge in Pennsylvania from 1853–61, a delegate to the "Peace Congress" in 1861, a United States Senator from Pennsylvania in 1861–63, and from 1863–68 a judge of the Court of Claims at Washington. He died on March 16, 1868. W.F.J.

WILMOT PROVISO. See United States, Vol. XXIII, p. 806.

WILNO. See Vilna, Vol. XXIV, p. 251.

WILSON, a town and the county seat of Wilson County, North Carolina, in the eastern-central part of the state. It is in the valley of the Neuse River, in a region largely devoted to cotton and tobacco culture, but has since the Civil War developed considerable manufacturing interests, including cotton and lumber mills, woodworking shops, machine shops, and manufactories of vehicles. It is reached by the Wilmington and Weldon railroad, and had in 1900 a population of 3,525. W.F.J.

WILSON, Allen B. (1827–88). See Sewing Machines, Vol. XXI, p. 755.

WILSON, Augusta Jane (Evans), an American novelist; born near Columbia, Georgia, May 8, 1835. She was educated in private schools, and lived for some years at San Antonio, Texas. In 1868 she married L. M. Wilson of Mobile, Alabama, who died in 1891. Her first novel, *Inez*, was published in 1856, and her subsequent books met with great popularity. Her works include *Beulah* (1859); *Macaria* (1864); *St. Elmo* (1866); *Vashti* (1869); *Infelice* (1876); *At the Mercy of Tyberius* (1887), and *A Speckled Bird* (1902). W.M.C.

WILSON, Sir Charles Rivers, an English financier; born in London, February 19, 1831. He was educated at Eton and Balliol College, Oxford. He became a clerk in the treasury in 1856, and was private secretary to the chancellors of the exchequer, Mr. Disraeli (1867–68) and Mr. Lowe (1868–73). He acted as secretary to the royal commission on international coinage in 1868. In 1874 he was appointed comptroller-general of the national debt office. In 1876 he was sent on a financial mission to Egypt, but speedily returned, owing to a dispute with the Khedive; and was appointed an administrator of the Suez Canal Company. In 1878 he was a royal commissioner for the Paris Exhibition, and in the same year was acting president of the international commission of inquiry into the resources of Egypt. In consequence of its report, a new Egyptian cabinet was formed in 1878, in which Mr. Wilson was minister of finance; but the plan proved unworkable, and the ministry was dismissed in 1879. Mr. Wilson was created a knight in 1880, and in the same year was appointed president of the international commission for the liquidation of the Egyptian debt. In 1895 he went to the United States on a mission on behalf of the English holders of Central Pacific Railway Company's securities. The object of his mission was to endeavor to bring about an arrangement of the company's debt to the United States Government, and to effect an improvement in the general position of the English shareholders. These objects

were accomplished, and he was made president of the Grand Trunk railway. W.M.C.

WILSON, Sir Daniel, a Scottish-Canadian archæologist and educator; born in Edinburgh, Scotland, January 5, 1816. He received a classical education at the University of Edinburgh, and on leaving college in 1837 went to London and adopted literature and journalism as a profession. In 1841 he returned to Edinburgh, where he became secretary of the Royal Society of Antiquarians. In 1853 he was appointed professor of English literature in University College, Toronto, and in 1880 was called to the presidency of Toronto University. On the formation of the Royal Society of Canada in 1882, he was elected chairman of the section of history and English literature; and succeeded to the presidency in 1885. In 1888 he was knighted by Queen Victoria. He was a fellow of the Royal societies of Edinburgh, Italy and Copenhagen. His chief works are *Memorials of Edinburgh in the Olden Time* (1846); *Oliver Cromwell and the Protectorate* (1843); *Prehistoric Annals of Scotland* (1851); *Prehistoric Man* (1862); *Chatterton, a Biographical Study* (1869); *Caliban, the Missing Link* (1873). Died in Toronto, Can., Aug. 7, 1892. W.M.C.

WILSON, James, American agriculturist and statesman, born in Ayrshire, Scotland, in 1835, and settled in Iowa in 1855. He was elected to the State Legislature in 1867 and served for three consecutive terms, during the last of which he was speaker of the House. Later he was for six years a member of Congress and served on the Agricultural Committee. For four years he served on the Iowa State Railroad Commission, and took charge of the Government's Agricultural Experiment station in connection with the State Agricultural College at Ames, Iowa, at the same time acting as Professor of Agriculture. He has contributed much to the agricultural press of the West and greatly furthered the efforts of the Department of Agriculture in the interests of the farmer. Mr. Wilson was appointed U. S. Secretary of Agriculture in 1897.

WILSON, James. See Ornithology, Vol. XVIII, pp. 16–17.

WILSON, James Franklin, an American statesman; born in Newark, Ohio, October 19, 1828. He received a common school education, took up the study of law, and in 1851 was admitted to the bar. Two years later he removed to Iowa, where he built up an extensive practice. In 1856 he was elected a member of the Iowa Constitutional Convention, and served as a Republican member of the state legislature from 1857 to 1861. He was then elected to Congress and sat in the House until 1869. For several years he was chairman of the Judiciary Committee, and in 1868 was one of the participants in the impeachment trial of President Johnson. In 1869 he was appointed commissioner for the Union Pacific railroad, and in 1883 was elected United States Senator from Iowa. He was re-elected to the Senate in 1889. He died at Fairfield, Iowa, April 22, 1895. W.M.C.

WILSON, James Grant, an American author; born in Edinburgh, Scotland, April 28, 1832. He served in the Civil War, being promoted to the rank of brigadier-general. After the war he settled in New York city. In 1884 he was president of the New York Genealogical and Biographical Society, and for three years was president of the American Author's Guild. He is a member of various other historical and scientific societies. Besides numerous essays, addresses and articles in periodicals, he has published *Biographical Sketches of Illinois Officers* (1862); *Love in Letters, Illustrated in the Correspondence of Eminent Persons* (1867); *Life of General Grant* (1868); *Life of Fitz-Greene Halleck* (1869); *Sketches of Illustrious Soldiers* (1874); *Poets and Poetry of Scotland* (1876); *Centennial History of the Diocese of New York, 1775–1885* (1886); *Bryant and His Friends* (1886); *Commodore Isaac Hull and the Frigate, "Constitution"* (1889); *The President of the United States* (1901); *A Memorial History of the City of New York* (1892); *The World's Largest Libraries* (1894), and *Thackeray in America* (1904). He was the editor (with John Fiske) of Appleton's *Cyclopedia of American Biography* (6 vols., 1889). W.M.C.

WILSON, James Harrison, soldier, was born at Shawneetown, Ill., on September 2, 1837, studied at McKendree College, and was graduated from West Point in 1860. He was one of the foremost engineer officers in the Civil War, rendering distinguished services in the Vicksburg, Chattanooga and Richmond campaigns, but was in 1864 also a cavalry commander, under Sheridan. He took part in the capture of Fort Pulaski, and the campaigns of Antietam, Vicksburg, Chattanooga, and the Wilderness, was in command at the attacks upon and capture of Selma and Montgomery, Alabama, and Columbus and Macon, Georgia, and in the pursuit and capture of Jefferson Davis. On July 28, 1866, he was promoted to the brevet rank of major-general in the regular army, "for gallant and meritorious services during the war." On December 31, 1870, he was honorably discharged from the service at his own request, and thereupon engaged in railroad and other large engineering enterprises in America and other lands. At the outbreak of the war with Spain in 1898 he was made a major-general of volunteers, and commanded the First Army Corps in Georgia and in the occupation of Cuba, and also in the Porto Rico campaign. He commanded the American forces in the Chinese "Boxer" campaign, and represented the American army at the coronation of Edward VII of England. He was placed upon the retired list of the army in 1901, with the rank of brigadier-general, U.S.A. In addition to his military duties and business labors, General Wilson has devoted some attention to authorship, having published a *Life of Andrew Alexander* (1868), a *Life of General Grant* (1868), the latter in collaboration with Charles A. Dana, and *China: Travels and Investigations in the Middle Kingdom* (1887).

W.F.J.

WILSON, John, clergyman, was born at Poulton, England, on Feb. 13, 1763, and at an early age became interested in the Wesleyan movement and joined the Methodist Church. In 1793 he came to America and settled in New York City. There he was admitted to the Methodist Episcopal conference as a preacher, and entered the itinerancy, serving a number of churches in New York and its vicinity. In 1804 he was elected secretary of the general conference of the church, and also an assistant in the management of the Methodist publishing house in New York. Four years later the next general conference gave him full charge of the Book Concern, in which place he was most useful, increasing the capital of the establishment and greatly improving its methods. His administration, however, was short, for he died on January 29, 1810. W.F.J.

WILSON, John, clergyman, was born in England and educated at Cambridge. He came to Massachusetts with Winthrop's colony in 1630, and founded the First Church in Boston. There he distinguished himself by his zealous support of Winthrop in his opposition to Mrs. Hutchinson and other liberals. He was chaplain of the forces in the Pequot War, and received a large grant of land from the colony for his services. He also assisted Eliot in his missionary work among the Indians, and despite his bitterness against Mrs. Hutchinson and her friends was a man of much benevolence and of many good works. He was the author of a number of books in prose and verse, and of many published sermons and addresses. He died in Boston on August 7, 1667. W.F.J.

WILSON, John Leighton, an American clergyman and missionary; born in Salem, South Carolina, March 25, 1809. He was graduated from Union College in 1828 and from the Columbia Theological Seminary in 1832. He then spent two years in the study of languages at the Andover Theological Seminary, and in 1834 was sent by the American Board of Foreign Missions to West Africa, where he established several important missions. In 1846 while on the Gaboon River, he first discovered and named the gorilla. While in Africa he made a study of the languages of the native negro tribes and made several translations of portions of the Bible into these hitherto unknown tongues. In 1852 he returned to the United States, owing to failing health, and was appointed secretary of the Presbyterian Board of Foreign Missions, a position he held until 1861. In 1868 he was made secretary of the Board of Home Missions, and in 1872 secretary of the American Board of Foreign Missions. In 1857 he published *Western Africa: Its History, Condition and Prospects*. He died in Salem, South Carolina, July 13, 1886. W.M.C.

WILSON, Theodore Delavan, naval architect and constructor, was born in Brooklyn, New York, on May 11, 1840, worked in the Brooklyn navy-yard, was a soldier for a short time in the Civil War, and in the latter part of 1861 became a ship carpenter in the navy. He was engaged in the famous battle in Hampton Roads, when the *Merrimac* successfully attacked the wooden ships, and was beaten off by the *Monitor*. He served at various navy-yards and at the Annapolis academy, had the rank of naval constructor in 1873, took a prominent part in the rebuilding of the navy, and died on June 29, 1896. W.F.J.

WILSON, Thomas, scientist, was born at New Brighton, Penn., on July 18, 1832, and was privately educated. He was for twenty-five years a practicing lawyer; in 1881–87 was United States consul at Nantes, France, and since then has been curator of prehistoric archæology in the U. S. National Museum at Washington. Since 1889 he has also been professor of prehistoric archæology in the National University, of which institution he is a regent and secretary. He is a member of anthropological societies in Washington. London, Paris and Brussels, and has written many papers upon anthropological and archæological topics. He died in 1902. W.F.J.

WILSON, Thomas, an English clergyman; born in Barton Wirral, Cheshire, September 20, 1663. He was ordained in 1686, and soon after became curate of Mew Church in the parish of Winwick, Lancashire. In 1697 he was appointed bishop of Sodor and Man. His *Principles and Duties of Christianity* (1707), commonly called the *Manx Catechism* (the first book printed in the native tongue), and his *Essay Toward an Instruction for the Indians*, written for Oglethorp's Georgia plantation scheme, and submitted to Isaac Watts, were combined to form *The Knowledge and Practice of Christianity Made Easy to the Meanest Capacities* (1775). His name best survives in his admirable *Short and Plain Instructions for the Better Understanding of the Lord's Supper* (1736), and *Sacra Privata Private Meditations, Devotions and Prayers* (1800). He died on the Isle of Man, March 7, 1755. W.M.C.

WILSON, Thomas, jurist, was born in Ireland on May 16, 1827, came to America in 1838, was graduated from Allegheny College, Penn., in 1852, became a lawyer, removed to Minnesota, was chief justice of the supreme court of that state in 1864–69, resigned his place, and afterward was a member of the state legislature, and in 1887–89 a representative in Congress. Since 1889 he has been engaged in the practice of law in St. Paul, Minn. W.F.J.

WILSON, William, journalist and poet, was born in Scotland on December 25, 1801, and spent much of his life in America. He edited the *Scottish Songs, Ballads, and Other Poems* of Hugh Ainslee, and himself wrote a volume of poems, which were edited by Benson J. Lossing, and published in 1870. He died at Poughkeepsie, N. Y., on August 25, 1860. W.F.J.

WILSON, William Lyne, an American educator and legislator; born in Lexington, Jefferson County, Virginia, May 3, 1843. He was educated at the Charlestown, Virginia, Academy, and in 1860 was graduated from the Columbian University. In 1861 he attended the University of Virginia. During the Civil War

he served in the Confederate army. From 1865 to 1871 he was professor of Latin at the Columbian University, and until 1882 practiced law at Charleston, West Virginia. In 1880 he was a delegate to the Democratic National Convention and in 1882–83 was president of the University of West Virginia. In 1883 he was elected to Congress as a Democrat from West Virginia, serving in the House until 1895. From 1893 to 1895 he was chairman of the Committee on Ways and Means. He was prominent as an orator and was an ardent advocate of the free trade movement. He introduced the Democratic law-tariff measure commonly known as the Wilson Tariff Bill. In 1892 he was made chairman of the Democratic National Convention held at Chicago. In 1894 he was defeated for re-election to Congress by his Republican opponent, A. G. Dayton. In 1895 he was appointed Postmaster-General in the second administration of President Cleveland. While a resident of Washington, he was one of the Board of Regents of the Smithsonian Institution. He received degrees from the Columbian University and Hampden-Sidney College. In 1897 he was appointed president of Washington and Lee University, which position he held until his death in Lexington, Va., Oct. 17, 1900. W.M.C.

WILSON, Woodrow, an American historian and educator; born in Staunton, Virginia, December 28, 1856. He was graduated from Princeton in 1879 and became professor of jurisprudence and politics there in 1890. He has published numerous political and literary articles for the magazines and reviews. His books include *Congressional Government: A Study of American Politics* (1885), a work popular in the United States and much used by foreign publicists; *The State, Elements of Historical and Practical Politics* (1889); *Division and Reunion* (1893); *An Old Master and Other Political Essays* (1894); *Colonies and Nation* (1900); *A Short History of the United States* (1901). In 1902 he was elected president of Princeton University. W.M.C.

WILSON'S CREEK, Battle of, an engagement which took place Aug. 10, 1861, at Wilson's Creek, Missouri, between the Union forces under Generals Sigel and Lyon and the Confederates under McCulloch. The Union troops numbered five thousand and the Confederates over twelve thousand. Lyon planned a night attack, which was unsuccessful owing to the disparity of force, and in the Union defeat and retreat which followed, Lyon and over twelve hundred of his troops were killed. Sigel withdrew to Springfield, Missouri.

WILTON, Connecticut, a town of Fairfield County, in the southwestern part of the state. It comprises several villages, chiefly devoted to agriculture and horticulture. It is on the Housatonic River railroad, and had in 1900 a population of 1,598. W.F.J.

WILTON, Iowa, a town of Muscatine County, on the southeastern border of the state. It lies in the rich agricultural and industrial region between the Cedar and Mississippi rivers, has a large trade in cattle, and is reached by the Chicago, Rock Island and Pacific railroad. Its population in 1900 was 1,233. W.F.J.

WILTON, Maine, a town of Franklin County, in the western part of the state. It is picturesquely situated, south of the Bald and Blue mountains, and has a good water supply, but its industries are confined to a few minor woodworking establishments and vehicle shops. It is reached by the Maine Central railroad, and had in 1900 a population of 1,647. W.F.J.

WILTON, New Hampshire, a town of Hillsborough County, in the south-central part of the state. It lies on the Souhegan River, which gives it water power, and is reached by the Boston and Maine railroad. It has dairying and manufacturing interests, including lumber and woolen mills, but its population has decreased from 1,850 in 1890 to 1,696 in 1900. W.F.J.

WILTON CARPETS. See Carpet, Vol. V, p. 114.

WIMAN, Erastus, an American financier; born at Churchville, Peel County, Ontario, April 21, 1834. In 1864 he began to edit the Montreal *Trade Review*, and in 1867 acquired a partnership in a New York mercantile agency and carried the system of correspondence and reports to high perfection. He was an advocate of commerical union of Canada with the United States; engaged extensively in the development of Staten Island, obtaining for it a system of rapid transit connecting nearly the whole shore of the island with the New York ferry. In 1894 he was convicted, on technical grounds, of forging indorsements on the paper of the mercantile agency which he had built up, the prosecution claiming that he was only an employee and not a partner. In 1896 he was pardoned and exonerated. He died Feb. 9, 1904.

WIMPFFEN, Emmanuel Felix, a French soldier and author; born in the Department of Aisne, September 13, 1811. He was educated in the French military schools, and upon entering the army was assigned to Algeria, where he participated in numerous engagements. He was promoted brigadier-general of the Imperial Guard in 1855. He was a prominent officer in the Crimean War, and in 1859 was made general of division, being placed in command at Lyons. From 1867 to 1871 he was governor of Algiers. In the Franco-Prussian War he commanded an army corps, and succeeded General MacMahon as commander-in-chief of the French troops. He published *The National Army of France*, in 1876, and wrote several papers on military topics. He died in Paris, February 26, 1884. W.M.C.

WIMSHURST INFLUENCE MACHINE. See Electricity, § 12*b*, in these Supplements.

WINAMAC, a town and the county seat of Pulaski County, Indiana, in the northwestern part of the state. It lies in the agricultural prairie region drained by the Tippecanoe River, is reached by the Pittsburg, Cleveland, Chicago and St. Louis railroad, and in 1900 had a population of 1,684. W.F.J.

WINCHELL, Alexander, an American ge-

ologist, author and educator; born in North East, Dutchess County, New York, December 21, 1824. In 1847 he was graduated from the Wesleyan University, Middletown, Connecticut, studied theology for a year and then became a tutor. In 1852 he was president of a female seminary at Selma, Alabama, and in 1853 became professor of physics and civil engineering in the University of Michigan. In 1855 he was appointed to the chair of botany and geology. From 1859 to 1862 he was state geologist of Michigan, and from 1866 to 1869 was professor of geology in the University of Kentucky. For two years he was director of the Michigan Geological Survey and from 1872 to 1875 was chancellor of the Syracuse University. In 1879 he was made professor of geology and paleontology in the University of Michigan. In 1890 he was elected president of the American Geological Society and was a member of various scientific societies. He was well known as a lecturer on geological subjects and contributed largely to the magazines and reviews. His books include *The Grand Traverse Region* (1866); *Sketches of Creation* (1870); *Geological Chart* (1870); *The Doctrine of Evolution* (1874); *Science and Religion* (1877); *Preadamites* (1880); *Sparks from a Geologist's Hammer* (1881); *World and Life* (1883); *Geological Studies* (1886), and *Walks and Talks in the Geological Field* (1886). He died at Ann Arbor, Michigan, February 19, 1891. W.M.C.

WINCHENDON, a town of Worcester County, Massachusetts, at the center of the northern border of the state. It lies on Miller's River, has machine shops, cotton mills, furniture factories, and other industries, and is the site of a large asylum for orphans and destitute children. It is reached by the Fitchburg and the Boston and Albany railroads, and had in 1900 a population of 5,001. W.F.J.

WINCHESTER, a city and the capital of Scott County, western Illinois, on Big Sandy Creek, and on the Chicago, Burlington and Quincy railroad, 18 miles S.W. of Jacksonville. It is in a farming and coal mining region; ships grain, packed meats, lime and sandstone; has a saw-mill, plow and furniture factories, five churches, two banks and two weekly newspapers. Population, 1890, 1,542; 1900, 1,711.

WINCHESTER, Indiana, a city and the county seat of Randolph County, at the center of the eastern border of the state. It lies on the upper waters of the White River, in an agricultural region, and is reached by the Grand Rapids and Indiana and the Cleveland, Cincinnati, Chicago and St. Louis railroads. Its population in 1900 was 3,705. W.F.J.

WINCHESTER, Kentucky, a city and the county seat of Clark County, in the north-central part of the state. It lies just south of Bourbon County, in the famous "blue grass" region, 18 miles from Lexington. The chief interest of the region is stock raising, though Winchester has some lumber mills, but the city is pre-eminently a favorite place of residence, and one of the chief educational and social centers of that part of the state. It is well built and prosperous, and is steadily and substantially growing in wealth and population. It is reached by the Chesapeake and Ohio, the Kentucky Central and the Kentucky Union railroads, and had a population of 4,519 in 1890 and 5,984 in 1900. W.F.J.

WINCHESTER, Massachusetts, a large town of Middlesex County, in the eastern part of the state, containing many factories of leather and of furniture and school appliances. It is attractively situated on the Mystic River and Mystic Pond, and is a favorite place of residence in the suburbs of Boston, from which city it is only eight miles distant. It is reached by the Boston and Maine railroad, and had in 1900 a population of 7,248. W.F.J.

WINCHESTER, New Hampshire, a town of Cheshire County, in the extreme southwestern corner of the state. It fronts upon the Connecticut and the Ashuelot rivers, and is reached by the Connecticut River railroad. It has some manufactures of woolen and cotton goods, leather and hats, and is growing in favor as a place of summer resort. Its population in 1900 was 2,274. W.F.J.

WINCHESTER, Tennessee, a town and the county seat of Franklin County, in the central part of the southern border of the state. It is on the Elk River, in an agricultural, lumbering and mining country, and has considerable manufactures of vehicles and finished lumber. It is also a health resort for invalids, being salubriously situated at the foot of the Cumberland Mountains. It is reached by the Nashville, Chattanooga and St. Louis railroad, and in 1900 had a population of 1,338. W.F.J.

WINCHESTER, Virginia, a city which was formerly part of and the county seat of Frederick County, at the northern extremity of the state, but which is now an independent city, separated politically from the county. It lies at the northern end of the Shenandoah Valley, in a rich agricultural and stock-raising region, and is reached by the Baltimore and Ohio and the Cumberland Valley railroads. During the Civil War it suffered much, possession of it alternating between the two sides, and it was from Winchester that Sheridan made his famous ride to Cedar Creek, to turn defeat into a sweeping victory for the Federal arms, an incident which has been the theme of song and story. The city contains cemeteries of Federal and Confederate soldiers. Its population in 1900 was 5,161. W.F.J.

WINCHESTER, Caleb Thomas, educator and author; was born at Montville, Conn., on January 18, 1847, was graduated from Wesleyan University, Middletown, Conn., in 1869, and afterward studied at Leipsic. Since 1873 he has been professor of English literature at Wesleyan University and has been a frequent lecturer at Amherst, Princeton, Johns Hopkins and other colleges and universities. He is the author of *Five Short Courses of Reading in English Liter-*

ature (1892) and *Some Principles of Literary Criticism* (1899), and of numerous magazine and review articles. W.F.J.

WIND-DOGS. See HALO, Vol. XI, p. 357.

WINDER, JOHN HENRY, soldier, son of William Henry Winder, was born in Baltimore in 1800, and was graduated from West Point in 1820. He served in the Mexican War and was promoted for gallant and meritorious conduct at Contreras and Churubusco, and at the city of Mexico. In the Civil War he was a brigadier-general of the Confederate army, and had command of Libby, Belle Isle and Andersonville prisons. He died on February 7, 1865. W.F.J.

WINDER, WILLIAM HENRY, soldier, was born in Somerset County, Md., on February 18, 1775, was graduated from the University of Pennsylvania, and practiced law in Baltimore until the War of 1812. Then he entered the army. He led a successful expedition from Buffalo to the Canadian shore, and at first defeated the British at Stony Creek, but later in that engagement was taken prisoner and held until 1814. In the spring of that year he was released, and became adjutant-general in command of Maryland and Virginia, with a force of only 400 men. When the British invaded Maryland he was reenforced by about 2,000 undisciplined militia, with which it was impossible to make an effective stand against the British veterans. He was thus defeated at Bladensburg, and had to abandon Washington to the invaders. For this he was brought before a court martial, but the verdict was one of commendation for having heroically done the best he could against overwhelming odds. He was next sent to the Niagara River, but had no opportunity of achievement before the war closed. Then, with health shattered, he returned to Baltimore and resumed the practice of his profession. His rank in the army was that of brigadier-general. In civil life he was twice elected to the State Senate of Maryland. He died on May 24, 1824. W.F.J.

WINDERMERE LAKE. See LANCASHIRE, Vol. XIV, p. 253.

WIND-FLOWER, the popular name of species of *Anemona*, a genus of herbaceous plants belonging to the crowfoot family (*Ranunculaceæ*). The stem leaves are borne high up and are opposite or whorled, forming a kind of involucre to the showy flowers.

WIND-GALLS, soft swellings near the pastern joints of horses. They are generally the result of overwork, and are caused by an increased flow of the synovial fluid. R.W.C.

WINDHAM, a town of Cumberland County, Maine, in the southwestern part of the state. It lies between Portland and Sebago Lake, and is practically a suburb of that city. It contains several villages, is reached by the Maine Central railroad, and has a number of manufacturing establishments. Despite its natural advantages, its population decreased from 2,216 in 1890 to 1,929 in 1900. W.F.J.

WINDHOVER. See KESTREL, Vol. XIV, p. 55, note.

WINDISCHGRÄTZ, ALFRED, PRINCE, Prime Minister of Austria (1804–62). See AUSTRIA, Vol. III, p. 119.

WINDLASS, DIFFERENTIAL. See MECHANICS, Vol. XV, p. 772.

WINDOM, a village and the capital of Cottonwood County, southwestern Minnesota, 60 miles W. of Mankato, on the Chicago, St. Paul, Minneapolis and Omaha railroad. It is the center of an agricultural and stock-raising district. Population 1890, 835; 1900, 1,944.

WINDOM, WILLIAM, an American statesman; born in Belmont, Ohio, May 10, 1827. He removed to Massachusetts in 1855, and was sent to Congress in 1859. He was appointed to the United States Senate in 1870 and resigned in 1881 to accept the Treasury portfolio in Garfield's cabinet. After Garfield's death he returned to the Senate. He was Secretary of the Treasury in President Harrison's cabinet in 1889. He died in New York city, January 29, 1891. W.M.S.

WILLIAM WINDOM.

WIND-PIPE OR TRACHEA. See RESPIRATION, Vol. XV pp. 488–489.

WINDOWS, STAINED. See GLASS, Vol. X, pp. 596–600.

WINDS. See METEOROLOGY, Vol. XVI, pp. 129, 130, 131, 148–155.

WINDSOR Connecticut, a town of Hartford County, in the central-northern part of the state. It lies on the Connecticut River, at the confluence of the Farmington River, and contains a number of villages, devoted to agriculture and manufactures. Fruit-growing, tobacco-culture and dairying are among the chief occupations, the tobacco fields being of great extent and productiveness. Windsor was one of the earliest settlements in the state. It is reached by a division of the New York, New Haven and Hartford railroad, and had in 1900 a population of 3,614. W.F.J.

WINDSOR, a city of Henry County, western Missouri, 208 miles W. of St. Louis and 21 miles S.W. of Sedalia, on the Missouri, Kansas and Texas railroad. The surrounding region contains coal, and produces grain, broom-corn, flaxseed and live-stock, and the city is an important trade-center. Population, 1900, 1,502.

WINDSOR, Nova Scotia, a seaport town and port of entry of Hants County, Nova Scotia, Canada, fronting on the Minas Basin, 39 miles northwest of Halifax. It lies at the junction of the Avon and St. Croix rivers, in a region rich in limestone and gypsum, of which it has large quarries. It has also a trade in fruit, and has shipbuilding yards, foundries, lumber and cotton

mills, and other industries. It is the seat of King's College, and had in 1901 a population of more than 3,398. W.F.J.

WINDSOR, a town and port of entry of Essex Co., Ontario, Canada, 110 miles S.W. of London, and opposite Detroit, on the Detroit River, and on the Canadian Pacific, the Grand Trunk and the Michigan Central railroads. It is an important shipping-point for grain, produce and salt, and has breweries, distilleries and manufactories of tobacco, brooms, leather and carriages. Pop., 1901, 12,153.

WINDSOR, Vermont, a town of Windsor County, on the southeastern border of the state. It borders on Mill Brook and the Connecticut River, in a country of rare beauty and of considerable fertility. Its chief products are cattle, poultry, fruit, and maple sugar, and it has some manufacturing establishments. It is the site of the state prison. It is reached by the Connecticut River and the Central Vermont railroads, and in 1900 had a population of 2,119. W.F.J.

WINDSOR CASTLE. See WINDSOR, Vol. XXIV, pp. 632, 633.

WINDSOR LOCKS, a town of Hartford Co., Connecticut, adjoining the town of Windsor, of which it was until 1854 a part, on the Connecticut River, and on the New York, New Haven and Hartford railroad. By means of a canal it obtains a good water-power, and has large mills engaged in the manufacture of various grades of paper, and manufactories of cotton and woolen goods, thread, silk, school apparatus, furniture, and foundry products. Pop., 1900, 2,997.

WINDTHORST, LUDWIG, a German statesman; born at Osnabrück, Hanover, January 17, 1812. After having studied law at Göttingen and Heidelberg he began to practice at Osnabrück. In 1849 he entered the Second Hanoverian Chamber, and as chief of the Ministerialists was made president of the Chamber in 1851, and was minister of justice from 1851 to 1853. In 1862 he became a member of the reactionary cabinet and pushed on the alliance with Austria, which resulted in the annexation of Hanover to Prussia. He then organized the Hanoverian opposition, and was returned to the Prussian Chamber. He was a member of the Catholic Congress of Berlin, which pronounced against the dogma of the infallibility of the Pope's utterances *ex cathedra;* nevertheless, after the creation of the German Reichstag, he became leader of the Ultramontane party, and Prince Bismarck's most able opponent. He addressed himself particularly against the system of repression established in Alsace-Lorraine, labored against the expulsion of the Jesuits, opposed the establishment of the May Laws, and in the Prussian Landtag took a strong position against the Falk Laws. In 1879, however, when Falk was dismissed, and Prince Bismarck seemed disposed to rest upon Conservative support, Herr Windthorst adopted a more conciliatory attitude. As a result of this position he was able to gain important concessions for the Roman Catholics in 1882 and 1883. He died in Berlin, Germany, March 9, 1891. W.M.C.

WINDWARD ISLANDS, the name given to the southern part of the Lesser Antilles, also known as the Southern Caribbees. They are a British colonial possession, and as such form an administrative entity. The chief members of the group are Barbados, St. Lucia, St. Vincent, the Grenadines, Tobago, and Grenada. Of these Barbados is a separate colony and Tobago is attached to Trinidad. The others are all under a single governor, court of appeal, board of audit, and asylum system. In other respects their governments remain separate. Their area is 508 square miles and their population in 1903 was 167,067. W.F.J.

WINEBRENNER, JOHN, clergyman and reformer, was born in Maryland on March 25, 1797, studied at Dickinson College, and in 1820 became a minister of the German Reformed Church at Harrisburg, Penn. His peculiar zeal as a "revivalist" incurred the disapproval of some of his fellow clergymen, and he accordingly in 1825 withdrew from that church and became the founder of a number of new, independent churches, called by him "The Church of God," but popularly known as Winebrennerians. These were organized into a coherent denomination in 1830. Its object, according to Winebrenner, was "the restoration of primitive Christianity in letter and spirit, in faith and practice." It was earnestly opposed to slavery, and to intemperance, practiced baptism by immersion, and also practiced the washing of feet as a sacrament. The Lord's Supper was celebrated in the evening, seated at a table. This pure and simple faith was earnestly promulgated through "revivals" and camp-meetings, and found many to accept it. It survived Winebrenner, and at the present time has scores of thousands of adherents. Winebrenner was the author of a number of books, marked with his own fervent piety, and edited several hymn-books and a periodical called *The Church Advocate*. He died at Harrisburg, Penn., on September 12, 1860. W.F.J.

WINES, ENOCH COBB, philanthropist and prison reformer, was born in Burlington County, New Jersey, on February 17, 1806; was graduated from Middlebury College, Vermont, in 1827, and for a number of years was engaged in teaching. In 1849 he entered the Congregationalist ministry, in 1853 became professor of ancient languages in Washington College, Penn., and in 1859 president of the City University of St. Louis, Mo. It was not until 1862, however, when he was fifty-six years old, that he found and entered upon the real work of his life. In that year he became secretary of the New York Prison Association, and gave himself to the study of prison conditions. He visited prisons and reformatories throughout the country, and in 1867 made an important report to the New York legislature upon existing abuses and needed reforms. He founded the National prison congresses, which were held in 1870, 1872, 1874, and 1876, and the National Prison Association in 1870. Of the

latter association he was secretary from its organization to his death. He was the chief pioneer in the introduction of healthful labor into prisons. In 1871 he went to Europe and organized the international penitentiary congress which met in London in 1872 and was attended by representatives of twenty-six governments. At that congress he was appointed chairman of a permanent international prison committee. He was the author of *Commentaries on the Laws of the Ancient Hebrews* (1853), *Adam and Christ* (1855), *Historical and Farewell Discourses* (1855), *The True Penitent* (1862), *Regeneration* (1863), *Temptation* (1865), *The Promises* (1865), and *The State of Prisons and Child-Saving Institutions Throughout the World* (1880). The last named work was put into type just before his death, but not published until after it. He died while correcting the last proof-sheets, at Cambridge, Mass., on December 10, 1879. W.F.J.

WINES, Frederick Howard, a prison reformer, son of Enoch Cobb Wines (q. v.), was born in Philadelphia on April 9, 1838, was graduated from Washington College, Penn., in 1857, and from Princeton Theological Seminary in 1865. He was a chaplain in the army, and a Presbyterian minister afterward. He became associated with his father in the work of prison investigation and reform, and continued it after his father's death. He has been a member and officer of numerous reform associations, congresses, etc., and a special lecturer on penology and other topics. W.F.J.

WINFIELD, a city and the capital of Cowley County, southeastern Kansas, on the Walnut River, and on the Atchison, Topeka and Santa Fé and the St. Louis and San Francisco railroads, 38 miles S.E. of Wichita. It is in a rich farming region; has several flouring-mills and machine-shops. It contains the Southwestern Methodist Episcopal college, a German Lutheran college, the state institution for the feeble-minded, and Chautauqua grounds; has four banks, one daily, three weekly and several monthly newspapers. Population 1890, 5,184; 1900, 5,554.

WINFIELD, a village and the capital of Putnam County, southwestern West Virginia, on the Great Kanawha River, 24 miles N.W. of Charleston. It has steamboat traffic to the Ohio River; has a tannery, stave factory, flour-mills, tobacco factory and two weekly newspapers. Population 1890, 302; 1900, 338.

WINGHAM, a village of Kent County, Ontario, Canada, sixty-two miles north of the city of London. It lies on the Maitland River, in an agricultural, dairying and lumbering region, and has considerable industries subsidiary to those interests. It is reached by the Grand Trunk and Canadian Pacific railroads, and had in 1900 a population of about 2,250. W.F.J.

WINLOCK, Joseph, an American astronomer; born at Shelbyville, Kentucky, February 6, 1826. He was graduated from Shelby College in 1845, and in the same year was appointed professor of mathematics and astronomy in that institution. From 1852 to 1856 he was one of the editors of *The American Ephemeris and Nautical Almanac*. In 1856 he was appointed professor of mathematics in the United States Naval Academy at Annapolis, Maryland, and at the end of two years returned to the office of the *Nautical Almanac*. From 1859 to 1861 he was again in the mathematical chair at Annapolis. In 1866 he was appointed professor of astronomy at Harvard University and became director of the observatory at Cambridge. In 1863 he was elected to the National Academy of Sciences, and was in charge of the solar eclipse expedition to Kentucky in 1869. He made a number of important improvements in the equipment of the Cambridge observatory and devised a horizontal telescope of long focus, used in observing the transit of Venus in 1874 and in 1882. He wrote a volume entitled *Tables of Mercury*. He died in Cambridge, Massachusetts, June 11, 1875. W.M.C.

WINNEBAGO, a lake in Winnebago County, east central Wisconsin, the largest in this state, lying 40 miles W. of the middle of the west shore of Lake Michigan, and connected by Fox River with Green Bay. It forms the eastern boundary of Winnebago County, which it separates from Calumet County; the southern portion of the lake being in the county of Fond du Lac. Its length is about 30 miles; greatest width, 11 miles; area, 220 square miles; altitude, 748 feet. The Fox River enters at the west side and issues at the northern end of the lake. Steamboats ply on it, the chief towns on it being Fond du Lac, Oshkosh and Menasha. It abounds in fish.

WINNEBAGO CITY, a village of Faribault county, southern Minnesota, on Blue River, and on the Chicago, Milwaukee and St. Paul and the Chicago, St. Paul, Minneapolis and Omaha railroads, 33 miles S. of Mankato. It is in a farming region; has water-works, two banks, two weekly newspapers, and a Freewill Baptist college. Population 1890, 1,108; 1900, 1,816.

WINNEBAGO INDIANS. See Indians, Vol. XII, p. 871.

WINNEMUCCA, a village, the capital of Humboldt county, northwestern Nevada, on the Humboldt River and the Southern Pacific railroad. It is in a farming and silver-mining region; ships beef, wool and grain; has one bank and one daily paper. It contains extensive workshops of the Central Pacific railroad. Population precinct, 1900, 1,110.

WINNEMUCCA LAKE, in western Nevada, lying in a desert, without a visible outlet, 27 miles long from north to south, 4 miles wide, from 50 to 57 feet deep, altitude 3,875 feet. It is supplied on the south by the eastern division of the Truckee River, and receives part of the surplus waters of Lake Tahoe. It occupies the extreme southwest strip of Humboldt County, and lying over into Washoe County, its southernmost end lying in Churchill County. It lies between the Truckee range on the east and the Lake range on the west, between it and Pyramid Lake, which receives the western division of the Truckee River.

WINNIPEG, capital of the Canadian province of

Manitoba. Population 1891, 25,639; 1901, 42,340. See Vol. XXIV, p. 646.

WINNIPEG LAKE AND RIVER. See MANITOBA, Vol. XV, pp. 497–498.

WINNIPEGOOSIS LAKE. See MANITOBA, Vol. XV, p. 498.

WINNIPESEOGEE, pronounced and often spelled WINNEPESAUKEE, is the largest lake in New Hampshire and one of the most beautiful in America. It lies in Belknap and Carroll counties, in the east-central part of the state, directly south of the White Mountains, and is very irregular in shape and studded with many islands. Its total area is about 175 square miles, and it lies at a level of 472 feet above the sea. It is a favorite resort of tourists. W.F.J.

WINNSBORO, a city and the county seat of Fairfield County, South Carolina, in the north-central part of the state. It is in an agricultural district, and has some quarrying interests. In the Revolutionary War it was for a time Lord Cornwallis's headquarters. It is reached by the Richmond and Danville railroad, and had in 1900 a population of 1,765. W.F.J.

WINONA, Minnesota, the seat of Winona County, a city on the west bank of the Mississippi River, and converging point for divisions of the Chicago, Milwaukee & St. Paul, the Chicago & Northwestern, and the Winona & Western railroads, 106 miles southeast of St. Paul. It is a busy railroad, farming, commercial and manufacturing center for southeastern Minnesota, southwestern Wisconsin and northern Iowa, and has passenger and steam freight connections with all leading river ports, flour and lumber mills, agricultural implement and machinery factories, grain elevators, breweries, and pork-packing establishments. The State Normal School is situated here. Population, 1890, 18,208; 1900, 19,714. C.L.S.

WINONA, a town and the capital of Montgomery County, north central Mississippi, on the Illinois Central and Southern railroads, 23 miles S. of Granada. It is the commercial center of a large cotton-raising region, and has a variety of small manufactures. Pop. 1890, 1,648; 1900, 2,455.

WINOOSKI, the name of a river and village of Vermont. The village is in Chittenden County, in the northwestern part of the state, on the Vermont Central railroad, 3 miles E. of Burlington. Population 1900, 3,783. The river rises in Caledonia County, northwestern Vermont, and after a northwesterly course of one hundred miles through the Green Mountains in Washington and Chittenden counties, empties into Lake Champlain three miles north of Burlington. Montpelier, the capital, is on this stream.

WINSLOW, GORDON, clergyman, was born at Williston, Vt., on September 12, 1803, the brother of Hubbard and Myron Winslow (q. v.). He was graduated from Yale College in 1830, and from the Yale Divinity School in 1833, and was a Congregationalist pastor in 1834–35. He then became a minister of the Protestant Episcopal Church. In the Civil War he was an army chaplain, with Duryea's Zouaves, and did heroic work in hospitals and elsewhere. He was one of the founders of the Sanitary Commission, and was its inspector with the Army of the Potomac. He was drowned in the Potomac River on June 7, 1864. W.F.J.

WINSLOW, HUBBARD, clergyman and author, brother of Gordon and Myron Winslow (q. v), was born at Williston, Vt., on October 30, 1799. He was graduated from Yale College in 1825, studied theology at Andover and became a Congregationalist minister, at Dover, N. H., and in Boston. In 1844–54 he conducted a girls' school in Boston, in 1857–59 he had charge of a Presbyterian Church at Geneva, N. Y., and in 1860 he became a Presbyterian preacher and also a teacher in New York. He died on August 13, 1864. W.F.J.

WINSLOW, JOHN, soldier, grandson of Josiah Winslow, was born at Marshfield, Mass., on May 27, 1702, and became a soldier. In 1740 he led a Boston company in an expedition against Cuba; in 1755 was major-general of the colonial troops in charge of the removal of the Acadians,—a business which he disliked; in 1756 commanded at Fort William Henry on Lake George; in 1758–59 led an expedition to the Kennebec River; and in 1762 was a commissioner to define the eastern boundary of Maine. He died at Hingham, Mass., on April 17, 1774. W.F.J.

WINSLOW, JOHN ANCRUM, naval commander, a descendant of John Winslow, brother of Governor Edward Winslow, of Plymouth, was born at Wilmington, N. C., on November 19, 1811, was educated at Dedham, Mass., and entered the navy as midshipman in 1827. He did gallant service in the Mexican War, where for a time he was a shipmate of Raphael Semmes. At the outbreak of the Civil War he served with great efficiency on Foote's flotilla of gunboats on the Ohio and Mississippi rivers. In July, 1862, he was made captain, and put in command of the *Kearsarge*, his special commission being to watch for and capture Confederate cruisers. He accordingly cruised in French and British waters, and in June, 1864, had the joy of finding at Cherbourg the *Alabama*, commanded by his old friend Semmes. A battle occurred on June 19 with the result that the *Alabama* was soon destroyed, the *Kearsarge* suffering only slight damage. Winslow was made commodore for this achievement, and in 1872 was made rear-admiral. He died in Boston on September 29, 1873. W.F.J.

WINSLOW, JOSIAH, colonial statesman, son of Governor Edward Winslow of Plymouth Colony, was born at Plymouth, Mass., in 1629, was a fine scholar, and became a soldier and leader in the war with King Philip. He was a deputy to the general court of the colony, was assistant governor of the colony from 1657 to 1673, and after 1673 governor of the colony, being the first American-born governor of any colony. He was tolerant to the Quakers and a friend to the Indians. He married Penelope Pelham, daughter of Hubert Pelham, and lived at the family seat at

Marshfield, Mass., afterward the home of Daniel Webster. He died at Marshfield on December 18, 1680. W.F.J.

WINSLOW, MYRON, missionary, brother of Hubbard and Gordon Winslow, was born at Williston, Vt., on December 11, 1789. He was graduated from Middlebury College, Vt., and from Andover Theological Seminary, and then went to Ceylon as a missionary of the American Board. After sixteen years there he removed to Madras, where he spent twenty-eight years, and founded a college and several schools. He published a Tamil edition of the Bible, a Tamil dictionary, and several other works. He died at the Cape of Good Hope, on his way home, on October 22, 1864. W.F.J.

WINSLOW, WILLIAM COPLEY, archæologist, son of Hubbard Winslow, was born in Boston on January 13, 1840, and was graduated from Hamilton College in 1862, and from the General Theological Seminary of the Protestant Episcopal Church in 1865. In 1883 he founded the American branch of the Egypt Exploration Fund, was its chief officer for ten years, and did much for the promotion of Egyptology. He has also been associated with other historical and scientific organizations, and has done much editorial work. He has been a voluminous writer. W.F.J.

WINSOR, JUSTIN, an American historian and librarian; born in Boston, Massachusetts, January 2, 1831. He was educated at Harvard and in Europe, and from 1868 to 1877 was superintendent of the Boston Public Library. From 1877 to 1897 he was librarian at Harvard, and from 1876 to 1886 was president of the American Library Association. His works include *Reader's Handbook of the American Revolution* (1880); *Memorial History of Boston* (1882); *Narrative and Critical History of America* (8 vols., 1889); *Christopher Columbus* (1891); *From Cartier to Frontenac* (1894); *The Mississippi Basin*, and *The Struggle in America between England and France* (1895). He died in Cambridge, Massachusetts, October 22, 1897. W.M.C.

JUSTIN WINSOR.

WINSTED, a borough of Litchfield County, extreme northwestern Connecticut, on Mad River, and on the Philadelphia, Reading and Northeastern and the New York, New Haven and Hartford railroads, 26 miles N.W. of Hartford. It has an abundant water-power, and contains manufactories of cutlery, hardware, pins, hoes, scythes, clocks and silk goods. Population 1890, 4,846; 1900, 6,804.

WINSTON, a city and the capital of Forsyth County, northwestern North Carolina, on the Southern and the Norfolk and Western railroads; 27 miles W. of Greensboro. It is a manufacturing center, having over one hundred factories, including iron-works, cotton and woolen mills, and shuttle and bobbin works. Salem, one half mile distant, is generally included in Winston. Population 1900, 10,008.

WINSTON, JOHN ANTHONY, statesman, was born in Alabama on September 4, 1812, was educated at LaGrange College, Ala., and Nashville University, Tenn. In 1853 he was elected governor. In 1860 he supported Douglas for the Presidency and opposed secession, but upon the election of Lincoln was drawn into the secession movement. He served in the Confederate army, and distinguished himself at Seven Pines, at Yorktown, and elsewhere. In 1867 he was elected to the U. S. Senate but was excluded from his seat on the ground that he was not "reconstructed." He died at Mobile on December 21, 1871. W.F.J.

WINTER, JOHN STRANGE. See STANNARD, in these Supplements.

WINTER, WILLIAM, an American dramatic critic, essayist and poet; born in Gloucester, Massachusetts, July 15, 1836. He was graduated from the Cambridge High School and from the Harvard Law School, and was admitted to the bar in 1858. After serving a year on the staff of the Boston *Transcript*, he removed to New York, where in 1859 he became attached to the staff of the *Saturday Press*. He subsequently wrote for the *Albion* and *Vanity Fair*, both weekly newspapers, and in 1865 became managing editor and dramatic critic of the New York *Weekly Review*. In 1866 he accepted a position with the New York *Tribune* as dramatic critic and in the course of a few years won a high place in his profession, being recognized as a leading authority on the drama in America. He has written several volumes of verse, including *The Convent and Other Poems* (1864); *The Queen's Domain* (1868); *My Witness* (1871); *Thistledown* (1877), and *Wanderers* (1888). A complete edition of his poems appeared in 1893. In dramatic biography and criticism he has written *Life of Edwin Booth* (1872); *The Jeffersons* (1884); *Life of Henry Irving* (1885); *The Stage Life of Mary Anderson* (1886), and *Shadows of the Stage* (1895). His other works include *The Trip to England* (1879); *English Rambles* (1884); *Shakespeare's England* (1886); *Gray Days and Gold in England and Scotland* (1891); *Old Shrines and Ivy* (1892), and *Brown Heath and Blue Bells* (1893). He also edited the works of Fitz James O'Brien and the *Shakespearian and Miscellaneous Plays of Edwin Booth* (1899). W.M.C.

WILLIAM WINTER.

WINTERBERRY. See HOLLY, Vol. XII, p. 105.

WINTERGREEN, a name given to various species of the heath family (*Ericaceæ*): (1) *Gaultheria procumbens*, also called checkerberry, a common

running evergreen in low woods, sending up low stems which bear oval leaves at the summit and one or two nodding white flowers, followed by edible red berries, which, with the leaves, are aromatic and yield the oil of wintergreen; (2) species of *Pyrola*, low plants with leaves more clustered at the base, and a raceme of delicate flowers; and (3) *Moneses uniflora*, a plant of the cold woods, with roundish, veiny leaves, and a naked stem bearing a rather large white or rose-colored flower.

WINTERGREEN, Oil of. An oil obtained from the flowers of *Gaultheria procumbens* (wintergreen), one of the ericaceæ. Its chief constituent is the methyl ester of salicylic acid. This acid is used largely in medicine, but all our supply is made artificially from phenol (carbolic acid).

WINTERHALTER, Franz Xavier, a German artist; born at Menzenschwand, near St. Balsien, April 20, 1806. He was educated in Carlsruhe and Munich and studied art for several years in Florence and Rome. He removed to Paris in 1834 and here obtained the patronage of Louis Philippe and other celebrities. He was subsequently liberally patronized by the English court. He received medals for his work in his portraiture at the Salon of 1836–37, and at the Paris Exposition of 1855. In England he executed portraits of Sir Robert Peel, the Duke of Wellington and others, and in France of Louis Philippe, Napoleon III, the Prince Imperial and the members of the Orléans family. A portrait of Queen Caroline of England is regarded as his masterpiece. In 1857 he was made an officer of the French Legion of Honor, and in 1861 was nominated a member of the Order of the Red Eagle. He died at Frankfort-on-the-Main, July 8, 1873. W.M.C.

WINTER PARK, a town of Orange County, eastern-central Florida, on the Savannah, Florida and Western and the Florida Central and Peninsular railroads, 5 miles from Orlando. It is in the midst of an orange-raising district, and is a popular winter-resort. Population, 1900, 366.

WINTERPORT, a town of Waldo County, Maine, in the southern part of the state. It lies on the west side of the Penobscot River, twelve miles south of Bangor, and has much commerce on that river by steam and sailing craft. It has some industries, and in 1900 had a population of 1,623. W.F.J.

WINTERSET, a city in Madison Co., southwestern-central Iowa, on the Chicago, Rock Island and Pacific railroad, 30 miles S.W. of Des Moines. It is in a farming region which produces livestock, grain and general produce; has four weekly newspapers and a good system of graded schools. Population, 1890, 2,281; 1900, 3,039.

WINTHER, Christian. See Denmark, Vol. VII, p. 81.

WINTHROP, Maine, a town of Kennebec County on the Cobbesconte River, 70 miles by rail northeast of Portland. It has milling industries, and manufactures woolens, blankets, oilcloths, etc. Population, 1900, 2,088. C.L.S.

WINTHROP, a town of Suffolk County, eastern Massachusetts, on the Boston, Revere Beach and Lynn railroad, on Boston harbor, five miles N.E. of Boston, of which city it is a suburb and summer-resort; has a public library and sundry manufactures. Population 1890, 2,726; 1900, 6,058.

WINTHROP, James, jurist, son of John Winthrop of Harvard College, was born at Cambridge, Mass., in 1752, and was graduated from Harvard in 1769. He was an earnest patriot, and fought and was wounded at Bunker Hill. He was librarian of Harvard College, a judge of the court of common pleas, and register of probate. He was a student of Scriptural prophecies, and wrote a number of works upon the subject. He died at Cambridge on September 26, 1821. W.F.J.

WINTHROP, John, scientist, descendant of Governor John Winthrop of Massachusetts Colony, was born in Boston on December 19, 1714, was graduated from Harvard in 1732, and in 1738 became professor of mathematics and natural philosophy in that college. For forty years he filled that chair, and was a leading figure among the scientists of the day. In 1761 he led an expedition to Newfoundland to observe a transit of Venus, the first such expedition sent out from America. In 1740 he reported upon a transit on Mercury, and was elected a member of the Royal Society. In 1755 he made observations of an earthquake shock, noted the character of the vibrations, and by his computations and deductions founded the modern science of seismology. His theory of earthquakes led to a controversy with Thomas Prince, of Boston, who opposed him on theological grounds, but Winthrop had little difficulty in maintaining the soundness at once of his science and of his orthodoxy. He died at Cambridge on May 3, 1779. W.F.J.

WINTHROP, John (or Fitz-John), colonial statesman, son of John Winthrop, Jr. (q. v., Vol. XXIV, p. 647); was born at Ipswich, Mass., on a date variously stated as March 14, 1638, and March 19, 1639. He studied at Harvard College but did not finish the course, leaving it to enter the parliamentary army in England. After the Stuart restoration he returned to New England, settled in Connecticut, and became a leading magistrate of the colony. In 1690 he led a land expedition up the Hudson to attack Montreal, in co-operation with Phipps's expedition against Quebec. Three years later he was sent to England to secure a vindication of Connecticut's independence of New York and the other colonies, which he did. In 1698 he was chosen governor of Connecticut. He died on November 27, 1707. W.F.J.

WINTHROP, Robert Charles, statesman, descendant in the sixth generation of John Winthrop, the first governor of Massachusetts Colony, was born in Boston on May 12, 1807, entered the Boston Latin School in 1816, and was graduated from Harvard College in 1828. He then entered the law office of Daniel Webster, was admitted to the bar, and became interested in politics as a Whig and a follower of Henry Clay. He also

became an officer of the Ancient and Honorable Artillery Company of Boston. In 1834 he was elected to the state assembly, and in 1838 was chosen speaker, being the youngest man that had ever filled that place. In 1841–50 he was a representative in Congress, and in 1848–49 was speaker of the House. In 1850 he was appointed to succeed Webster in the U. S. Senate, serving for a year. Thereafter he held no public office save that of Presidential elector in 1852. Thereafter he was known as a scholar, orator, writer, and public spirited citizen. He made many notable historical and commemorative addresses, and was identified with Harvard University, the Massachusetts Historical Society, the Boston Provident Association, and other public bodies. He was for many years the head of the Peabody Educational Fund. He died in Boston on November 16, 1894. W. F. J.

WINTHROP, Theodore, soldier and author, descendant of John Winthrop, first governor of Massachusetts Colony, was born at New Haven, Conn., on September 22, 1828, and was graduated from Yale College in 1848. He entered the service of the Pacific Mail Steamship Company and spent much time at sea, and also crossed the continent from Oregon to New York. He became a lawyer in New York in 1855, went to the Civil War with the New York Seventh Regiment in 1861, and was killed in an engagement at Great Bethel, Va., on June 10, 1861. He wrote several books in prose and verse, two of which, the romances *Cecil Dreeme* and *John Brent*, are marked with rare genius and are among the gems of American literature. W. F. J.

WINYAW BAY, in Georgetown County, South Carolina, is really the tidal estuary of the Great Pedee, the Black and the Waccamaw rivers. It is about fourteen miles long and averages two miles wide. W. F. J.

WIRE. The drawing of wire has greatly increased within recent years, as the manufacture of small articles has called for greater quantities. The annual production of wire-rods, as the material is called before it is drawn, in the United States, is now about seven hundred thousand tons a year, exceeding the combined product of all the other mills in the world. Pennsylvania, Ohio, Illinois and Massachusetts are the leading wire-making states, in the order named. About four hundred kinds of round wire are made, one hundred sorts of flat wire, and an innumerable number of forms of odd cross-section, as for commutators, pinions, pivots, typewriter bars, eye-glasses, etc. The largest size of wire, properly so called, is .300 of an inch in diameter, and it has been drawn as fine as $\frac{1}{1000}$ of an inch. Diamond or ruby dies are used for drawing very small sizes. About one third of the wire used in this country goes into fences, mostly of the barbed-wire style, and nearly another third is used in the electrical industries. Since 1884 basic Bessemer steel has largely superseded iron wire for many purposes. Telegraph and telephone wire is still most commonly made of iron, because it is a better conductor than steel, though steel is often preferred on account of its greater strength; and a bimetallic wire having a steel core for strength, surrounded by a coating of copper for conductivity, is coming largely into use. For long-distance telephony an all-copper wire is necessary. Aluminum wire, having more than half the conductivity of copper, and much greater tensile strength, is increasing in use. Brass wire is principally used for springs, etc., that are exposed to moisture prohibiting the use of iron, which would rust. Platinum wire is used largely for incandescent lamps, and for scientific and chemical apparatus, where intense heats are created. About sixty million square feet of wire-netting are made annually in the United States, the wire used being called weaving-wire or stone-wire. The latter name originated from the English custom of putting it up in 14-pound coils. In this country 12-pound coils are used for this wire. Most wire is put up in 63-pound bundles, a survival of an old English custom. Telegraph-wire, however, is ordered by the mile, and put up in any convenient size. Copper trolley-wire is frequently shipped in mile lengths on large reels. Music or piano-wire, which forms the strings of musical instruments, the spokes of bicycles, etc., is made of highly tempered steel, and often has a tensile strength of two hundred tons per square inch. The covering-wire used for the bass notes of musical instruments is a soft, untempered wire of no great strength. The smaller sizes of screws, bolts, rivets, pinions and similar articles are made almost wholly from wire, which is cut up and shaped by special machinery. Some of the names applied to varieties of wire are confusing and far from self-explanatory. Bail-wire is used for the handles of tin-pails, kettles, etc.; baling-wire is a soft annealed wire for tying up bales. Bonding-wire is a copper or galvanized iron wire for connecting rail-joints of an electric railway; binding-wire is the same as bailing-wire, and is also called bundling or binder-wire. Market wire is any common size of soft steel or iron wire, suitable for the retail hardware trade. Slug-wire is a rectangular corrugated wire used for pegging shoes. Patented wire is that tempered by what is known as the Horsfall process. Cooperage wire is of coppered steel, and is used for strengthening barrels in connection with wooden hoops. Feeder-wire is a heavy copper wire used for feeding or transmitting a current of electricity to distant points on a trolley-line where the current requires to be increased or renewed. Magnet-wire is a wire of soft, pure copper, wrapped with silk or cotton, for use in induction-coils, etc. Much confusion exists as to the sizes by which wire is gauged. The Birmingham wire gauge, usually indicated as B.W.G., is numbered 1 for .300 of an inch and 36 for .004 of an inch, while the Brown and Sharpe gauge (B. and S.) is numbered 1 for .2893 and 36 for .005. The new British standard is 1 for .300 and 36 for .0076. C. H. Cochrane.

WIRE–GLASS. When glass came to be used for the roofs of large buildings, such as railway stations, to which light could not be admitted conveniently in any other way, it was found to endanger people below because of the frequency with which broken

pieces fell down. The difficulty was met by the use of protective gratings or stout wire-screens, until 1892, when Shuman's patent wire-glass appeared. It is cast glass, commonly from three sixteenths to three eighths of an inch in thickness, within which is imbedded wire-netting made in meshes of from three inches down to one quarter-inch. In manufacture, the molten glass is poured on a large iron table, over which four heavy iron rollers are passed, the hot wire-netting being fed in automatically between the first and second rollers. The iron table is set in the floor, and heated from below by means of gas-flames, so that it may not chill the glass. The wire-netting is heated almost to the temperature of the molten glass. The rollers are very heavy, delivering a pressure of fifty pounds to the square inch. They are connected by a firm, truck-like framework. The first roller serves to smooth and spread the glass evenly. The hot wire-netting slides down with the second roller, which is corrugated, so as to depress it into the glass, which then requires further smoothing, which is done by the third roller. This rolling renders the glass plastic, and the fourth roller is used to prevent it from curling up, as well as to give a further smoothing. The glass is then annealed, to secure toughness, after which it is trimmed down at the edges to the size of the netting, and is ready for the market. Wire-glass can be made thinner than other glass for the same use, because of the added strength given it by the wire. It is therefore an economical article, and has come into use so rapidly that two large factories, one at Tacony, Philadelphia, and one at St. Louis, were established within two years after the Shuman process was patented. It is particularly suitable for use in the roofs of railway stations, as it is not readily damaged by vibration, and as it will sustain a great weight of snow. Its use in business buildings, dwellings, etc., in skylights is on the increase.

C. H. COCHRANE.

WIRE-ROPE. See ROPE, Vol. XX, 868–869.

WIRE-WAYS. See ROPEWAY, in these Supplements.

WIRELESS TELEGRAPHY. See TELEGRAPHY (Wireless), in these Supplements. What experiments have recently been made by M. Marconi in electro-magnetic wave-telegraphy, oscillation or radiation, emphasizes the value of the discovery, with a view at least to commercial utilization. Its practical app' cation would, however, appear to be limited, as compared with submarine cable use, since messages transmitted by continuous wire, the present metallic-circuit system, can be sent at the rate of 600 words per minute, while the Marconi wave-telegraph, so far as developed, can transmit only about 20 words per minute. For communications between the shore and lightships or moored vessels and lighthouses on the mainland, or in signaling between ship and ship in fleet maneuvers, the discovery must nevertheless be of moment. The distances covered by wireless telegraphy in regular operation are indefinite and dependent on various conditions and may be set at from one to one hundred miles and in exceptional cases to two hundred miles. Mr. Valdemar Poulsen, of Copenhagen, the inventor of the telegraphone, has of late succeeded in the continuously generating of high frequency waves, which permits much closer syntonizing of the apparatus and makes the transmission of radiant energy more effective. By connecting an oscillating-current circuit with a direct current arc, *i. e.*, by placing the arc in an atmosphere of hydrogen or hydrocarbon, the frequency of its oscillations running up to 30,000 or 40,000 a second, can be raised to a million or more. The new system permits of very close syntonization and prevents interference of different stations in the same region. There is also very little trouble from atmospheric disturbances and accidental electrical discharges.

There are four principal wireless telegraph companies, of which the first three use only slightly deviating systems. The Marconi International Marine Commission Company has 70 stations located in Great Britain, the English Colonies, and Italy. The four Marconi towers at Glace Bay, Nova Scotia, each 215 feet tall, are surmounted by poles 50 feet high. Some 50 ærial wires run from these poles horizontally for several feet, as a directive system. The plant includes a steam engine of 500 horse power and an alternator of 250 kilowats of 2,000 volts.

Commercial service between Nova Scotia and Ireland by the Marconi wireless system was inaugurated October 18, 1907. Nearly five years ago the first message was sent across the Atlantic Ocean, and commercial service was attempted two years ago, but abandoned because the apparatus was not sufficiently powerful and sensitive. Daylight transmission is now nearly as satisfactory as sending by night. The American DeForest Wireless Telegraph Company, of New York, has 41 stations in the United States, and after having become affiliated with The American Orling Company, became The Amalgamated Radio-Telegraph Company, London.

Another company is The National Electric Signaling Company of Washington. The largest company, however, is The Wireless Telegraph Company of Berlin, using the Slaby-Arco-Broun system. It operated in 1906, 628 stations, one-third of which are located in Germany.

WISCONSIN had in 1900 a population of 2,069,042, and 54,450 sq. miles of land surface. In 1900, the foreign born in the state numbered 515,971.

AGRICULTURAL STATISTICS.	1890.	1900.
Number of farms	146,409	169,795
Number of acres in farms	16,787,988	19,862,727
Value of farms, fences, buildings, machinery and live-stock	$560,475,894	$811,712,319
Number of horses	460,740	521,867
Number of mules and asses	5,752	4,918
Total number of cattle	1,647,947	2,314,105
Number of milch cows, included above	792,620	998,397
Number of swine	1,347,750	2,014,631
Number of sheep	984,972	1,675,453

The production of wool for 1899 was greater than that for any previous census year. The year 1889 showed a considerable decrease compared with 1879, but the census of 1900 showed an increase of 2.9 per cent in the production of wool since 1879, and 45.0 per cent since 1889.

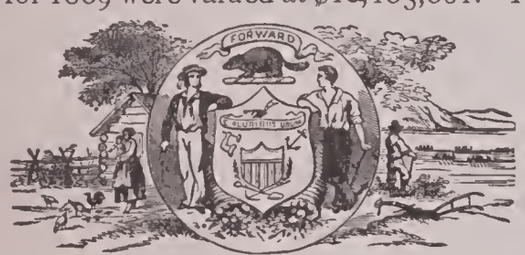
Of tobacco, Wisconsin produced 45,500,480 pounds, raised on 38,830 acres in 1899.

STATE CENSUS OF PRODUCTS IN 1900.

	NUMBER.	VALUES.
Improved farms	89,000	.....
Acres of improved land	11,246,972	.....
Value of the agricultural products	.....	$157,445,713
Horses and colts	555,756	34,316,475
Cattle	1,315,708	17,206,896
Sheep and lambs	1,675,453	4,510,356
Number of milch cows	998,397	29,642,522
Milk	472,274,264 gals.	26,779,721
Butter	44,739,147 lbs.	
Cheese	1,635,618 lbs.	
Wheat	9,005,170 bu.	5,115,346
Corn	53,309,810 bu.	15,905,822
Oats	84,040,800 bu.	17,931,685
Rye	5,142,606 bu.	2,443,946
Barley	18,699,690 bu.	6,916,935
Hay and forage	3,667,212 tons	19,267,709
Irish potatoes	24,641,498 bu.	5,826,552

The amount found invested in the dairying interests of the state was $160,000,000, and the aggregate value for 1895 was $30,000,000.

MINERALS. The mineral industries of the state as reported for 1889 were valued at $10,183,861. The output of iron-ore, in 1899, was 579,798 long tons, of the value of $837,766. The amount invested in the iron-mines of the state was $4,385,269, the amount in 1879 being only $186,000. Lead and zinc to the value of $464,630 were produced, the zinc-ore being 24,832 tons and the lead-ore 1,678 tons. Stone of all kinds, to the value of $1,229,925, was taken in the year 1899. The leading kinds were granite, $270,538; limestone, $826,486; sandstone, $132,901. Metallic paint is found in several parts of the state in paying quantities and of excellent quality. Wisconsin produced mineral waters from 20 springs, to the extent of 2,292,910 gallons, valued at $409,179.



STATE SEAL OF WISCONSIN.

FISHERIES. The fisheries of the state, by the census of 1890, had a value of $455,030; gave employment to 1,484 persons, and employed a capital of $326,744. Inland fisheries gave $92,000 of the total returns, the remainder coming from the great lakes. In 1895 the state commissioner of fisheries reported the number of persons then employed at 1,440, boats engaged at 733, and the value of all investments $1,016,278. The catch for the year was 28,998,942 pounds, 12,000,000 pounds less than that of 1893. More than one half the catch came from Green Bay, about one fourth from Lake Michigan, the remainder being almost equally divided between Lake Superior, Lake Winnebago and the Mississippi River. The kinds, in order of importance, were herring, lake-trout, whitefish, blue-fins, perch and black-bass. Large sums have been expended under the supervision of the state in stocking the waters of Wisconsin. In 1895 the distribution amounted to 3,600,000 brook-trout, 2,550,000 rainbow-trout, thousands of black and white bass and whitefish, in addition to 10,000,000 lake-trout eggs. Wisconsin has 420 square miles of rivers and streams, 1,170 square miles of lakes and ponds, and the trout-streams aggregate more that 5,000 miles in length.

MANUFACTURES. The 12th (1900) census showed that Wisconsin had specified manufacturing industries to the number of 16,187, with a capital of $330,568,779 in which 142,076 persons were employed, to whom $58,407,597 was paid as wages. The cost of material used was $208,838,167 and the value of the products $360,818,942. Leading among the products were lumber and timber in its different forms, which amounted to $66,035,511; followed by flouring and grist-mill products to the amount of $26,327,942; paper and wood pulp, $10,895,576; leather, tanned and curried, $20,074,373; foundry and machine-shop products, $22,252,730; slaughtering and meat-packing, wholesale, $13,601,125. Other industries were iron and steel, cheese, butter, condensed milk, carriages and wagons, and agricultural implements.

FORESTS. Much of the state was once covered with heavy forests of oak, ash, hickory, poplar, maple, pine, hemlock and spruce, the three last named occupying the northern section. Forest-fires have swept the timber from thousands of the best wooded areas. In the southern and western portions of the state the hardwood districts furnish valuable timber. The output of the mills of Wisconsin, which are very numerous, is given in the preceding paragraph.

WEALTH AND TAXATION. The railroad mileage of the state in 1900 was 6,566; capital stock of all companies, $112,393,960; debts, $160,388,000; earnings for the year, $28,318,544; operating expenses, $18,285,467.

The taxable property of Wisconsin in 1900 was assessed at one-third of the real value. It was distributed as follows:

Real estate and improvements	$4,098,350,591
Live-stock, implements and machinery	82,951,387
Mines and quarries and products on hand	8,388,551
Gold, silver coin and bullion	27,934,449
Machinery of mills and products on hand	81,874,031
Railroads, including street-railways and all equipments	399,269,054
Telegraph, telephone, shipping and canals	14,738,945
Miscellaneous	524,801,515
Total	$6,225,308,523

The receipts from all sources for the fiscal year ending Sept. 30, 1900, amounted to $6,925,227, of which railways paid $1,175,752; telegraph companies, $9,999; telephone companies, $9,838; insurance companies, for licenses, $131,574. The balance from the preceding year was $402,031, making the amount available $7,327,258. The disbursements for this fiscal period were $6,830,850; the balance remaining on hand was $496,408. The following

are among the chief items of expense: State Hospital for the Insane, near Madison, $113,702; Northern Hospital for Insane, near Oshkosh, $137,694; maintenance of chronic insane in county asylums, of which there are 23 in the state, $301,796; state prison at Waupun, $87,399; School for the Deaf, at Delavan, $41,050; School for the Blind, at Janesville, $30,978; Industrial School for Boys, at Waukesha, $74,161; State School for Dependent Children, at Sparta, $47,036; militia, $93,684; free high-schools, $47,600. The total investment of state trust funds was $5,674,553, as follows: School fund, $3,371,657; university fund, $212,204; agricultural fund, $271,270; normal-school fund, $1,819,421. The semi-state institutions include the Milwaukee Insane Hospital, the Milwaukee House of Correction, the Wisconsin Industrial School for Girls, at Milwaukee, and the Wisconsin Veterans' Home, at Waupaca. All receive aid and supervision from the state.

EDUCATION AND CHURCHES. The public schools of Wisconsin are of exceptionally high grade. The state superintendent of schools reported for 1900 an

CAPITOL BUILDING, MADISON.

enrollment of 445,141, which was 60.2 per cent of the school population. There were 6,940 schoolhouses, with a seating-capacity for 452,708 pupils; male teachers numbered 2,307, female 11,074, the former receiving, in the country, average wages of $47.30 per month, the female country teachers receiving $33.15 per month. There were school libraries in 563 towns of the state, the total number of volumes being 80,597. The total distribution for educational purposes for the year amounted to $5,735,724, of which $284,759 went to the normal schools and $698,944 to the state university. There were 219 free high-schools, with a four-years' course, and 17,382 students in attendance, instructed by 664 teachers, the graduates during the year numbering 960. There were 66 similar schools with a three-years' course, their students numbering 2,400, their teachers 84 and the graduates 288. The normal schools of Wisconsin are located at Platteville, Whitewater, Milwaukee, Oshkosh, River Falls and Stevens Point. For buildings alone at the places above named there has been expended since 1891 the sum of $200,000. Throughout the state, school-grounds have been beautified by trees, shrubs and flowers, more than twenty thousand trees having been planted in a single year.

Denominational educational institutions are: Lawrence University, Appleton, Methodist Episcopal; Mission House, Franklin, Reformed; Gale College, Galesville, Presbyterian; Milton College, Milton, Seventh-Day Baptists; Marquette College, Milwaukee, Roman Catholic; Ripon College, Ripon, Congregational and Presbyterian; Seminary of St. Francis of Sales, St. Francis, Roman Catholic; Northwestern University, Watertown, Lutheran; Beloit College, Beloit; and the University of Wisconsin, Madison, nonsectarian.

In 1900 Wisconsin had 3,922 church organizations, 3,586 edifices, 556,355 communicants (which constituted 32.98 per cent of the population), and church property of the value of $15,521,341. All Baptist bodies numbered 250; the Roman Catholic, 646; Congregationalists, 182; Evangelical Association, 224; Lutheran Synodical Conference, 388; Lutheran Independent Synods, 410; all Methodist bodies, 784; all Presbyterian bodies, 180; Protestant Episcopal, 133.

NATIONAL GUARD. The report of the adjutant-general of Wisconsin, 1899, shows the strength of the National Guard to have been 144 commissioned officers and 2,692 enlisted men, making a total strength of 2,836 men. The expenditures of the adjutant-general and the quartermaster-general for the year 1899 aggregated $100,000. The Federal appropriation for 1895 was $10,351.

NEWSPAPERS. March 30, 1905, there were published in Wisconsin, 736 newspapers, of which 63 were daily, 1 triweekly, 23 semiweekly, 559 weekly, 4 semimonthly, 75 monthly, 2 bimonthly, and 9 quarterly. Papers were published in all of the 71 counties of the state, and in 315 of the cities, towns, and villages, including 71 county seats.

PRINCIPAL CITIES AND TOWNS OF WISCONSIN, WITH POPULATION IN 1890 AND 1900.

PLACE.	1890.	1900.
Appleton	11,860	15,085
Ashland	9,956	13,074
Beloit	6,315	10,436
Chippewa Falls	8,670	8,094
Eau Claire	17,415	17,517
Fond du Lac	12,024	15,110
Green Bay*	9,069	18,684
Janesville	10,836	13,185
Kenosha	6,532	11,606
La Crosse	25,090	28,895
Madison	13,426	19,164
Manitowoc	7,710	11,786
Marinette	11,523	16,195
Menomonee	5,491	5,655
Merrill	6,809	8,537
Milwaukee	204,468	285,315
Oskosh	22,836	28,284
Racine	21,014	29,102
Sheboygan	16,359	22,962
Stevens' Point	7,896	9,524
Superior	11,983	31,091
Watertown	8,755	8,437
Waukesha	6,321	7,419
Wausau	9,253	12,354

List of governors of Wisconsin:

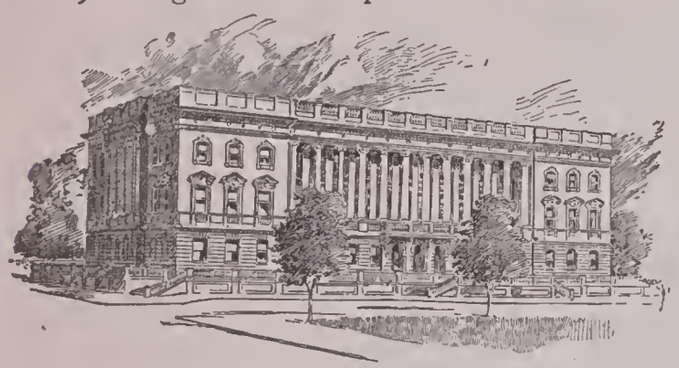
Nelson Dewey	1848-52	Alexander W. Randall	1858-62
Leonard J. Farwell	1852-54	Louis P. Harvey	1862
William A. Barstow	1854-56	Edward Salomon	1862-64
Coles Bashford	1856-58	James T. Lewis	1864-66

* Fort Howard consolidated with Green Bay since 1890.

Lucius Fairchild.....1866–72	William D. Hoard.....1889–91
C. C. Washburn.....1872–74	George W. Peck.....1891–95
William H. Taylor. 1874–76	W. H. Upham.....1895–97
Harrison Ludington.....1876–78	Edward Scofield.....1897–1901
William E. Smith.....1878–82	R. M. La Follette.....1901–06
Jeremiah M. Rusk.....1882–89	J. O. Davidson.....1906–

See also WISCONSIN, Vol. XXIV, pp. 649–652.

WISCONSIN, UNIVERSITY OF, a co-educational institution, established and maintained by the state, at Madison, Wisconsin. It was chartered in 1838, but was not organized until 1848. In 1838, 1854 and 1862, grants of land were made to the institution by Congress, amounting in all to 332,160 acres. In 1889 the agricultural department was benefited



UNIVERSITY BUILDING.

by the Agricultural Experiment Station Act. The annual income exceeds $500,000. There are courses in arts, chemistry, philosophy, commerce, pharmacy, home economics, mechanics, engineering, law, agriculture, music, and military science. The library of the University of Wisconsin contains 86,000 volumes and 30,000 pamphlets. The college of law has a special library of 5,000 volumes, and the library of the State Historical Society 128,000 volumes. *Revised by* W. R. B.

WISCONSIN RIVER, the principal stream of the state of Wisconsin, rises in Vilas County, northern Wisconsin; flows southerly through Vilas, Oneida, Lincoln, Marathon, Portage and Wood counties; forms the boundary-line between Adams and Juneau, Sauk and Columbia counties; flows westerly, forming the boundary of Sauk, Iowa, Richland, Grant, and Crawford counties; flowing into the Mississippi at Prairie du Chien. The principal towns on its banks are Portage, Grand Rapids, Stevens' Point, Wausau, Merrill and Rhinelander. It is six hundred miles in length and is navigable to Portage, where it is connected by canal with Fox River, and thus with Lake Michigan.

WISDOM OF SOLOMON. See APOCRYPHA, Vol. II, pp. 159, et seq.

WISE, HENRY ALEXANDER, statesman, was born at Drummondtown, Va., on December 3, 1806, the descendant of a distinguished family from Devonshire, England. He was educated at Washington College, Penn., and became a lawyer and political leader. He entered Congress in 1833, as an opponent of "Nullification," and fought a duel with Richard Coke, his defeated rival in the electoral campaign. He was a representative in Congress for twelve years, and ranked high as a debater. In 1845–47 he was minister to Brazil. In 1855 he was nominated for governor of Virginia by the Democrats, to oppose the "American" or "Know-Nothing" party, and was successful, administering to the latter party a defeat from which it never recovered. He was governor of Virginia during the John Brown raid at Harper's Ferry, and was responsible for the putting to death of Brown. In 1860–61 he opposed secession, yet vigorously upheld State Rights — an anomalous position, in which he had few supporters. Finally he joined the secessionists, and was a brilliant officer in the Confederate army. After the war he practiced law at Richmond, and wrote a valuable historical work entitled *Seven Decades of the Union*. He died at Richmond on September 12, 1876. W. F. J.

WISE, HENRY AUGUSTUS, naval commander, cousin of Henry Alexander Wise, was born in Brooklyn, New York, on May 12, 1819, and entered the navy in 1834. He was promoted to be a master in 1846 and lieutenant in 1847, and as such served in the Mexican War on the Pacific coast. In the Civil War, differing from his cousin, he remained loyal to the Union, and served on the *Niagara* in the blockade of Charleston. He was made a commander in 1862, and served for some years in the bureaus of ordnance and hydrography. He was promoted to be a captain in 1866. He was the author of several entertaining works of fiction, including *Tales for the Marines*, *The Story of a Gray African Parrot*, *Captain Brand of the Centipede*, and *Scampavias, from Gibel-Tasek to Stamboul*. He also wrote a book of travel and adventure, entitled, *Los Gringos, An Interior View of Mexico and California, with Wanderings in Peru, Chili, and Polynesia*. He died at Naples on April 2, 1869. W. F. J.

WISE, JOHN, clergyman and author, was born at Roxbury, Mass., in 1652, and was graduated from Harvard College in 1673. Ten years later he became pastor of a church near Ipswich and spent the rest of his life there. He opposed Andros's taxation, and was fined and deposed by the tyrannical chief justice, Dudley, but after Andros's fall sued Dudley, resumed his duties, and was sent to the legislature. In some of his half-political, half-theological writings, in 1705–17, he seemed to foreshadow the Declaration of Independence, and he ranked among the most forceful and brilliant writers of the colonial era. He died at Ipswich, on April 8, 1725. W. F. J.

WISEHART OR WISHART GEORGE. See BEATON, Vol. III, p. 402.

WISEMAN, NICHOLAS PATRICK STEPHEN, an English prelate; born in Seville, Spain, August 3, 1802. He entered the Roman Catholic College at Ushaw, near Durham, in 1810, and was removed to the English College at Rome in 1818. He was made D.D. in 1824, promoted to the priesthood in 1825, and became, in 1827, professor of Oriental literature and afterwards, in 1828, rector of the English College. In 1835 he lectured in the Catholic Chapel at Lincoln's Inn Fields on *The Principal Doctrines and Practice*

of the Catholic Church. In 1840 he was chosen bishop-coadjutor to Dr. Walsh, the vicar apostolic of the central district in England, and was consecrated Bishop of Melipotamus *in partibus* at Rome by Cardinal Frenzoni. He then went to Oscott and presided over St. Mary's College until 1847, when he was removed to the London district. In 1850, on the establishment of the hierarchy, he was nominated archbishop of Westminster, and was made cardinal-priest with the title of St. Pudenziana. He has been characterized as a great Biblical scholar. His works include *The Connection between Science and Revealed Religion* (1836); *Real Presence* (1836); *Lives of Five Saints Newly Canonized* (1839); *Prayers for the Conversion of England* (1840); *Papal and Royal Supremacy Contrasted* (1850); *The Hierarchy* (1850); *Fabiola* (1854), and *Last Four Popes* (1858). He was joint-editor for many years of the Dublin *Review*. He died in London, England, February 15, 1865. W.M.C.

WISSEMBOURG, OR WEISSEMBURG, a small fortified town of Alsace, Germany, in what was formerly the French department of Bas-Rhin, on the Lauter, 42 miles N.E. of Strasburg by railway. It carries on a flourishing trade, and manufactures tiles, brick, soap, hats, etc. Besides its fortress, a line of works, called the lines of Wissembourg, extend S.E. to Lauterberg, a distance of nine miles. The cathedral, the only remarkable building, dates from the thirteenth century. Population, 6,788.

WISTARIA, a genus of ornamental woody twiners belonging to the pea family (*Leguminosæ*). *W. frutescens*, the native American species, has pinnate leaves with 9 to 15 ovate leaflets, and a dense raceme of showy blue-purple flowers. *W. sinensis*, the species cultivated from China and Japan, is faster growing and higher climbing than the other, and with longer, more pendent racemes.

WISTER, ANNIS LEE (FURNESS), an American translator; born in Philadelphia, Pennsylvania, October 9, 1830. She was married in 1854 to Dr. Caspar Wister. She made many translations from the German, including Von Hillern's *Only a Girl;* Lewald's *Hulda;* Marlitt's *Old Mamselle's Secret;* Hacklander's *Enchanting and Enchanted*, and Von Auer's *It Is the Fashion.* In 1888 her complete works appeared in 30 volumes. In the same year she wrote *Metrical Translations and Poems.* W.M.C.

WITCH-ELM OR WYCH-ELM. See ARBORICULTURE, Vol. II, p. 278.

WITCH-HAZEL. See ARBORICULTURE, Vol. II, p. 281; and HAZEL, Vol. XI, p. 490.

WITENAGEMOT. See PARLIAMENT, Vol. XVIII, p. 308.

WITHERITE. See MINERALOGY, Vol. XVI, p. 414.

WITHERSPOON, JOHN, educator and patriot, was born in Scotland on February 5, 1722, a descendant on the maternal side of John Knox. He was educated at the University of Edinburgh, and became a Presbyterian minister. In 1768 he came to America, to accept a call to be the sixth president of the College of New Jersey (now Princeton University). The institution was then in an impoverished state, and he set about improving it with great energy. He secured for it money, books and instruments, and enlarged its courses of instruction, and was largely instrumental in placing the college upon a secure foundation and in making it a stronghold of Presbyterian orthodoxy. In the Revolution he was an ardent patriot, being a prominent member of the Continental Congress and a signer of the Declaration of Independence. He left Congress for a time in 1780, to rehabilitate the college at Princeton, and after the war went to England to secure funds for rebuilding that institution, in which enterprise he was unsuccessful. He died on November 15, 1794. W.F.J.

WITHROW, JOHN LINDSAY, an American Presbyterian clergyman; born near Philadelphia, Pa., in 1837; educated at neighboring academies and at Princeton University, where he graduated in 1860, and at the Princeton Seminary in 1863. He held pastorates in Abington, Pennsylvania; Arch Street Church, Philadelphia; Indianapolis, Indiana; Park Street Church, Boston; and the Third Presbyterian Church, Chicago. In 1896 he was elected moderator of the general assembly of the Presbyterian Church in the United States. He contributed the article PRESBYTERIANS IN AMERICA, in these Supplements. Was made LL.D. by Knox College.

WITHROW, WILLIAM HENRY, clergyman and author, was born at Toronto, Canada, on August 6, 1839, and was educated at Victoria College. He became a Methodist minister, and was engaged in preaching from 1864 to 1874. In the latter year he became editor of *The Methodist Magazine* at Toronto, and since then has largely devoted himself to authorship. He has written *The Catacombs of Rome*, a *History of Canada*, *Life in a Parsonage*, *Lawrence Temple*, a novel, *Men Worth Knowing*, *Canada: Scenic and Descriptive*, and *China and Its People.* W.F.J.

WITTIKIND OR WIDUKIND, a chief. See SAXONY, Vol. XXI, pp. 367, 368.

WITWATERSRAND. See GOLD AND GOLD-MINING, in these Supplements.

WOAD. See INDIGO, Vol. XII, p. 884.

WOBURN, an important city of Middlesex County, Massachusetts, in the eastern part of the state. It has extensive tanneries and manufactories of boots and shoes and other leather goods, of electric lighting supplies, and numerous other articles. It is reached by the Boston and Maine railroad, is a close suburb of Boston, and despite the cession of a part of it to Stoneham town, had in 1900 a population of 14,254. See also WOBURN, Vol. XXIV, p. 659. W.F.J.

WODEN OR ODIN. See ASGARD, Vol. II, pp. 593, 594.

WOFFINGTON, MARGARET OR PEG, a British actress; born in Dublin, Ireland, October 18, 1720. In 1740 she made her first appearance at Covent Garden as Sylvia in *The Recruiting Officer.* Her beauty, grace and coquetry immediately won her the affection of the public, which she retained until the close of her career. She

is remembered as one of the leading historical figures of the British stage. She died in Teddington, England, March 28, 1760. W.M.C.

WOJWODE, WAIWODE OR VOIVODE, a Slavonic title equivalent to the German *Herzog* or leader. See ROUMANIA, Vol. XXI, p. 21.

WOLCOTT, EDWARD OLIVER, an American statesman; born in Longmeadow, Massachusetts, March 26, 1848. He served in the Civil War, and in 1866 entered Yale College, graduating from the Harvard Law School in 1871. He then removed to Colorado, and in 1888 was elected to the United States Senate as a Republican. He was re-elected in 1894. He died in Monte Carlo, France, March 1, 1905. W.M.C.

WOLCOTT, OLIVER, soldier and statesman, son of Roger Wolcott, was born at Windsor, Conn., on December 20, 1726, and was graduated from Yale College in 1747. In that same year he was made captain of a company of volunteers and served for the next year on the Canada frontier. From 1751–65 he was sheriff of Litchfield County, Conn. In August, 1774, he presided at a town meeting held to consider the Boston port bill, and drew up notably bold and eloquent resolutions. From 1774–86 he was a member of the governor's council, and part of the time also judge of the court of common pleas. He entered the Continental Congress in January, 1776, and was one of the signers of the Declaration of Independence. In August, 1776, he entered the army as a brigadier-general, and assisted in the defeat and capture of Burgoyne. During the rest of the war his time was divided between Congress and the field. In 1784–85 he was Indian commissioner for the northern department. In 1786 he was elected lieutenant-governor of the state of Connecticut, and was re-elected successively until 1796, when he was elected governor. In the same year he was also chosen a Presidential elector, and cast his vote for John Adams. He died at Litchfield, Conn., on December 1, 1797. W.F.J.

WOLCOTT, OLIVER, statesman, son of Oliver Wolcott, was born at Litchfield, Conn., on January 11, 1760, and was graduated from Yale College in 1778. He studied law, and did some service in the army in the Revolution. In 1784 he was one of the commissioners to settle the claims of Connecticut against the United States, in 1789 became auditor of the U. S. Treasury, and in 1795 succeeded Hamilton as Secretary of the Treasury, and filled that office with distinction until 1800. For the next two years he was a Federal judge for the Second District, and then became a banker and manufacturer. In 1817 he was elected governor of Connecticut, an office held by his father and grandfather before him, as the candidate of a party opposed to any union of church and state. The abolition of the existing union of church and state quickly followed, and Wolcott presided over the convention, in 1818, which framed a revised constitution for the state. The last years of his life were spent in New York City, where he died on June 1, 1833. W.F.J.

WOLCOTT, ROGER, colonial statesman, was born at Windsor, Conn., on January 4, 1679, and owing to the early death of his father grew up without ever being able to attend school. He educated himself, however, and became a prosperous weaver. In 1707 he was chosen a selectman, in 1709 was sent to the assembly, in 1710 was elected to the bench of justices, and in 1711 was commissary of the forces sent for the invasion of Canada. In 1714 he was a member of the council, in 1721 a judge of the county court, in 1732 a judge of the superior court, in 1741 chief justice and deputy governor, in 1745 commander of the Connecticut forces sent against Louisburg, and from 1750 to 1754 governor of Connecticut. He wrote a little volume of poems, and a few pamphlets of some historic interest. He died at Windsor on May 17, 1767. W.F.J.

WOLFBORO, which should probably be spelled WOLFEBORO, is an attractive town of Carroll County, New Hampshire, in the southeastern part of the state. It is on the shore of Lake Winnipeseogee (q. v.), and is a favorite summer resort. It had in 1900 a population of 2,390. W.F.J.

WOLF-DOGS. See DOG, Vol. VII, p. 283.

WOLFE ISLAND, an island in the St. Lawrence River, in Frontenac County, eastern Ontario, Canada. Population 1901, 2,200. See also ST. LAWRENCE, Vol. XXI; and LAKE OF THE THOUSAND ISLANDS, in these Supplements.

WOLFENBÜTTEL FRAGMENTS. See LESSING, Vol. XIV, pp. 481, 482.

WOLFF, ALBERT (1814–92), professor at the Berlin Academy of Fine Arts. See SCULPTURE, Vol. XXI, p. 593.

WOLFF, JOSEPH, a German missionary and traveler; born near Weimar in 1795, of Jewish parents, but becoming a convert to Christianity, he studied at Rome, from which he was banished as a recusant against the doctrines of Roman Catholicism, and completed his education in Germany. In 1837 he was ordained deacon, and priest in 1838. He made several journeys to Bokhara, partly in search of the Lost Ten Tribes of Israel, and partly to ascertain the fate of Colonel Stoddart and Captain Connelly, who were murdered in that region. Dr. Wolff published a narrative of his adventures under the title of *A Journey to Bokhara*, and wrote besides six volumes of *Travels*. He died in England, May 2, 1862. W.M.C.

WOLFFIAN BODIES. See REPTILES, Vol. XX, pp. 475, 476.

WOLF-FISH. See SEA WOLF, Vol. XXI, p. 645.

WOLFRAM AND WOLFRAMITE. See TUNGSTEN, Vol. XXIII, pp. 645, 646.

WOLF RIVER, a stream of southern Mississippi, which rises in Pearl River County, and after a southeasterly course through Harrison County, empties into St. Louis Bay, an inlet of the Gulf of Mexico. It has a length of one hundred miles.

WOLF RIVER, a stream of northeastern Wisconsin; rises in Pine Lake, in Forest County, and,

flowing southeasterly through Langlade County, the Menomonee Reserve and Shawano, Outagamie, Waupaca counties, empties into Poygan Lake, and thence into Lake Winnebago, in Winnebago County. Its course is two hundred miles long, one hundred of which are navigable for light-draught vessels.

WOLFSBANE. See ACONITE, Vol. I, p. 92.

WOLLSTONECRAFT, MARY. For the mother, see GODWIN, Vol. X, p. 638; for the daughter, see SHELLEY, Vol. XXI, p. 826.

WOLSELEY, GARNET JOSEPH, VISCOUNT, a British soldier; born at Golden Bridge House, Dublin, June 4, 1833. He is the son of the late Major Garnet Joseph Wolseley, and obtained his first commission in March, 1852, when he joined the 12th (now Suffolk) Regiment. In 1852 he took part in the second Burmese War, in which he was severely wounded. He served with distinction in the Crimea, and was wounded at the siege of Sebastopol. He engaged in the siege and capture of Lucknow during the Indian mutiny of 1857–58 and was employed in 1860 in the Chinese War. He was dispatched to Canada in 1861, and again in 1867, having received command of the Red River expedition. In 1870 he led the expedition against the French-Italian rebel, Louis Riel. In 1874 he commanded an expedition to punish the King of Ashantee. After the defeat of a British force by the Zulus in South Africa in 1879 he was dispatched as high commissioner. His next command was in Egypt in 1882. When the Mahdi held General Gordon prisoner at Khartum, Wolseley was dispatched in 1884 with a relief expedition. On his return to England he was created a viscount. In 1890 he was made commander of the forces in Ireland and in 1895 was made field-marshal and commander-in-chief of the British army. He wrote *Soldier's Pocket Book* (1869); *Field Book for the Auxiliary Forces* (1873); *Narrative of the War in China* (1861); *Life of the Duke of Marlborough* (1894), and *Decline and Fall of Napoleon* (1895). W.M.C.

LORD WOLSELEY.

WOLSELEY, SIR GEORGE, a British soldier; born in 1839; entered the army in 1857; took part in the Shahabad district, India, in suppressing the Indian mutiny; saw service in Bengal, in Egypt, in 1882, and again in 1884, in the Burmah expedition of 1887, and that year was placed in command of the Belgaum district. He was appointed captain in 1868, colonel in 1872, brigadier-general in 1887 and major-general the same year.

WOLVERINE. See GLUTTON, Vol. X, p. 620. The name is also used as a nickname for the natives of Michigan.

WOLZOGEN, KAROLINE VON (VON LENGEFELD), a German author; born in Rudolstadt February 3, 1763. In 1796 she married Baron von Wolzogen. In 1787 Schiller became a guest in the house of her mother and soon afterward was affianced to her younger sister, Charlotte. She first wrote *Agnes von Lilien* (1798), which at first was thought to be the production of Goethe. She published *Erzahlungen* (1820), and *Cordelia* (1830). She died in Jena, Jan. 14, 1847. W.M.C.

WOMB OR UTERUS. See MAMMALIA, Vol. XV, pp. 370, et seq., and REPRODUCTION, Vol. XX, pp. 420–422.

WOMB, DISEASES OF. See SURGERY, Vol. XXII, pp. 725–727.

WOMEN, COLLEGES FOR. See EDUCATION IN THE UNITED STATES, and WOMEN, in these Supplements.

*WOMEN, THEIR EDUCATION AND ENFRANCHISEMENT IN THE UNITED STATES. Suffrage is considered the keynote of the emancipation of man. Only within recent years has universal suffrage made headway, even among male citizens, and the number of men entitled to vote is a very small percentage of the male population of the habitable globe. Slowly but surely the trend of all civilized nations has been to confer on the citizen more and more responsibility. It was but natural that woman suffrage should be the last step in the advancement of woman. Forty years ago almost nothing was heard on this subject. The women who ventured to discuss it were considered radical, and even dangerous; it was tabooed, as a topic of conversation, both in the home and society. These remarks apply only to American women. The French Revolution had accustomed social economists to the idea that woman would gradually secure representation under all republican forms of government, and the justice of such representation was conceded. The socialists in all countries have always been in favor of woman suffrage, and in England women are entitled to representation in the local elections and are on school-boards, poorhouse relief, and most of the boards which dispense government or parish charity. It is singular that in a republic, such as the United States of America, so great a prejudice has existed against woman suffrage. No woman has shown greater adaptability than has the American to conform to the unstable conditions of a new country. She is a colonist by temperament as well as by habit, and is extremely intelligent, comprehending political and economic questions, and ready to adapt herself to different climates, different races and different social conditions. That such a type of woman should so long have been denied even municipal suffrage is incomprehensible to a superficial observer of the conditions of American life.

This restriction arises largely from the dread of increasing the vote. It is not that American men have not full confidence in the judgment and ability of the women of the nation, but they are in deadly fear of the large foreign vote which granting women the suffrage would bring to the fore. They contend, with reason, that the illiterate and depressed immigrant classes, of varied nationalities, from Europe who form a large part of the tenement population in American cities, are not fitted by education to have a voice in the government of the municipality.

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Still less do they understand questions of national politics. In the most American of the states, like the Western states, where the American type predominates, woman suffrage is an assured fact. Wyoming, Utah, Colorado and Idaho are full suffrage states, and in the other Western states the tendency is constantly toward increasing woman suffrage.

At the election held on Nov. 5, 1895, the people of Utah ratified the new state constitution, including the clause, "giving to woman full suffrage," and in January of 1896, Utah became the forty-fifth state of the Union and the third in which the full suffrage is accorded to women. The supremc court of Washington holds that in cities of eighteen thousand and over, women are entitled to vote at all elections held to legalize school indebtedness. The legislatures of Nevada and Oregon in 1895, passed a full suffrage bill, which must also pass the legislature of 1897, and then be approved by the people of those states, before becoming a law.

The right of the women of Ohio to vote for members of school boards was sustained by decision of the state supreme court. This decision was rendered in 1895.

The Connecticut legislature, in the same year, refused to repeal the school suffrage laws. In the legislatures of Iowa, Michigan, Wisconsin, Maine and Connecticut full suffrage bills and in Vermont a municipal suffrage bill were defeated during 1894 and 1895. The senate committee of the Rhode Island legislature returned a unanimous report in favor of woman suffrage.

The legislature of New Jersey took the first step in 1895 toward passing a constitutional amendment, conferring on women the right to vote for school trustees, of which they had been deprived by a judicial decision which left unimpaired the right to vote on school appropriations. The amendment has not been adopted.

In June, 1895, the Massachusetts legislature enacted a law, giving to both men and women the opportunity of voting for and against woman suffrage. The state majority against suffrage was 77,000.

In Lexington, Kentucky, there were elected on the school board four men and four women; the election took place in 1895.

The constitutional convention of South Carolina seriously considered the woman-suffrage amendment. It was, however, defeated.

The legal status of woman has undergone many rapid changes during the last ten years. In most of the states women are entitled to their own money and have entire control of their income, which cannot be seized for the debts of the husband. Most of the states are passing laws, giving to the mother equal custody and control, with the father, of the minor children. Thus she has power to select guardians, and this law also prevents the separation of mother and child.

Husband and wife are now free to make contracts with each other, to sue and be sued. The condition of the widow is greatly changed; the old dower law, that is, a life interest in one third the real estate, has been widely modified, and the widow is now entitled to an equal share in her husband's estate, real and personal, and the courts are very liberal in interpreting the rights of the wife. In all the states the widow and children are entitled to support from the estate for a certain length of time. Some of the states also recognize a homestead estate in the dwelling of the family. The widow is entitled to the use of the dwelling until she re-marries, and the family until the youngest child is 21 years of age. This is, in brief, a summing-up of the political and legal status of woman in the United States. The interpretation of the law by the courts is always more liberal than the law itself, and the tendency is to constantly legislate to better the condition of women and children.

Women are admitted to the bar in all the states. Mrs. Arabella Mansfield, of Iowa, was admitted to the supreme court in 1869, and about the same time women students were received into the law schools of the Universities of Washington, St. Louis and Chicago. There are now 11 law schools open in the United States to women. It would be difficult to give the exact number of women lawyers in the United States. There are probably not more than 300, 11 of whom have been admitted to practice in the supreme court of the United States. Most of the states of the Union allow women to hold public office; even in some states where they do not vote, this is the case. Many offices connected with public charities are held by women in the United States, as factory inspector, state board of charities, managers and trustees of penal institutions, physicians, visitors and trustees of state institutions. By the act of Congress in 1870, the clerkships of the executive departments of the United States government were open to women. A large percentage of the clerks employed in these departments are women.

The government positions are eagerly sought after and are largely held by the widows and daughters of former employees of the government; female relatives of army officers, of judges, and legislators make up the largest percentage of the women employed in Washington.

The beginning of the agitation for woman suffrage was foreshadowed in the anti-slavery movement. The first woman's rights convention of the world was called by Lucretia Mott and Elizabeth Cady Stanton, at Seneca Falls, New York, on the 19th of July, 1845. The platform of the convention was very radical, demanding equal rights in education, the trades and professions, universal suffrage and a share in all political offices. It is an open question whether the movement would not have secured better results had the demands of the organizers been more moderate.

The first movement in the advancement of women was naturally on educational lines. The employment of women as teachers in the public schools of the country was a recognized feature of the American system, and during the Civil War the number of women thus employed was greatly increased. Women have largely usurped the profession of teaching all over the civilized world. Children up to the age of ten, both boys and girls, are usually committed to their care, and in the public schools of the United States women teachers predominate,

from the kindergarten to the high-school. In the higher branches of the profession men have held their own, so that the professorships of the great universities and those of the larger colleges are entirely held by men. The reason for the excess of women over men teachers is not difficult to explain. The teacher's position, comparatively unremunerative and unstable, does not appeal to the spirit of enterprise in which the American boy is educated, and until within the last fifteen years teaching was almost the only profession which gave to women of culture the opportunity to exercise their talents. Antioch and Oberlin colleges were the first co-education institutions of the country, and Horace Mann was the president of Antioch; it was founded in 1852; Oberlin was founded in 1833; Cornell University in 1862, and Michigan University in 1870. The colleges founded exclusively for women are Vassar, Wellesley, Smith, Bryn Mawr, and Wells Colleges. The great universities and colleges for men are being rapidly opened to women. Radcliffe is the annex of Harvard, Barnard of Columbia, and in both these institutions women receive the same education as that given to the university men. The Massachusetts Institution of Technology, one of the most important institutions of this country, is co-educational. And the high and grammar schools are all co-educational. In 1822 the public schools were first opened to girls. This privilege was accorded them at a town meeting in Northampton, Massachusetts. Most of the state universities, even in the South, are now co-educational.

There still exists, however, some difference of opinion as to the success of co-education in the large universities.

The total number of colleges available to women, whether co-educational or otherwise, returned by the Bureau of Education for the years 1892 and 1893, was 143. The majority of these colleges are in the North Atlantic states, where co-education has made the least progress. In the South there are many women's colleges, but the standard of education of these colleges is not above that of the secondary schools of the North. Along the line of primary, secondary and high-schools, the South ranks well with the North; but for the higher education it is very backward. Such Southern girls as desire to secure the benefits of a university training are obliged to come North.

The denominational colleges are also admitting women to classes. In 1856 the Universalist denomination founded a college for the education of both men and women. The Unitarians, the Free-Will Baptists, the Congregationalists, the Methodists and several of the smaller sects admit women to their schools and colleges. The medical schools and industrial and technical schools are open to women in most of the states.

It is surprising that so few women avail themselves of the advantages of the higher education. American parents are very self-sacrificing, when it is a question of the future of their daughters, and in this age of specialization the fact that so few young girls enter the colleges and universities is to be deplored. Among the so-called wealthy classes the fashion of introducing young girls into society and making them an influential factor in social life is, of course, in direct opposition to the principles of higher education. The age at which a girl is willing to devote her entire time to dress and pleasure is from 16 to 22, and that is the time in which higher education makes the most exacting demands on the young girl; from 16 to 18 in the preparatory schools and from 18 to 22 in the university. The question of a girl's social life in connection with university life is not yet solved. Men in the higher universities have a delightful social life, but until quite recently the girl was completely cut off from social pleasure while attending a university course. The tendency to build houses for the girls and to allow them to become members of college fraternities, to introduce games in which they can join, is revolutionizing this aspect of university education, and in the near future the problem of social life and higher education will be solved for women as for men. It is too early in the history of the higher education for women to prophesy its effects on the professions. From a careful observation of the women in attendance at the colleges and universities, the writer would say that the majority are in training for the profession of teacher, either in kindergartens, private and technical schools, or in women's colleges. An ever-increasing number are becoming artists, engravers, etchers and decorators. The remainder seem to be ambitious to be all-round, well-educated, sensible women, and the spirit of conservatism among them all is a marked characteristic. See INDUSTRIAL CONDITION OF WOMEN and CLUBS, WOMEN'S, in these Supplements.

ELLEN M. HENROTIN.

*WOMAN'S CHRISTIAN TEMPERANCE UNION, an organization originating in the temperance crusade by women which began in Hillsboro, Ohio, Dec. 23, 1873. The methods of that movement were the holding of prayer-meetings by women in the morning, from which went forth "Praying Bands" to the saloons, where they read the Bible, sang hymns and prayed, after which they repaired to some designated church and continued their prayer-meetings. In many instances the saloonkeepers agreed to close their places of business, and invited the women to break their casks and decanters. As a result of this movement, the attendance in church, Sunday school and public school greatly increased.

The first local Women's Christian Temperance Union was founded in Fredonia, New York, in December, 1873. The first State Union was founded in Ohio, in 1874. In Chautauqua, New York, several crusaders gathered at the Sunday-school conference in August of that year and issued a call for a National Convention, which met in Cleveland, Ohio, Nov. 18–20, 1874, and organized the National Woman's Christian Temperance Union, eighteen states being there represented. Since then, every state has been organized locally, most of them by counties and districts, while every State and Territory of the republic has for many years steadily held its annual meeting. The first President of the Na-

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tional Society was Mrs. Annie Wittenmyer, of Philadelphia. Miss Frances E. Willard was corresponding secretary until 1879, when she became president.

The Society's work has been classified under the heads Preventive, Educational, Evangelistic, Social and Legal work, all of which are based upon the Department of Organization.

Total abstinence for the individual and total prohibition for the state are the chief corner-stones of the movement.

In 1883 was founded the World's Woman's Christian Temperance Union, a federation having branches in all English-speaking countries and having for its motto, "For God and home and every land." This organization prepared what is known as the Polyglot Petition, which calls for the universal abolition of the liquor and opium trades, and is addressed to the heads of all governments. This petition has been signed in 50 different countries and languages, and bears nearly two million personal signatures, also endorsements of societies, making the aggregate 7,000,000.

There are forty distinct departments of work connected with this society, the headquarters being located in Chicago. An organized effort has been made to secure temperance instruction in the public-school systems of all nations, and this has already been accomplished throughout the United States with one or two exceptions; also in Japan, the Hawaiian Islands, some of the Australian provinces, and Canada. A like course was recommended by the Minister of Public Instruction in France, while in Great Britain much attention is paid to it, through the efforts of the temperance people in the board schools. Measures have been also adopted for introducing temperance instruction in the Sunday-school system throughout the world. The international lesson-series now admits a quarterly temperance lesson.

There are but two requisites for admission to the society, viz., promises of payments of dues and abstention from intoxicating drinks. The dues are usually fifty cents a year. In the annual meetings, resolutions are adopted and platforms put forth recognizing the woman's ballot as a method of securing and enforcing prohibitory law, and urging the department of purity with the White Cross pledge upon the attention of all who have the training of the young. There is also a department of suffrage work for those who desire to labor in that cause. Much sympathy has been developed for the wage-worker and the eight-hour law, and many other of the methods urged by the great group of labor reformers have been warmly seconded by the society.

The organization is thoroughly systematized, and the same principles and methods generally prevail, from the local to the world's union. The Woman's Temperance Publication Association has 120 employees, and publishes the *Union Signal*, the organ of the movement. One hundred and thirty million pages of total-abstinence and purity literature have been sent out from this publishing-house in a single year. The National Temperance Hospital, founded in 1883, has for its purpose the demonstration that alcoholics are not essential in medical practice. The department of evangelistic work is the foundation department of the Woman's Christian Temperance Union, and has developed many women evangelists, bible readers, and Christian workers.

In England there is also a White Ribbon publishing company, their paper, *The Woman's Signal*, being founded by Lady Henry Somerset, president of the White Ribbon societies in England. A woman's lecture-bureau, a home for friendless girls and an industrial farm home for inebriate women, at Duxhurst, near Reigate, Surrey, have also been established. There are ten thousand local unions in the United States, and a membership and following of not fewer than half a million. There are in England about one thousand local societies, and more than one hundred thousand actual members. The work in Australia, New Zealand, South Africa, Japan and India is becoming thoroughly established. In Canada it is almost as far advanced as in the United States. A department of peace and international arbitration co-operates with all the other peace societies of the world. The department of purity is among the leading lines of work. There is also a department of mercy, which opposes vivisection and inculcates kindness to all sentient beings. The department of penal-reform work has secured laws requiring the appointment of women in police-station work.

The first convention of the world's Woman's Christian Temperance Union, was held in Fanueil Hall, Boston, Nov. 10 and 11, 1891; the second, in Chicago at the Art Institute during the World's Fair in 1893; the third in Queen's Hall and Albert Hall, London, England, June 18–20, 1895.

Twenty national organizers are in the field continually visiting those states and localities that most need help, and an equal number of evangelists are steadily at work.

FRANCES E. WILLARD.

WOMAN'S NON-PARTISAN NATIONAL CHRISTIAN TEMPERANCE UNION, organized in 1890, by seceders from the Woman's Christian Temperance Union, as a protest against the attitude of that organization toward the political parties. Article 2 of the constitution provides: "The object of this association shall be to interest and unite the women of the nation in non-partisan, non-sectarian temperance work, and confining itself strictly to such temperance work, it will devise and execute measures to secure, through the blessing of God, total abstinence and the complete extinction of the liquor traffic." Article 5 reads: "Neither the officers of this association, nor the annual meeting, shall directly or indirectly pledge the influence or co-operation of the association, in whole or in part, to any other association, or to any political party, or to any religious sect." The first annual convention of the Union was held at Allegheny, Pennsylvania, in November, 1890.

WOMAN'S RELIEF CORPS. This organization was created by the mothers, wives, daughters and sisters of Union soldiers of the Civil War of 1861–65, for the purpose of aiding the Grand Army of the Republic, and to "perpetuate the memory

of their heroic dead," to "extend needful aid to the widows and orphans," to "cherish and emulate the deeds of our army nurses," and to "inculcate lessons of patriotism and love of country among our children and in the communities in which we live." The organization is composed of departments, which are subdivided into 3,106 corps. The total membership of the order, June 30, 1901, was 144,387. The annual amount expended in relief during the fiscal year was $200,000; the amount since organization in 1883, nearly $2,000,000.

WOMEN'S CLUBS. See CLUBS, in these Supplements.

WOOD. See BOTANY, Vol. IV, pp. 89, 90.

WOOD, EDWARD STICKNEY, chemist, was born at Cambridge, Mass., on April 28, 1846, and was graduated from Harvard College in 1867, from the Harvard Medical School in 1871, and afterward studied physiology and medical chemistry in Berlin and Vienna. From 1871 to 1876 he was assistant professor, and since 1876 has been professor of chemistry in the Harvard Medical School. Since 1873 he has also been chemist to the Massachusetts General Hospital. In 1874 he was a member of the medical commission on the water supply of Boston, and in 1880 a member of the committee on revision and publication of the United States Pharmacopœia. W.F.J.

WOOD, FERNANDO, politician, was born in Philadelphia on June 14, 1812, and in boyhood became a clerk in a New York shipping office. In 1839 he was already chairman of a political club, and in 1840 he was elected to Congress as a Democrat, serving for two years. For the next seven years he was engaged in business, and made a fortune on which he was able to retire and devote himself entirely to politics. He was elected mayor of New York in 1854, and re-elected in 1856. In his second term he forcibly resisted the attempt of the legislature to put the police under state control, and serious riots resulted. He was elected mayor a third time in 1859. He again served in Congress from 1863 to 1865, and from 1867 to 1877. He was elected mayor the first time as the candidate of Tammany Hall, but soon after quarrelled with that body and organized the opposition Mozart Hall. The result was a schism in the Democratic party so severe that not until 1865 was it able to control all the offices in New York. Fernando Wood was one of the most astute and energetic politicians of his time, and left a lasting influence upon the Democratic party in New York. He died on February 14, 1881. W.F.J.

WOOD, GEORGE BACON, physician, was born in Cumberland County, New Jersey, on March 13, 1797, and was graduated from the University of Pennsylvania in 1815, and from its medical school in 1818. In 1820 he became a lecturer on chemistry, and in 1821 was one of the organizers of the Philadelphia College of Pharmacy, in which he was professor of chemistry for nine years. Thereafter until 1860 he filled a professorship in the medical department of the University of Pennsylvania. In 1865 he organized, at his own cost, and permanently endowed, an auxiliary faculty in the University of Pennsylvania, consisting of professorships of zoology, comparative anatomy, mineralogy, geology, hygiene, medical jurisprudence, and toxicology. For many years he was president of the College of Physicians in Philadelphia. In 1833, with Dr. Bache, he published the first edition of *The United States Dispensatory*, and he also wrote a *Treatise on the Practice of Medicine*. He died in Philadelphia on March 20, 1879. W.F.J.

WOOD, SIR HENRY EVELYN, an English soldier; born in Cressing, Braintree, February 9, 1838. He served in the Crimea and in the Indian Mutiny War. As lieutenant-colonel of infantry, he was with Wolseley during the Ashantee War. He served through the Zulu War, in the Transvaal War in 1881, and in Egypt in 1882. In 1893 he was made quartermaster-general and became adjutant-general in 1897. He has written *The Crimea in 1854 and 1894; Cavalry at Waterloo* (1896). W.M.C.

WOOD, HORATIO C., physician and botanist, was born in Philadelphia on January 13, 1841, and was graduated from the medical department of the University of Pennsylvania in 1862. In that institution he was professor of botany from 1866 to 1876, from 1875 to 1901 professor of the diseases of the nervous system, and since 1876 has been professor of therapeutics. He has edited *The United States Dispensatory*, *New Remedies*, and *The Philadelphia Medical Times*, and has written *Materia Medica and Therapeutics*, *Brain Work and Over Work*, and various other works. He has been president of the Pharmacopial Convention of America and of the College of Physicians of Philadelphia. W.F.J.

WOOD, JAMES FREDERICK, clergyman; born in Philadelphia, Pa., April 27, 1813; went to Rome and studied in the College of the Propaganda in 1836–43. In the following year he was ordained a priest, and returning to the United States became assistant at the cathedral in Cincinnati, O. He held this position till 1854, when he became pastor of St. Patrick's Church of Cincinnati. In 1857 he was consecrated bishop-coadjutor of Philadelphia. When Bishop Newman died, in 1860, he succeeded to the bishopric, and after fifteen years of service in this capacity, was elevated to the newly-created archbishopric of Philadelphia, on Feb. 15, 1875. He died in Philadelphia, Pa., June 20, 1883. G.J.H.

WOOD, JAMES RUSHMORE, surgeon, was born in New York City on September 14, 1816, studied at the College of Physicians and Surgeons, and was graduated from the Castleton, Vt., Medical College in 1834. In 1847 he became a member of the medical board of Bellevue Hospital, New York, and there effected great reforms in management and hygiene which resulted in the reduction of the yearly death rate to a notable degree. In 1861 he was one of the founders of the Bellevue Hospital Medical College, and was for the rest of his life its professor of operative surgery and

surgical pathology, becoming professor emeritus in 1868. He died in New York on May 4, 1882. W.F.J.

WOOD, JOHN GEORGE, an English naturalist; born in London, July 21, 1827. He was educated at Merton College, Oxford; was ordained in 1852, and was for some years chaplain to St. Bartholomew's Hospital. He was an enthusiast in natural history, and published a large number of books on zoölogy and kindred subjects which had great popularity. Among the best known of them are *Common Objects of the Sea Shore; Common Objects of the Country; Homes Without Hands; Insects at Home; Natural History of Man*, and an admirable *Illustrated Natural History of Animals*. He died in Coventry, England, March 4, 1889. W.M.C.

WOOD, LEONARD, an American soldier; born in Winchester, New Hampshire, October 9, 1860. He entered Harvard Medical School in 1880, graduated third in his class and in 1884 began the practice of medicine in Boston. In January, 1886, he was commissioned surgeon in the United States army. The year before, however, he entered the service in Arizona and soon became distinguished for great bravery, capturing the Apache chief, Geronimo, whom he ran down after a chase of 500 miles. When war was declared against Spain he became colonel of the Rough Riders, whom he led in the gallant charge of Las Guasimas. He was subsequently promoted brigadier-general of volunteers. After Santiago surrendered he was made military commander of the city, and afterward of both city and province. He began the task of cleaning the city, fighting the fever epidemic, and assisting the starving people. On April 13, 1899, he was honorably discharged as major-general of volunteers. On December 5, 1899, he was appointed a brigadier-general of the regular army. In December, 1899, he became governor-general of Cuba. In 1903 he was promoted major-general, from 1903–06, governor of Moro Province, was in 1906 commander of the Philippines Division.

WOOD, THOMAS JOHN, soldier; was born at Munfordville, Ky., on September 25, 1823, and was graduated from West Point in 1845. He was on Taylor's staff in the Mexican War, at Palo Alto, Monterey, and Buena Vista, and in the Civil War was at Shiloh, Perryville, Stone River, Chickamauga, Missionary Ridge, the Atlanta campaign, Franklin, and Nashville. He was raised to the rank of major-general of volunteers and retired 1868. Died Feb. 25, 1906. W.F J.

WOOD, THOMAS WATERMAN, an American artist; born in Montpelier, Vermont, November 12, 1823. He studied art in Boston and then went to Europe where he was a pupil of Hans Gude in Düsseldorf. He settled in New York city in 1866 and became well known as a portrait painter. Later he devoted himself to genre painting. In 1871 he was made a member of the National Academy and was president of the American Water Color Society from 1878 to 1887. He founded the Wood Art Museum in Montpelier His works include *The Recruit; The Veteran*, and *The Contraband*. He died in New York city, April 14, 1903. W.M.C.

WOODBERRY, GEORGE EDWARD, educator; was born at Beverley, Mass., on May 12, 1855, and was graduated from Harvard College in 1877. He has been professor of English in the University of Nebraska in 1877–78 and 1880–82, on the staff of *The Nation* (New York) in 1878–79, professor of comparative literature in Columbia College in 1891–1904, and resident lecturer on English literature at Amherst College since 1904. He has written a number of volumes. W.F.J.

WOODBINE. The name is applied by some to the Virginia creeper, a variety of ampelopsis. See HONEYSUCKLE, Vol. XII, p. 143.

WOODBRIDGE, a township of Middlesex County, New Jersey, having extensive brick and tile yards and fire clay works. Its population in 1900 was 7,631. W.F.J.

WOODBRIDGE, WILLIAM, statesman; was born at Norwich, Conn., on August 20, 1780, was taken to Ohio in 1791, but was educated in Connecticut. He practiced law in Ohio, was elected to the legislature in 1807, and from 1808 to 1814 was prosecuting attorney and state senator. In 1814 he was appointed secretary of the territory of Michigan, in 1819–20 was the first congressional delegate from that territory, in 1828–32 was judge of the superior court, in 1835 was a member of the Constitutional Convention, in 1837 was a state senator, in 1839 was elected governor of Michigan, and in 1841–47 was a U. S. Senator. He died on October 20, 1861. W.F.J.

WOODBURY, Connecticut, a town of Litchfield County, in the central-western part of the state. It lies on the Pomperaug River, includes several agricultural and industrial villages, contains a large academy, and had in 1900 a population of 1,988. W.F.J.

WOODBURY, New Jersey, a city and the county seat of Gloucester County, in the southwestern part of the state adjacent to Camden and Philadelphia. It has glass works, a large patent medicine factory, and much trade in fruit and vegetables. It is also an attractive residence city. Its population in 1900 was 4,087. W.F.J.

WOODBURY, LEVI, jurist; was born at Francestown, N. H., on December 22, 1789, was graduated from Dartmouth College in 1809, studied law at Litchfield, Conn., and began practice in 1812. He was clerk of the New Hampshire senate in 1816, judge of the state supreme court in 1817, governor in 1823, and U. S. Senator in 1825, in which latter office he was called by Benton "the rock of the New England Democracy." He was a member of Jackson's and Van Buren's cabinets for ten years, as Secretary of the Navy in 1831–34 and of the Treasury in 1834–41, and in 1841 returned to the Senate. In 1846 he was made a justice of the U. S. Supreme Court. He died on Sept. 4, 1851. W.F.J.

WOODCHAT. See SHRIKE, Vol. XXI, p. 885.

WOODCHUCK OR GROUND-HOG, a well-known American marmot (*Arctomys monax*), of the

family *Sciuridæ*. It is the most common marmot in North America. The animal has coarse fur, brownish gray above and reddish brown beneath. The skin is of little value, but when tanned makes a very strong leather. The animal lives alone, to which habit the specific name refers. It hibernates during the winter. According to the well-known rural myth, the winter's sleep is supposed to be broken on February 2d, and the ground-hog becomes for the day a prophet of the weather. The animal is so destructive to many cultivated plants that in many states rewards are paid to the hunters who kill them.

WOODBURYTYPE, a photomechanical process of printing, named after Walter Bentley Woodbury, the inventor. This process consists in exposing a film of gelatine and bichromate of potassium under a negative in a strong light. Where the light strikes the film the gelatine becomes insoluble, but is unchanged where protected from the light. This print is then washed with hot water to remove the unchanged gelatine, leaving the insoluble parts in the form of a relief, which after being hardened in a solution of alum is put into a hydraulic press and pressed into a sheet of lead. The mould thus formed is laid flat in a printing press and upon the center is poured a little pool consisting of a warm solution of gelatine colored with any desired pigment. The paper is laid upon the solution and on being pressed, the mixture oozes out in all directions, fills the hollows in the mould and attaches itself to the paper. The proof is then removed from the mould, immersed in an alum solution, dried and the work is done. The modulation of the varying tints in the picture is very fine. A sheet of glass may be substituted for the paper and transparencies of great beauty are obtained. W.R.B.

WOOD-DUCK. See DUCK, Vol. VII, p. 437.

WOOD-ENGRAVING. See ENGRAVING, Vol. VIII, pp. 388–391.

WOODEN VESSELS, in the United States navy. See NAVY, in these Supplements.

WOODFALL, HENRY SAMPSON, an English journalist; born in London, in 1739. In 1760 he succeeded his father, William Woodfall, as editor of the *Public Advertiser*, in which first appeared *The Letters of Junius*. (See JUNIUS, Vol. XIII, p. 784.) In 1797 he was appointed by the King as superintendent and conductor of Stationer's Hall. He died in Bristol, England, December 12, 1805. See also NEWSPAPERS, Vol. XVII, p. 427. W.M.C.

WOODFORD, STEWART LYNDON, lawyer; was born in New York city on September 3, 1835, and was graduated from Columbia College in 1854, and began the practice of law. He was the messenger of the New York Electoral College in 1860, and in 1861–62 was assistant United States district attorney in New York. In 1862–65 he was an officer of the Federal army in the Civil War, rising to be brigadier-general of volunteers. He was lieutenant-governor of New York in 1866–68, Republican candidate for governor in 1870, Presidential elector and president of the Electoral College in 1872, representative in Congress in 1873–75, U. S. district attorney in New York in 1877–83, and U. S. Minister to Spain from March, 1897, until the beginning of the war in 1898. W.F.J.

WOOD-GROUSE. See CAPERCALLY, Vol. V, p. 49.

WOODHOUSELEE. See TYTLER, Vol. XXIII, p. 761.

WOOD-IBIS. See IBIS, Vol. XII, p. 642.

WOODLAND, a city and the county seat of Yolo County, California, in the northwest-central part of the state. It lies in the fertile Sacramento Valley, in the midst of vast vineyards and raisin-making establishments, and has a large trade in grape products, including wine and raisins. It also has woolen and lumber mills, and is the seat of two colleges. It is reached by the Southern Pacific railroad, and had in 1900 a population of 2,886. W.F.J.

WOOD-LOUSE. See CRUSTACEA, Vol. VI, pp. 567, 582.

WOOD-OIL. See BALSAM, Vol. III, p. 253.

WOOD-RAT, the common name for rodents of the genus *Neotoma*. They live in forests, and construct houses by collecting great quantities of brush and leaves into heaps, into which they burrow. The best known, perhaps, is the Florida wood-rat (*N. floridans*). Several other species occur in the Southern and Southwestern states, in Mexico, and in Central America. See MOUSE, Vol. XVII, p. 12.

WOODROW, JAMES, an Anglo-American journalist and educator; born in Carlisle, England, May 30, 1828. He was given a classical education at Jefferson College, the Lawrence Scientific School and at Heidelberg University. He then studied theology and was ordained a minister in the Presbyterian Church in 1860. He edited the *Southern Presbyterian Review* from 1861 to 1865, and after 1865 was editor of the *Southern Presbyterian*. After filling several professorships in various South Carolina and other southern colleges, he became president of South Carolina College in 1891. He published *Geology and Its Assailants* (1862); *An Examination of Certain Recent Assaults on Physical Science* (1873); *A Further Examination* (1874), and many valuable magazine and review articles. He died in 1907. W.M.C.

WOODRUFF, the local name of *Asperula odorata*, a European plant of the madder family (*Rubiaceæ*). It dries with a pleasant fragrance, and is used by European peasants in flavoring various domestic drinks.

WOOD-RUSH. See LUZULA, in these Supplements.

WOODS, HENRY, a British artist; born at Warrington, Lancashire, April 23, 1847; studied in the South Kensington Art School, and engaged in magazine-illustration, especially on the *Graphic*. His first exhibitions at the Royal Academy were *Going Home* and *Haymakers*. He went to Venice, in 1876, and produced a number of pictures of Venetian life; among them, *A Venetian Ferry; A Gondolier's Courtship*, and *Preparing for the Fiesta*.

Among his later pictures are *Bargaining for an Old Master; Cupid's Spell; On the Riva of the Giudecca;* and *Waiting for a Ferry, Venice*, executed in 1894.

WOODS, LEONARD, educator, son of Leonard Woods (q. v.), was born at Newbury, Mass., on November 24, 1807, and was graduated from Union College in 1827 and from Andover Theological Seminary in 1830. He taught at Andover in 1831, edited *The Literary and Theological Review* in New York in 1834–37, and was professor of sacred literature in Bangor Theological Seminary in 1836–39. From 1839–66 he was president of Bowdoin College, and had a distinguished career, being the preceptor of many eminent men and greatly developing the college both intellectually and materially. In 1866 he resigned the presidency and went to Europe for the Maine Historical Society to collect material for a history of that state. He died in Boston on December 24, 1878. W.F.J.

WOODS, LEONARD, theologian, was born at Princeton, Mass., on June 19, 1774, and was graduated from Harvard College in 1796. He taught school, studied divinity, and was ordained into the Congregationalist ministry in 1798, settling as pastor of a church at Newbury, Mass. He was a strong upholder of Calvinistic doctrines against Channing and other Liberals, and was regarded as a champion of orthodoxy. On the foundation of Andover Theological Seminary in 1808 he became its professor of theology and filled that place until 1846. He wrote a history of Andover Theological Seminary. He died at Andover, Mass., on August 24, 1854. W.F.J.

WOODS, WILLIAM BURNHAM, jurist, was born at Newark, Ohio, on August 3, 1824, and was graduated from the Western Reserve College in 1841 and from Yale College in 1845. He was admitted to the Ohio bar in 1849, and through his professional ability and great eloquence rapidly rose to prominence. He was elected mayor of Newark, Ohio, in 1855, and a member of the legislature in 1857–61. In 1862 he became a volunteer officer in the Federal army in the Civil War, serving with distinguished valor and efficiency at Fort Donelson, Shiloh, Chickasaw Bluffs, Arkansas Post, Resaca, Dallas, Atlanta, Jonesboro, Lovejoy Station, Bentonville, and the sieges of Vicksburg and Jackson, and rising to the rank of brevet major-general of volunteers. In 1866 he settled in Alabama and was a Republican leader in "Reconstruction" days. In 1868–70 he was chancellor of that state, and thereafter U. S. Circuit Judge. In 1880 he was appointed an associate justice of the Supreme Court of the United States. He died in Washington, D. C., on May 14, 1887. W.F.J.

WOODSFIELD, a village and the capital of Monroe County, southeastern Ohio, 30 miles S.W. of Bellaire and about 48 miles E.S.E. of Zanesville, on the Bellaire, Zanesville and Cincinnati railroad. It is in a hilly region, devoted to agricultural pursuits and sheep-raising, and has a number of unimportant manufactures. Population 1890, 1,031; 1900, 1,801.

WOOD'S HALFPENCE. See SWIFT, Vol. XXII, p. 804.

WOOD'S HOLE, often but incorrectly spelled WOOD'S HOLL, is a village of Falmouth township, Barnstable County, Massachusetts, in the southeastern part of the state. It lies at the base of the Cape Cod Peninsula, fronting upon Vineyard Sound and Nenomesset Island. It enjoys some popularity as a summer resort, especially for those fond of boating and fishing, but is best known as the site of the great fish-hatching establishment and marine biological school and station, maintained by the fish commission of the United States Government. This establishment is one of the best of its kind in the world. Wood's Hole is reached by the New York, New Haven and Hartford railroad. W.F.J.

WOOD'S METAL. See CADMIUM, Vol. IV, p. 558.

WOOD-SORREL, the common name of species of *Oxalis*, a genus of plants belonging to the geranium family (*Geraniaceæ*). They are herbs with sour and watery juice, leaves of three obcordate leaflets, which droop at nightfall, and regular flowers of various colors.

WOOD-SPIRIT. See METHYL, Vol. XVI, p. 203.

WOOD-SPITE OR WOOD-SPEIGHT. See WOODPECKER, Vol. XXIV, p. 685.

WOODSTOCK, a town of Windham County, extreme northeastern Connecticut, on the Quinebaug River. It is a noted summer resort, and the seat of an excellent academy. It contains the villages of Woodstock, North, South, East and West Woodstock and Woodstock Valley, and is chiefly interested in agriculture and the manufacture of cotton twine. Population 1900, 2,095.

WOODSTOCK, Illinois, a city and the county seat of McHenry County, in the northeastern part of the state. It is in a farming and dairying region, fifty miles northwest of Chicago and tributary to that city, and has some manufacturing establishments. It is the site of a large preparatory school for boys, is reached by the Chicago and Northwestern railroad, and had in 1900 a population of 2,502. W.F.J.

WOODSTOCK, New Brunswick, Canada, is a port of entry and county seat of Carleton County, in the western part of the province. It lies on the St. John River, twelve miles from the Maine boundary line, in an agricultural and lumbering region. Its iron mines have been exhausted, but it has various manufacturing industries, which have an excellent water supply from the St. John River. It is reached by the Canadian Pacific railroad, and has a population (1905) of about 3,000. W.F.J.

WOODSTOCK, a town and port of entry, the capital of Oxford County, southwestern Ontario, Canada, on the Thames River and Cedar Creek, and on the Canadian Pacific and the Grand Trunk railroads, 49 miles W. of Hamilton and 29 miles E.N.E. of London. It is the center of a large

trade, has considerable water-power, and contains mills, piano and organ factories, furniture factories, tanneries, foundries and manufactures of agricultural implements. Woodstock is the seat of Woodstock College (Baptist), and is visited by many tourists during the summer. Population 1891, 8,612; 1901, 8,833.

WOODSTOCK, Vermont, a town and the county seat of Windsor County, in the southeastern part of the state. It lies south of Mount Tom, on the Ottagueachy River, and is reached by the Woodstock railroad from White River Junction, where it connects with the Central Vermont railroad. It is the center of an agricultural region, but has some manufactures. Its population in 1900 was 2,557. W.F.J.

WOODSTOCK, Virginia, a town and the county seat of Shenandoah County, in the northwestern part of the state. It lies in the famous Shenandoah Valley, and suffered much from the ravages of the Civil War, but has now regained its prosperity. It is interested chiefly in agriculture but has some machine shops. It is reached by the Baltimore and Ohio railroad, and had in 1900 a population of 1,069. W.F.J.

WOOD-SWALLOW, the swallow-shrikes of the family *Artamidæ*, a small group of Australian birds, which are shrike-like in form. The best known is the common wood-swallow (*Artamus sordidus*). They are said to cluster on branches, like a swarm of bees. The birds cling to each other, forming a cluster, suspended beneath the supporting branch.

WOOD-TAR. See TAR, Vol. XXIII, p. 62.

WOOD-TIN. See TIN, Vol. XXIII, p. 427.

WOODVILLE, a town of Wilkinson County, southwestern Mississippi, 15 miles E. of the Mississippi River, 24 miles N. of Bayou Sara, Louisiana, and 35 miles S. of Natchez, on the Illinois Central railroad. It is in a cotton, corn and fruit raising district; has a carriage factory, and is the seat of an academy. Population 1890, 950; 1900, 1,043.

WOODVILLE, a town and the capital of Tyler County, eastern Texas, 110 miles N.E. of Houston, on the Southern Pacific railroad. It is the center and trading-point of a region devoted to farming and stock-raising. Population 1900, 550.

WOODWARD, BERNARD BOLINGBROKE, an English librarian and archæologist; born in Norwich, May 2, 1816. He was educated at a private school and at London University. In 1843 he became minister of a Congregational Church at Wortwell, Norfolk, but resigned his office in 1849 and devoted himself to literature in London. He was appointed librarian in ordinary to the Queen at Windsor in 1860. He was the author of *A History of Wales* (1853); *Windsor Castle, Picturesque and Descriptive* (1870), and an admirable *Encyclopedia of Chronology* (1872). He died in London, October 12, 1869. W.M.C.

WOODWARD, HENRY, a British geologist, son of Samuel Woodward; born in Norwich, Nov. 24, 1832; studied at the Royal Agricultural College, Cirencester; was appointed an assistant in the geological department of the British Museum in 1858; in 1860 was a member of the MacAndrew Mediterranean expedition, and again in 1863; became the editor of the *Geological Magazine* in 1864; and in 1880 became keeper of the department of geology in the British Museum. Among his writings are over two hundred papers and monographs, including *Fossil Merostomata*, a *Catalogue of British Fossil Crustacea*, and the article on CRUSTACEA, in this ENCYCLOPÆDIA.

WOODWARD, JOSEPH JANVIER, surgeon, was born in Philadelphia on October 30, 1833, and was graduated from the Philadelphia High School and in 1853 from the Medical Department of the University of Pennsylvania. At the beginning of the Civil War he became an army surgeon, with the Army of the Potomac, and later was chief assistant in the surgeon-general's office at Washington. In the latter place he spent the remainder of his life. He took a prominent part in preparing the great *Medical and Surgical History of the War of the Rebellion*. He was one of the surgeons in attendance on President Garfield when the latter was assassinated, and wore out his own life in serving that patient. He died in Philadelphia on August 17, 1884. W.F.J.

WOODWARD, ROBERT SIMPSON, an American mathematician and astronomer; born in Rochester, Michigan, July 21, 1849. He was educated at the University of Michigan, was employed for several years on the United States Geological Survey as engineer and astronomer, and in 1882 was one of the commissioners to observe the transit of Venus. Since 1893 he has been professor of mechanics in Columbia University. His published works include *On the Free Cooling of a Homogeneous Sphere* (1887); *The Mathematical Theories of the Earth* (1889); *Mechanical Interpretation of the Variations of Latitudes* (1895). W.M.C.

WOOL. See WOOL AND WOOLLEN MANUFACTURES, Vol. XXIV, pp. 687-693; and AGRICULTURE, in these Supplements.

WOOL, JOHN ELLIS, soldier, was born at Newburg, N. Y., on February 20, 1784, and began his military career in the War of 1812, serving at Queenstown Heights, where he was wounded, and at Plattsburg. He was a prominent officer in the Mexican War, being next in command to General Taylor, and was the foremost leader at Buena Vista. For his services in that battle he was brevetted major-general and received swords of honor from Congress and New York state. In 1856 he served against the Indians in the northwest. He saved Fortress Monroe to the Union in 1861 by promptness in re-enforcing it, and did other valuable work in the Civil War, especially in New York, where he commanded the troops in suppressing the "draft riots." He was retired for age in 1863, and died on November 10, 1869. W.F.J.

WOOLEN MANUFACTURES IN THE UNITED STATES. The latest reliable statistical summaries relating to wool are furnished in the following table:

Year ending June 30.	Production.	Imports.	Total wool exported.	Per cent imported.
	Pounds.	Pounds.	Pounds.	Per cent.
1870-----	162,000,000	49,230,199	1,862,945	23.3
1880-----	232,500,000	128,131,747	3,840,071	35.5
1885-----	308,000,000	70,596,170	3,203,345	18.8
1889-----	265,000,000	126,487,929	3,404,670	31.7
1890-----	276,000,000	105,431,285	3,519,509	28.4
1891-----	285,000,000	129,303,648	2,931,045	31.8
1892-----	294,000,000	148,760,652	3,210,019	33.6
1893-----	303,000,000	172,435,838	4,310,495	36.2
1894-----	298,057,384	55,152,585	6,497,654	15.6
1895-----	309,748,000	206,033,906	6,622,190	39.8
1896-----	272,474,708	230,911,473	12,972,217	45.9
1901-----	302,502,328	103,583,505	3,790,067	22.6

The above was prepared by the Bureau of Statistics of the Treasury Department.

The census report for 1900 gives the following statistics of wool manufactured in the United States in 1900: Number of manufacturing establishments, 2,636; capital employed, $415,075,713; miscellaneous expenses, $19,547,200; average number of hands employed, males 99,318, females 106,112, children 15,657, total, 264,021; total amount paid in wages, $92,499,262; cost of materials used, $250,805,214; value of products, $427,905,020.

The total production of wool in the world in 1901 was 2,699,884,704 pounds. There were 41,883,065 sheep in the United States in 1900, with a total estimated value of $122,665,913, or an average of $2.93 per head.

Composition of Wool Products. The necessity of proper food for sheep, in order to insure successful wool-culture, is rapidly becoming practically understood by American wool-growers. It is now well known that wool is as much a product of food as fat or flesh, or milk. The composition is much the same, as will be seen by the following analysis:

Composition of Flesh, Wool, Hair and Skin.

	Flesh.	Wool.	Hair.	Skin.
Carbon, per cent	51.83	50.65	51.53	50.99
Hydrogen, per cent	7.57	7.03	6.69	7.07
Nitrogen, per cent	17.23	17.71	17.94	18.72
Oxygen, per cent	23.37	24.61	23.84	23.32
Total ----------	100.00	100.00	100.00	100.00

So that it is quite as important to feed for wool as to feed for flesh—indeed, it is the same thing—for the wool is nourished by the blood quite as much as the flesh is, and the weight of the wool is equivalent to so much flesh. Consequently, sheep-food that goes to make flesh will make wool, but food that makes fat will not.

But there is a most important matter to consider in regard to the fleece of a sheep, which must not be lost sight of. This is, that healthy wool requires a large quantity of grease and yolk for its preservation. Without this grease and yolk the wool would be harsh and dry and would tangle and fall on the sheep's back and be of no service to the manufacturer. A fleece of a merino, as shorn from the sheep, has a very large quantity of these fatty matters in it, which are lost in the washing, and in some cases these amount to one half or three fourths the weight of the unwashed wool. Necessarily, as the grease and yolk are indispensable for the welfare of the wool for its protection from the weather, one cannot have a good healthy fleece without them, and the feeding must be such as will afford an adequate supply of this large secretion from the skin.

Composition of Yolk in Wool. But there is a difference between the mere grease in the wool and the yolk. The latter is not grease, but a soapy matter which is soluble in water, and which is made up, as other kinds of soap are, of fat combined with alkalies. The composition of this yolk is as follows:

	Per Cent.
Carbonate of potash ----------	86.78
Chloride of potash ----------	6.18
Sulphate of potash ----------	2.83
Other substances ----------	4.21
Total ----------	100.00

The yolk forms nearly twenty-two per cent of the weight of the ordinary clothing wool fleece, while there is from seven to ten per cent of oil in the wool. The yolk, therefore, from its special composition, calls for the attention of the shepherd in regard to the food, which necessarily must contribute the large quantity of potash required by the yolk. In fact, some of the large and most intelligent wool-growers favor as large a product of yolk in the fleece as possible, believing, and reasonably so, that it is an important advantage to the fleece.

Value of Root-Food in Wool-Culture. The most successful American wool-growers affirm that the food for sheep should contain an ample quantity of the potash, and chlorine and sulphur combined with it, for the supply of this part of the fleece. Just here it might be mentioned that turnips contain just these necessary elements of the yolk in large proportion, and thus it is accounted for that sheep fed upon these roots to a sufficient extent thrive much better, and produce better and more wool, than those which are not supplied with them. The ash of turnips contain—

	In the Roots.	In the Leaves.
Potash, per cent ----------	39.3	22.9
Sulphuric acid, per cent ----------	14.3	9.9
Chlorine, per cent ----------	4.1	8.2

No other food-substance contains so large a proportion of these component parts of the yolk, and as the albuminoids of the flesh of the sheep and the ash of the wool contain, also, considerable sulphur, it follows that these roots are really indispensable to the best condition of the sheep, both as regards the growth of flesh and the product and quality of the fleece. Thus the culture of roots, including mangels and beets, which possess the same character as the turnips, in this respect, for the proper feeding of sheep, becomes a subject of much importance to the wool-grower and shepherd.

No doubt, this has been too much neglected by American wool-growers, who rarely grow roots for the feeding of their flocks, laboring under the erroneous idea that it is difficult or impossible to grow roots in our climate. Climate, however, is not the reason for this difficulty. It exists mostly in our prevalent careless culture of the soil in regard to weeds, with which the land is so abundantly stocked as to cause great ex-

pense in working these crops, which will not grow in weedy soil. In its earliest stage, a crop of roots is of very weak growth, and the young plants are easily smothered by the stronger-growing and more abundant weeds. And hence, as the land is not kept under clean cultivation and the weeds reduced in number, there must be a large amount of hand-labor in hoeing the crop. This is the chief reason why roots are not grown for sheep, and one cause of the failure to produce such varieties of wool as are urgently required by the wool manufacturers.

In regard to the best system of feeding sheep for wool, it is unquestionable, for the reasons above stated, that a large portion of the winter and spring feeding of the flocks should consist of some kinds of roots, turnips, beets or mangels. As mangels are most easily grown, and yield more than any other kind of roots, and the field sugar-beets come next to these in regard to these points, these two roots are especially worthy of cultivation by the farmer and the wool-grower. They should form the bulk of the winter and early spring feeding, when dry fodder necessarily makes up the remainder of the subsistence. Next to roots, clover-hay, as containing a large proportion of nitrogen, required for the full growth of the fleece, should form a large part of the food. Pea-straw is quite as valuable as clover-hay, and may be given as an acceptable and agreeable change. For flocks in the South, pea-vines, with the peas, and green fodder crops to be pastured, such as, chiefly, the scarlet annual clover sown in August and turnips sown in September, which may be eaten from the ground in the form of pasture, would form an excellent subsistence.

The most helpful aid to the wool-grower lies in his own hands, and consists in the most skillful feeding of his flock and the production of better and more varied classes of wool, making better fleeces and rearing better sheep, and by the best system of cultivating feeding-crops, to enrich the soil and increase its productiveness.

Labor-Saving Machinery in Woolen Manufactories. Up to July, 1890, the United States Patent-Office reports showed a total of 8,895 patents issued for textile machinery alone. These were divided as follows: Felting and hat-making, 1,231; carding, 1,194; knitting, 1,189; spinning, 1,921; weaving, 2,954; cloth-finishing, 401. A large share of these inventions have been made within the last few years. Referring to the remarkably rapid progress which has been made in the manufactures, S. N. Dexter North says, in an admirable paper in the *Popular Science Monthly* of August, 1891: "Surveying the whole field, we are struck by two features in this evolution, the combination of which includes the sum of the advance. Not less wonderful than the succession of power-machines for the automatic handling of the fiber, in the several stages of its manipulation, is the series of mechanical contrivances for the automatic delivery of the material from machine to machine without the touching of human hand. The ingenuity of man has been constantly directed, in these latter years, to devices for the accomplishment of two purposes: first, to increase production; second, to diminish waste. Both tend to reduce the cost to the consumer, the first by reducing the number of operatives required to make a given amount of product and by increasing the productive capacity of machines otherwise perfect. Perfect as these machines now appear to be in their operation, every one among them is susceptible of improvement, and the patent-offices of every manufacturing nation are burdened with the plans and specifications of new devices. Most of these inventions come to naught; many of them are constantly introduced into the mills. Some few of these advances, not previously spoken of, may be enumerated here. Self-feeders on the first breaker and finisher have been applied to card-machines, dispensing with half the help formerly necessary in the card-room. Self-operating mules have been introduced in clothing-mills, effecting a saving of from 20 to 40 per cent in the cost of spinning. Improved winders, driers and cloth-presses give greatly increased rapidity to the processes of finishing. In weaving flannels, a width of 3 yards at once, 75 or 80 picks a minute are woven as economically and as excellently as 40 or 50 picks were 30 years go. In making cassimeres, the broad loom has been generally substituted for the narrow loom almost universally employed as recently as 1860. Fifty-six yards of Brussels carpet can now be woven in a day by one girl, in the improved looms, where 14 yards a day was a good product in 1860, with the same help. Similar illustrations might be multiplied almost infinitely. While there has been no new departure or novel idea of transforming effect in the wool-manufacture, the general advance in mechanical efficiency, during the last quarter-century, has been so great as to equal an economical gain in manufacture, equivalent to that which took place when power was first substituted for hand-labor. In our great yarn-mills there is constant progress in the direction of an increased product, of a finer quality, from the same machinery.

"This paper may properly conclude with some indication of the nature of the world's gain from the evolution of the wool-manufacture. It is difficult to obtain a proper standard for such comparison. Statistics, even were they attainable, present the contrast very inadequately. The total gain secured over hand-labor can hardly be estimated at an absolute value, for the present efficiency cannot be obtained. In the principal operations of the manufacture the increase has been about as follows: In olden times a woman could card one pound of wool a day by hand. At present one operative, with the proper machinery in hand, can card 150 pounds a day. Hence the improvement is about 125. On a spinning-wheel a woman could produce daily two skeins. An average "mule" to-day spins about 500 pounds; hence the improvement is about 500 times. On a hand-loom it took a day to weave two to three

yards. Power-looms produce from 35 to 50 yards a day, or an improvement of 17. Hence, disregarding all other factors but these, and placing a modest estimate, it is possible to produce over 700 times more goods to-day than in the olden time, with the same number of hands, disregarding the quality, design, etc.

"The individual capacity of the operative, thus enormously increased by machinery, has been accompanied by an increase in the total number of persons solely occupied in the manufacture of wool. The number who were thus employed in the period of household industry cannot, of course, be estimated. But a vastly larger number of persons now depend directly and solely for their livelihood upon employment in woolen factories than was ever the case before the introduction of power-machinery and the factory system, and they are able to earn quite double the wages of the hand-operative of olden times. It follows that the increase in the production of woolen goods to-day is very much greater than would be indicated by the fact that the labor of one operative is now equivalent to that of one hundred operatives one hundred and fifty years ago. This deduction is borne out by the extraordinary increase in the world's wool-clip. It is safe to put the annual product of wool at two billion pounds, in the greasy state. Of this amount nearly one half comes from three countries—Australia, South America and South Africa—whose wool-clip is a development subsequent to, and undoubtedly caused by, the substitution of machine for hand manufacture. The clip of the United States has increased from a few hundred thousand pounds, at the time of the Revolution, to over three hundred million pounds, and the product of the Continental countries has also increased very greatly in the interval.

"To fully realize the quantity of raw material now consumed in what is commonly known as woolen goods, we must estimate the quantity of waste and substitutes utilized as equal to that of wool, and thus we have four billion pounds of raw material passing annually through the looms of the world. Hand-manufacture knew no such thing as a substitute for wool. The raw material has only been kept abreast of the manufacturing capacity by the discovery of methods for the utilization of these substitutes.

"Something of what the world has gained in quantity has been lost in quality at certain points. It cannot be pretended that the utilization of wastes and substitutes does not involve a certain element of deterioration. Nevertheless, it is a distinct gain to the world, as is every new development that reduces the waste in any branch of industry. Within a few years a machine has been invented, known as the Garrett machine, which enables manufacturers to comb out all their waste, whether from cards, mules, spinning-frames, or from whatever source tangled and twisted fibers are produced in the various processes of manufacture, and to so restore it that it may be again utilized in connection with the original fiber. The saving thus effected is enormous. The machine, as the illustration shows, is, in principle, the same as the carding-engine. Its strong, sharp-pointed steel teeth gradually untwist and teazel out the kink in yarn or thread, restoring the fibers of wool in nearly their original length of staple.

"The fiber of wool has a wonderful capacity of endurance. Once used, it may be, and is, used again and again, reproduced, not with all its original virtues, but still with many serviceable qualities, and called, according to its form, shoddy, mungo, waste, wool-extract. The French, by a happy conceit, call this material *renaissance;* and it is literally wool born again. By chemical processes the wool in mixed goods is separated from the cotton or other fibers employed for its adulteration, and wonderful machines tear it apart, readjust its fibers and prepare it again for the spindles. Thus it goes into new garments, of a cheap grade to be sure, but if properly prepared, of a serviceable quality. It is customary to speak contemptuously of shoddy and of those engaged in its manufacture and use. But those who do so do not understand how important is the part now played by this preparation in the cheapening of the people's clothing and in the well-dressed appearance of the community."

WOOLLEY, Celia Parker, an American authoress; born in Toledo, Ohio, in 1848. She removed with her parents to Coldwater, Michigan, and graduated from the seminary in that city in 1866. She began her literary career with periodical contributions to Eastern journals; in 1884 published a short story in *Lippincott's* and later on several longer ones in the same magazine; in 1887 appeared her first novel, *Love and Theology* (later changed to *Rachel Armstrong*); in 1889, *A Girl Graduate; Roger Hunt* (1892). She married J. H. Woolley in 1868; and resided in Chicago, and in Geneva, Illinois.

WOOLMAN, John, minister and author, was born at Northampton, Burlington County, N. J., in August, 1720, and was a member of the Society of Friends. He began his ministry in 1742 at Mount Holly, teaching poor children and speaking at Friends' meetings. Four years later he set out on a missionary tour in the backwoods settlements of Virginia, and thereafter spent most of his life in such work, travelling widely through the Eastern and Middle and some of the Southern States. He preached among the Indians of Pennsylvania, also, with much effect. In 1772 he went to England to attend some of the general meetings of the Friends, and died there, of small-pox, on October 7 of that year. He was the author of several works, one of them being directed against human slavery, and of a most instructive *Journal*. W.F.J.

WOOLNER, Thomas, an English sculptor; born in Hadleigh, Suffolk, Dec. 17, 1825. He was educated at Ipswich, and then studied in the studio of Wm. Behnes. He exhibited his first notable life-size group, *The Death of Boadicea*, in 1844. In 1850 he joined the "Pre-Raphaelite Brotherhood," and contributed to their journal,

The Germ, a series of poems, which have since been collected into a volume bearing the title, *My Beautiful Lady* (1863). Besides his well-known statues of Carlyle, Tennyson, Gladstone, and others, his more celebrated works are *Elaine with the Shield of Sir Lancelot; In Memoriam*, and *Silenus* (1884), and *Tiresias* (1886). He died in London, October 7, 1892. W.M.C.

WOOLSEY. THEODORE DWIGHT, educator, was born in New York City on October 31, 1801,

T. D. WOOLSEY.

was graduated from Yale College in 1820, and for two years was a tutor there. In 1827–30 he studied at Bonn, Leipzig and Berlin, and then in 1831 became professor of Greek at Yale. While filling that chair he published admirable editions of the *Alcestis* of Euripides, the *Antigone* and *Electra* of Sophocles, the *Prometheus* of Æschylus, and the *Gorgias* of Plato. He also wrote much for periodical literature. In October, 1846, he became president of Yale. His administration of affairs was marked with great prosperity, the university being much enlarged materially and in point of scholarship. Indeed it was then that Yale was transformed from a small college into a great university. He retired from the presidency in 1871, and for ten years thereafter was chairman of the American committee on the revision of the Bible. He wrote an *Introduction to the Study of International Law* (1860), which ranks among the best works on that subject, and also *Communism and Socialism* (1880), *Political Science* (1877) and various other works. He died at New Haven on July 1, 1889. W.F.J.

WOOLSEY, SARAH CHAUNCEY ("SUSAN COOLIDGE"), an American author; born in Cleveland, Ohio, in 1845. Her best known books, appearing under the pseudonym of "Susan Coolidge," are *The New Year's Bargain* (1871); *What Katy Did* (1872); *A Round Dozen* (1883); *A Little Country Girl* (1885). Her other works include *Verses* (1880); *A Short History of Philadelphia* (1887), and the *Diary and Letters of Frances Burney* (1880). Died in 1905. W.M.C.

WOOLSEY, THEODORE SALISBURY, an American educator; son of Theodore Dwight Woolsey (q. v.); born in New Haven, Connecticut, October 22, 1852. He was graduated from Yale College in 1872; from the Yale Law School in 1876, and in 1878 became professor of international law at Yale. He has written *America's Foreign Policy* (1872); and has edited Pomeroy's *International Law* (1886) and Woolsey's *International Law* (1891). W.M.C.

WOOLSON, CONSTANCE FENIMORE, authoress, was born at Claremont, N. H., on March 5, 1848, a grand-niece of James Fenimore Cooper. She was educated at schools in Cleveland, Ohio, and New York City, and after the death of her father in 1869 began writing, making her home chiefly in Florida. After the death of her mother, in 1879, she went to Europe and spent the remainder of her life there, in England and Italy. Her chief writings were *Castle Nowhere* (1875), *Rodman the Keeper* (1880), *Anne* (1882), *For the Major* (1883), *East Angels* (1886), *Jupiter Lights* (1889), and *Horace Chase* (1894). She died on January 24, 1894. W.F.J.

WOONSOCKET, an important manufacturing city of Providence County, Rhode Island. It is on the New York, New Haven and Hartford railroad, and has rubber and cotton factories and other industries. Its population in 1900 was 28,204. See in Vol. XXIV, p. 700. W.F.J.

WOOSTER, a city and the capital of Wayne County, northeastern central Ohio, on the Baltimore and Ohio and Pennsylvania railroads, 25 miles W. of Massillon. It is contiguous to productive mines of bituminous coal and quarries of limestone. Among the lines of industry carried on in the city are manufactures of engines and machinery, plows, reapers and mowers, paints and varnish, harness and saddles, tiles, furniture, lumber, sashes, doors and blinds. The city contains, in addition, 6 weekly papers, 2 monthly periodicals, 14 churches, a courthouse, high and graded schools; also the Wooster University (a co-educational institution founded in 1870, under Presbyterian auspices, and having in 1904 a faculty of 29, with 550 students, and a library of 28,680 volumes). The city is illuminated by gas and electric light. Population 1900, 6,032.

WOOSTER, DAVID, soldier, was born at Stratford, Conn., on March 2, 1710, and was graduated from Yale College in 1732. He was engaged in 1733 as captain of a coast defence vessel in the war with Spain, and later, as a captain of Connecticut troops, greatly distinguished himself at the conquest of Louisburg. After the latter event he went to England and was received with much favor by the King, who made him a captain in the regular British army. In the French and Indian War he led Connecticut troops and became a brigadier-general. After the war he was collector of customs at New Haven until the Revolution. Then, despite his age, he gave up his office and his pay in the British army for the sake of patriotism. He organized the Ticonderoga expedition in 1775, and was one of the eight brigadier-generals appointed by Congress in 1776. He was mortally wounded in the battle of Danbury, and died there on May 2, 1777. W.F.J.

WORCESTER, a city and the capital of Worcester County, central Massachusetts, on the Blackstone River, 44 miles from Boston, and on the Boston and Albany, the Boston and Maine, the Fitchburg, the New York, New Haven and Hartford, and the Worcester and Shrewsbury railroads. The city contains, besides excellent public schools, the State Normal School, two state lunatic asylums, a military institute, high school, Jesuit college, Baptist academy, a large women's school, an

industrial school, Clark University (q.v., in these Supplements) and Worcester Polytechnic Institute (q.v.). Its churches include many handsome buildings, and from the porch of the Old South Church the Declaration of Independence was first read in Massachusetts. It has a public library containing one hundred thousand volumes, and other libraries having a total of over three hundred thousand volumes; has a flourishing trade, but it is more notable for its many manufactures. Of these, the chief are boots and shoes, foundry products and woolens. Its wire-mills are the largest in the world. The total value of all products, in 1900, was over fifty-three million dollars. Population 1890, 84,655; 1900, 118,421. See also WORCESTER, Vol. XXIV, p. 703,

WORCESTER, (EDWARD SOMERSET) MARQUIS OF, an English engineer, mathematician and inventor; born at Raglan Castle, about 1601. He was the second of his family bearing the title of Marquis of Worcester. He early devoted himself to mechanical study, became well known as an engineer, and made numerous researches and experiments. He was given the title of Lord Herbert, and in 1644 was created Earl of Glamorgan. In the same year he entered the military service under Charles I, and in 1645 was sent to Ireland on a secret mission. There he was taken prisoner and suffered exile and imprisonment. In 1648 he was residing in France. In 1652 he returned to England, was at once arrested and was imprisoned in the Tower for three years. While in prison he wrote a work which gave him more or less reputation. This was called *A Century of Inventions*, which was first published in 1663. Various editions have since been issued. In this work he describes all manner of mechanical appliances, and gave a description of the uses and effects of the steam-engine. (See STEAM-ENGINE, Vol. XXII, p. 491.) He also wrote at length on perpetual motion. (See PERPETUAL MOTION, Vol. XVIII, p. 565.) Several biographies of Worcester have been published, the latest one appearing in 1865. This work edited by Dircks contained many of Worcester's best writings. He died in London, April 3, 1667. W.M.C.

WORCESTER, JOSEPH EMERSON, lexicographer, was born at Bedford, N. H., on August 24, 1784. He was educated at Hollis, at Phillips Academy, Andover, Mass., at Salisbury, N. H., and graduated from Yale College in 1811. He afterwards taught school in Salem, where, in his spare time, he compiled his *Geographical Dictionary or Universal Gazetteer*, 2 vols., published in 1817. The compilation of text-books and works of reference then became his lifework, and for this purpose in 1830–31 he spent a year in Europe in philological studies. *A Dictionary of the English Language* published at Boston in 1860, is the chief of a long list of works which besides several dictionaries include *Epitome of Geography*, 1820; *Sketches of the Earth and its Inhabitants*, 2 vols., 1823; *Epitome of History*, 1827; *Outlines of Scripture Geography*, 1826–28, etc. Brown University conferred upon him the degree of LL. D., and he was a member of numerous learned societies. He died October 27, 1865. C.L.S.

WORCESTER POLYTECHNIC INSTITUTE, a school of learning located at Worcester, Mass. Founded by John Boynton in 1865, the institution was chartered by the legislature of Massachusetts, May 10, 1865, and it was opened for the reception of students, Nov. 12, 1868. The school offers courses of study in mechanical, civil, and electrical engineering, and chemistry. It is adapted for those who desire to become teachers of mathematics, the physical sciences, designing, etc. Several large and well equipped buildings are connected with the institution, viz., the Salisbury laboratories of physics, chemistry and electrical engineering; the Washburn shops; the engineering laboratory, the power laboratory, and the foundry. Boynton Hall, erected by the citizens of Worcester, contains the administration offices of the institution and here also is given instruction in various branches. The library of general reference is in this building, and the department libraries are distributed in the other buildings. Through the liberality of the directors of the Free Public Library, which contains 150,000 volumes, the students share its advantages. The library of the American Antiquarian Society, of 115,000 volumes, and the library of the Mechanics' Association are also accessible to the students making special researches. There is a special fund of $10,000, the interest of which is divided annually among the best six scholars in the graduating class, in the proportion of not more than $75 each. For 1907 the faculty had 45 instructors and 465 students. The degrees conferred are: M.S., M.E., E.E., C.E., Ch.E., and D.S. R.C.A.

WORDE, WYNKYN DE, a Flemish printer; born in Lorraine, in 1453. He went to England and was a pupil of William Caxton (See CAXTON, Vol. V, p. 243.) In 1491 he succeeded to the business at Westminster of his deceased master, but he did not append his name to his books until 1493. From about 1502 onward he worked in Fleet street, London, at the sign of the Sun. He used on his books many varieties of Caxton's "mark," and as many as 14 variant forms of his own name. Wynkyn de Worde made great improvements in the art of printing, and especially in that of type cutting. It is said he introduced Roman letters in England. The books printed by him were 408 in number. (See also TYPOGRAPHY, Vol. XXII, p. 739, and GESTA ROMANORUM, Vol. X, p. 496.) W.M.C.

WORDEN, JOHN LORIMER, an American naval officer; born in Mt. Pleasant, Westchester County, N. Y., March 12, 1818. He was appointed midshipman in the United States navy in 1834 and in 1840 was advanced to lieutenant. After a long sea service he was on duty at Washington, D. C., and during the Mexican War he was attached to the Pacific squadron. From 1854 to 1856 he was on duty at the Brooklyn navy yard. In 1861 he was sent with despatches from the secretary of the navy to Captain Adams of the frigate *Sabine* at Pensacola. Expecting an outbreak of hostilities, he committed his despatches to memory and destroyed them. At Pensacola

he was arrested by the Confederate authorities, but released by order of General Bragg and allowed to go on board the *Sabine*. On his return he was again arrested by order of General Bragg and kept a prisoner for several months, when he was released on parole and later was sent to Norfolk and exchanged. In 1862 he was placed in command of the *Monitor*, which met the Confederate *Merrimac* in battle in Hampton Roads, March 9. He commanded the *Monitor* with great skill, in an action which must be ranked among the most decisive naval engagements of the Civil War. He received a vote of thanks from Congress, and was promoted to be commander. He was afterward engaged in the blockade, destroyed the privateer *Nashville*, and took part in the attack on the Charleston forts in 1863. From 1870 to 1874 he was superintendent of the Naval Academy. He became commodore in 1868, a rear-admiral in 1872, and was retired in 1886. He died in Washington, D. C., Oct. 18, 1897. W.M.C.

WORD-FORMATION. See SANSKRIT, Vol. XXI, pp. 284, 285; PHILOLOGY, Vol. XVIII, pp. 783–785.

WORDSWORTH, CHRISTOPHER, an English clergyman, brother of William Wordsworth, the poet; born at Cockermouth, June 9, 1774. After becoming a fellow of Trinity College, Cambridge, he entered into orders, was appointed domestic chaplain to the archbishop of Canterbury, subsequently being preferred to a rectory in Norfolk, and the deanery of Bocking, in Essex. His principal works were *Ecclesiastical Biography, or the Lives of Eminent Men Connected with the History of Religion in England* and *Who Wrote Eikon Basilike?* In 1820 he was nominated master of Trinity College, Cambridge, in which office he was succeeded by Dr. Whewell in 1841. He died in Essex, England, February 2, 1846. W.M.C.

WORDSWORTH, CHRISTOPHER, an English prelate; born at Bocking, Essex, October 30, 1807. He was educated at Winchester College and at Trinity College, Cambridge, where he became a fellow and in 1836, having taken orders in the meantime, he became public orator at Cambridge. In the same year he became headmaster of Harrow. He soon began to acquire fame as an author by his descriptive works on Greece; *Athens* and *Attica* appeared in 1836; *Greece, Pictorial, Descriptive and Historical*, in 1842. In 1844 he was nominated canon of Westminster. He was now of celebrity as a leader of the Moderate High Church party, and his *Theophilus Anglicanus* (1843) is a well-known manual of Anglican theology. His *Sermons Preached in Westminster Abbey* have gone through many editions. He became archdeacon in 1865 and was appointed Bishop of Lincoln in 1869. He died in Lincoln, March 20, 1885. W.M.C.

WORDSWORTH, JOHN, an English prelate; born at Harrow, September 21, 1843. In 1865 he was graduated from Oxford, became canon of Rochester in 1883, and was made bishop of Salisbury in 1885. His works include *Church History; The Educational Question*, and *The Old Catholic Monument*. W.M.C.

WORK. See LABOUR, Vol. XIV, pp. 166–175; DYNAMICS, Vol. VII, p. 504 (mechanical); and STEAM-ENGINE, Vol. XXII, pp. 509–510; (relation to heat).

WORKHOUSE. See POOR-LAWS, Vol. XIX, pp. 490, 491.

WORKING-GIRLS' SOCIETIES. See CLUBS, WOMEN'S, in these Supplements.

WORKINGHAM OR OAKINGHAM, a small market town of England, seven miles S.E. of Reading, at the junction of the Reading and Staines and the Reading and Guildford railways. Shoes are here made, and gauze and silks woven. In the original Rose Inn, Gay, Swift, Pope and Arbuthnot, being detained here by wet weather, composed among them the old song of *Molly Mog*. The ancient amusement of bull-baiting was continued here until recent years. Population, 3,000.

WORLD, THE. See *Earth*, under ASTRONOMY, Vol. II, pp. 669–671, 692–696; and *Earth*, under GEOLOGY, Vol. X, pp. 191–202, 329–333.

WORLD'S CONGRESSES OF THE WORLD'S COLUMBIAN EXPOSITION. The World's Congresses of 1893 were first publicly proposed Sept. 20, 1889, by Charles C. Bonney. The idea was received with approval at once; and on Oct. 15, 1889, Mr. Bonney was made chairman of an executive committee to carry it into effect. A year's systematic work was carried on after that, and on Oct. 30, 1890, the World's Congress Auxiliary of the World's Columbian Exposition was formed, with Mr. Bonney as president and general director. Mr. Bonney was born in Hamilton, New York, Sept. 4, 1831; was educated at Hamilton Academy and Madison (now Colgate) University, from which he afterward received the degree of LL.D. He taught school, studying law meanwhile for several years, and after removing to Peoria, Illinois, which he did in 1850, he was vice-president of a state teacher's institute, and took a leading part in establishing the present educational system of Illinois. He was admitted to the Illinois bar in 1852, and to that of the United States supreme court in 1866; was president of the Illinois State Bar Association, and vice-president of the American Bar Association in 1882.

The first congress was opened May 15, 1893, and the last session of the series was held October 28th. Its sessions were held in a permanent memorial building, now known as the Art Institute, a dark-gray classical structure of 319 feet frontage, on the lake shore, at the foot of Adams Street. The following account is compiled from official reports:

As finally organized, the World's Congress Auxiliary consisted of 2,170 members, divided into 214 local committees of organization. Mixed committees of men and women were not appointed, but in all cases suitable for the participation of women, a committee of women was appointed to act in co-operation with the committee of men. These committees of women constituted what was called the Woman's Branch of the World's Congress Auxil-

iary. The general officers of the Auxiliary were a president, vice-president, secretary and treasurer; and the Woman's Branch had also its own president and vice-president.

To these local committees of organization were adjoined what were called advisory councils, which consisted of eminent persons selected from the various participating countries to advise and assist the committees of organization in selecting writers and speakers for the different congresses, and in perfecting the plans for them. The aggregate membership of these advisory councils was 14,528. The chairman of each committee of organization was the director of the congress committed to its charge, and the president of the Auxiliary was the general director of the whole series of the congresses.

As finally settled, the World's Congress work was divided into 20 departments and 224 general divisions, in which congresses were held. These, in their chronological order, were as follows:

1. Woman's progress, 25 divisions; 2. Public press, 6 divisions; 3. Medicine and surgery, 6; 4. Temperance, 12; 5. Moral and social reform, 15; 6. Commerce and finance, 10; 7. Music, 9; 8. Literature, 9; 9 Education, first series, 17; second series, 16; 10. Engineering, 9; 11. Art, 5; 12. Government, 7; 13. General department, 1, besides 4 held out of their regular order and here transferred to their proper places; 14. Science and philosophy, 13; 15. Social and economic science, 4; 16. Labor, 1; 17. Religion, 46 (of which the marvelous Parliament of Religions was the chief); 18. Sunday rest, 1; 19. Public health, 1; 20. Agriculture, 11.

The programmes also show 125 sections, of which 29 were of the nature of the general divisions.

These congresses held 1,283 sessions, aggregating 753 days. The printed programmes show 5,978 addresses delivered or papers read, including 5,454 formal contributions, 131 addresses of welcome, 176 addresses of response and 217 agricultural reports. But these are much less than the actual number, for many papers and addresses were admitted after the programmes were printed, and were inserted in the corrected programmes used by the presiding officers.

A carefully prepared alphabetical index shows 5,822 speakers and writers whose names appear on the printed programmes, including 368 cases in which the name of the paper to be read or subject discussed is not given. These participants in the congresses represented all the continents in the world, and 97 nations, states, provinces, territories and colonies, besides fifty states and territories of the American Union, making a total of 147 actually represented.

The managers set forth the aims of this organization to be—

"To establish fraternal relations among the leaders of mankind; to review the progress already achieved; to state the living problems now awaiting solution; to suggest the means of further progress; to bring all the departments of human progress into harmonious relations with each other in the Exposition of 1893; to crown the whole work by the formation and adoption of better and more comprehensive plans than have hitherto been made; to promote the progress, prosperity, unity, peace and happiness of the world, and to secure the effectual prosecution of such plans by the organization of a series of world-wide fraternities, through whose efforts and influence the moral and intellectual forces of mankind may be made dominant throughout the world."

WORLD'S FAIRS. Industrial fairs of great magnitude and interest have been held at frequent dates for many years. For a list of national and international exhibitions held previous to 1880 with descriptions of the more important ones, see EXHIBITIONS, Vol. VIII, pp. 702–704.

During the decade following the Paris Exhibition of 1878, the chief industrial displays were the following: Sydney and Berlin (1879); Melbourne (1880); Berlin, Moscow and Buenos Ayres (1882); Louisville (Kentucky), Caracas and Amsterdam (1883); Calcutta and New Orleans (1884); Antwerp (1885); Edinburgh and Liverpool (1886); Manchester, England (1887); Melbourne Centennial, Glasgow and Brussels (1888).

There have been held, also, numerous special exhibits engaging considerable attention on the part of the public. The following were held in London: An Electrical Exhibition (1882); an International Fisheries Exhibition (1883); a Health Exhibition (1884); an Inventions Exhibition (1885); a Colonial Exhibition (1886); an American Exhibition (1887); the Italian, Irish and Anglo-Danish exhibitions (1888); and a Spanish Exhibition (1889). In Paris there were held, in 1881, an Electrical Exhibition and Congress; in 1884–85, an "Exhibition of Manufactures and Processes."

I. FOURTH PARIS INTERNATIONAL, 1889. May 9, 1889, the "Paris Universal Exposition" was opened in the Champs de Mars. It occupied an area of 173 acres, and in magnitude and comprehensiveness excelled all its predecessors. One of the principal attractions was the Eiffel Tower (see EIFFEL, GUSTAVE, in these Supplements). On the opening-day there were present, exclusive of official sight-seers and invited guests, 112,294 persons. During the first week the paying visitors numbered 350,000.

During the year 1889 there were also held industrial and largely attended exhibitions as follows: "Exhibition of Arts and Industries," at Hamburg; the "Accident Prevention Exhibition," at Berlin; and the "Goldsmith's Exhibition," at Vienna.

II. THE WORLD'S COLUMBIAN EXPOSITION, CHICAGO, 1892–93, a great international universal exposition, held in Chicago during the summer of 1893. The act of Congress which definitely selected Chicago was approved by President Harrison, April 25, 1890. In accordance with its provisions, the task of raising the required $5,000,000 was accomplished. Pending the action of Congress, citizens of Chicago had formed the Exposition Company and invited subscriptions at $10 per share. The responses were quick and generous, and 29,374 shareholders subscribed $5,467,350. The legislature of the state authorized the city of Chicago to bond itself for $5,000,000 in aid of the Fair, the bonds to be available as soon as $3,000,000 of the capital stock had been paid in.

The organization and management of the Exposition were embraced in.

The *World's Columbian Commission*, created by act of Congress. It was composed of two commissioners from each state and territory and the District of Columbia (besides alternates), nominated by the governors and appointed by the President. This commission named a Board of Reference and Control to act in conjunction with it, the joint actions of both being final.

The *World's Columbian Exposition* (Corporation), vested in a board of 45 directors (citizens of Chicago), elected annually from the stock-

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